

Optimum Plan to Improve the Economic Relation between China and Arab World

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Abstract

Over the past few years China's economic growing has attracted significant research attention clout globally. Economic relation between China and Arab world (ERCA) has always been the most important of its relationships with other countries. It is based on trust, respect, and mutual benefit. This relation was developed very fast and doubled the export and import business in the last decade. It is possible to improve this relation for both sides by following scientific plans. Therefore, it is of great importance to study this relation by using the model proposed in this study (Multi-Objectives Model (MOM)), which can cover many aspects in this relation and get the optimum results which represent the best plans. Accordingly, optimum consequences for economic improvement will be doubled.

Keywords: Multi-objectives model, Arab-Chinese relations, Economic relation, China export and import, Chinese statistic export

1. Introduction

1.1 *The relation between China and Arab world*

China's role in the Arab World was limited to providing political, military and economic support to aid in facing external threats (Mohamed bin Huwaidin, 2008). Some components of the economic relation between the two countries are bilateral trade, mutual investments (direct/portfolio or both), joint ventures and aids/loans provided to each other. Taking into account these variables, contemporary (ERCA) appears quite developed (Atul Kumar, 2006). The 1955 Bandung Conference was a critical turning point in Arab-Chinese relations, and the beginning of Arab interest in China, with the Arab countries rushing to establish diplomatic relations with Beijing. Arab interest in China, at this time, revolved around China as a source of political support for themselves and for their national liberation movements. In this context, the Palestinians and Algerians obtained Chinese political and military backing in their struggles against imperial powers, and the Egyptians garnered Chinese political support during the 1956 Suez Crisis (Mohamed bin Huwaidin, 2008).

Later on, following that conference some Arab countries (Sudan, Egypt, Syria, Iraq, Morocco and Saudi Arabia) sent cultural and ecumenical delegations to china, then Egypt, Syria and Yemen to confess the republic China popularity that was a good starting point between China and Arab world.

For the last 60 years, China contributed in the development in all aspects such as the political, human resources, economic, education, production and constructional, where the Arab world make use of police and economic support, and in the same time import the oil from Arab countries.

China and Arab world are covering sixth of the world land, and the total of their population are representing quarter of the world population. Therefore, cooperation between both sides can contribute in peace and development in the world.

In addition, the Chinese policy in United Nations UN contributed in economy improvement in China relation with Arab countries, as China always supported Arab issues discussed in UN.

However, the future of these relations needs to get closer to each other, to be able to meet the necessities of the economic situations and the complex international political (Mohamed bin Huwaidin, 2008).

Much has been said about China's successful Middle East diplomacy. Beijing offers prospective partners many tangible benefits. In return for investment and development aid, China's profile in the region has grown

significantly in recent years, most notably in countries such as Egypt, Saudi Arabia and others firmly entrenched in long-standing political, military, and economic.

1.2 The economic relation

China is expected to account for 43 % of the increase in world oil consumption, and Arab states are slated to account for 60 % of the increase in world oil production. Thus, the Chinese-Arab relationship will be critical to China in sustaining its current level of economic growth.

China is also eager to gain access to untapped consumer markets for its exports and lucrative investment opportunities. The 2006 China-Arab Cooperation Forum included a commitment to expand and diversify trade volumes between China and the Arab countries to over \$100 billion within the next five years, up from the current Figure of just over \$50 billion—approximately 40 percent of which is oil-related. Furthermore, then-Chinese Foreign Minister Li Xiaoxing and Arab League Secretary-General Amr Moussa pledged to forge closer contacts in counterterrorism and security cooperation, technology and aid transfers, and cultural exchanges, expanding the dimensions of Chinese-Arab cooperation beyond energy and business (Chris Zambelis & Brandon Gentry, 2008).

An overlap in Chinese-Arab interests in the military domain distinguishes the second stage of Arab-Chinese relations. At this time, Arab states were looking to obtain weapons to bolster their defensive capabilities against new threats, while China wanted to expand its export market as a source of revenue for its military and civilian modernization programs. Throughout the Arab world these years saw escalating conflict and Arab countries were pushed to build up their arsenals, especially after the Soviet invasion of Afghanistan and the Islamic Revolution in Iran in 1979, and the breakout of the Iraq-Iran war one year after. On the Chinese front, Deng Xiaoping's rise to power and reform program to modernize China meant a drive to market China's military capabilities, both as part of a broader modernization effort and as a way to provide the necessary resources to finance China's modernization efforts on other levels (Mohamed bin Huwaidin, 2008).

The burgeoning Chinese-Arab relationship is poised to develop and expand in the twenty-first century, providing tremendous benefits on many levels to all parties involved. More robust Chinese inroads into the Middle East are being encouraged by both state actors and local public opinion, thus facilitating stronger ties across social, political, economic, and cultural sectors. Although the United States is certain to retain its preeminent position in the region in the foreseeable future, Arabs are increasingly optimistic regarding the rise of China. Beijing will continue to harness this momentum to enhance its position in the Middle East and will be able to count on many willing partners eager for an alternative to the United States.

1.3 Importance of Economic Relations

The emergence of China as a global economic power has spawned a gamut of differing analyses on the causes and implications of this phenomenon [7]. The trade amount between China and Arab world was in the past year to 107.4 U.S. \$ billion, while the value reached in the first half of this year to 69.1 U.S billion dollars, the Arab world to become an important trade partner of China. To promote and develop bilateral trade must follow the scientific methods of mathematical knowledge of the value of exports and imports in the future to achieve a specific program in trading process. Oriented programming and plan greatly helps in achieving realistic results to find out the exchange rate for future trade statistics, for good achievement and development (Liangxiang Jin, 2005).

China imports from Arab countries includes; crude oil; chemical raw material; chemical fertilizers; oil, etc. In 2001, China imported 24.28 million tons of crude oil from Arab countries or 47% of China's oil imports valued at 4.5 billion U.S. dollars, or 72% of the total value of China's imports from Arab countries. The relations witnessed increasing cooperation in such fields as politics, trade, culture and trade and reached almost 110 billion U.S. dollars in 2009, a level higher than one hundred times than they were thirty years ago.

1.4 Development of the economic relation

To develop the economic relation between China and Arab world, where both has ability to improve it, China-Arab countries economical relation is to certify the growth of exports of Chinese goods to the markets of the region steadily down, until it reached today's size to about \$ 35 billion include all varieties of forms and types of products and goods [10]. After the nineties of the twentieth century, the trade between the China and Arab world entered the phase of swift growth. In 1991, the total amount of trade exchange between the parties 42.2 billion U.S. dollars, and then rose to 61.4 billion U.S. dollars in 2001, including 1.7 billion U.S. dollars in Chinese exports to Arab world as opposed to 5.7 billion U.S. \$ exports from Arab world to China. Then bounded amount of trade exchange between the two sides to 5.13 billion U.S. dollars in the first nine months of 2002

(Willem Van Kemenade. 2009). Both sides signed 190 projects during 2010 Exhibition for Investment Trade and Economic Forum which was the first trade exhibition between China and Arab world. The total included eight framework agreements for cooperation and 182 investment projects, the total investments amounted to 203.563 billion Yuans (one U.S. dollar equals about 6.7 Yuans), of which 2.746 billion Yuans of ten contractual joint projects between China and the Arab world [12].

The Arab world have been the eighth-largest trading partner of China as the volume of oil to China Estrada in 2006 to 74.9885 million tons, accounted for 51.6% of the total, China's imports of oil [13]. Figure 1, shows the trading volume between the China and Arab world during last eight years between 2001-2008.

2. Mathematical model (Multi-Objectives Model, MOM)

The Mathematical (MOM) optimization techniques based on inherited algorithms propose various approaches were used since sixteen years ago. This programming technique is used to find just one "optimal" point or solution (Aberdeen Group. 2004).

In this study, the Multi-Objective performance of optimization by algorithms is presented to develop and enhance (ERCA). It gives a solution of this case study to improve the economic relation plans according to these solutions.

The basic approach of Multi-objective is to create a specific numeric goal and formulate an objective function for each of the objectives, and then seek a solution that minimizes the (weighted) sum of deviations of these objective functions from their respective goals, wherever optimal decisions need to be taken in the presence of trade-offs between two or more conflicting objectives. Maximizing profit and minimizing the cost of an economic relation; and minimizing weight while maximizing the strength of a particular component are examples of multi-objective optimization problems.

A general multi-objective optimization problem can be defined as follows; Standard formulation MOM is containing two or more objectives. Sometime, the objective take maximum or minimum formulation, or else, it may contain maximum and minimum value together. The MOM in this study is dealing with the last pattern which contains the objective of maximum (Boshoff & Gray, 2004, Razman Bin Tahar & Ali Asghar Jomah, 2010). The following formula (1, 2) presents standard formulation of MOM

$$\text{Objectiv or Goals (Max or Min) } Z_i = \sum_{j=1}^n X_j \quad (1)$$

Where: $i = 1, 2, 3, \dots, n$
 n =number of Objectives or goals
 X =the variable
 $\alpha \geq 0$

The number of the variables is between 1 to n , where n is a sum of all variables.

$$\sum_{j=1}^n \alpha_j X_j \leq \text{or} \geq C \quad (2)$$

Where: $i = 1, 2, 3, \dots, n$
 n =number of Objectives or goals
 $\alpha \geq 0$
 X = the variable

3. MOM to Improve ERCA

From the formula (1) can formulate many objectives formula, each objective such as aspect from ERCA. It is also easy to use more than one objective to make relation from many objectives to get the optimum solution. The MOM is very important to solve any problem or to develop any plan, it can get optimum plan for any case. In this case study, ERCA has many objectives, each objective represent one aspect. The MOM can solve the single objective or to complete many objectives, for example the same field of objective (education, agriculture, manufacturing, oil refinery and trade), the trade field consider very important field, therefore, in this paper will be taken as an example to get solution in this study.

The formula (3) represents the trade objective:

$$\text{Max } T = \sum_{i=1}^n X_i \quad (3)$$

Where:

$$\begin{aligned} T &= \text{trade} \\ i &= \text{type of item} \\ n &= \text{number of item} \\ X &= \text{type of item} \end{aligned}$$

Formula(4), gives the capability of exports and import:

$$\text{Subject} = \sum_{i=1}^n a_i X_i \leq C_i \quad (4)$$

Where:

$$\begin{aligned} a_i &= \text{coefficient of } X \\ C &= \text{Capability to export from the item} \end{aligned}$$

The case study contain two objectives, first objective represents the optimum increase in China export volume, second objective represents the optimum increase in import volume from Arab world. The both objectives were studied according to the possibilities available, possible exports from China and possible imports from Arab world are necessary to provide both sides needs.

a) The first objective maximum export can be calculated from formula (5) as follows:

$$\text{Max } E = \sum_{i=1}^n X_i \quad (5)$$

Where:

$$\begin{aligned} i &= \text{number of items} \\ n &= \text{the total on items} \\ X &= \text{type of the items} \end{aligned}$$

b) The second objective maximum import is shown in formula (6) bellow:

$$\text{Max } I = \sum_{i=1}^n Y_i \quad (6)$$

Where:

$$\begin{aligned} i &= \text{number of items} \\ n &= \text{the total on items} \\ X &= \text{type of the items} \end{aligned}$$

The possibilities available to achieve the highest percentage of exports for China and the top imports for Arab world as in formula (7, 8):

a) Subjective the export of China

$$\sum_{i=1}^n a_i X_i \leq C_i \quad (7)$$

Where:

$$\begin{aligned} i &= \text{number of items} \\ n &= \text{the total on items} \\ X &= \text{type of the items} \\ a &= \text{weighing of the items} \end{aligned}$$

b) Subjective the import of Arab world

$$\sum_{i=1}^n a_i Y_i \leq C_i \quad (8)$$

Where:

$$\begin{aligned} i &= \text{number of items} \\ n &= \text{the total on items} \\ Y &= \text{type of the items} \\ a &= \text{weighing of the items} \end{aligned}$$

4. Statistics of the economic relation

The economic relation between China and Egypt was taken as an example in this study, because it is not easy to get all the data needed from Arab world. Table 2, give the Figures of export and import of ERCA in million U.S Dollar as a standard unit.

Table 3, shows the volume of export of 5 items (X₁, X₂, X₃, X₄, and X₅) from China to Egypt for the last 6 years with million US Dollars as a standard unit.

Table 4, shows the volume of import of 5 items (Y₁, Y₂, Y₃, Y₄, and Y₅) from Egypt to China for the last 6 years with million US Dollars as a standard unit.

5. Results

After application the MOM depending on the statistical above, the model for the first objective solved the 2011 plan and limited the export amount to be 13,200 million U.S Dollar between China and Egypt, Table 5, shows the volume of export and import of 5 items (X₁, X₂, X₃, X₄, and X₅) between China and Egypt with million US Dollars as a standard unit.

For the second objective, it is possible to get the import volume from Egypt to China. Table 6, shows the volume of export and import of 5 items (Y₁, Y₂, Y₃, Y₄, and Y₅) between China and Egypt with million US Dollars as a standard unit.

The results shown that China can export 5 items with total value of 13,200 million U.S Dollar in the year 2011, and import another 5 items with total amount of 1270 million U/S Dollar from Egypt, the model also give the Figures about the volume or quantity of each item as how much to export and how much to import in the year 2011. Therefore, this model can be used to give the optimum results of expectation for the future. In addition, the model can process many items and more objectives.

6. Conclusion

The MOM assists to develop and improve optimum amount ERCA, it gives good expectation for the export and import. It is possible to find the maximum export depending on the ability of China. It also depends on how much the Arab world can export. In addition, the MOM can find the amount of each item to export and import. However, the MOM can develop more than one objective at same time and can contain much aspect, and many items. The result can be analyses to predict the amount of the export and import. This can assist both sides to be ready for the total expectation and to be prepared for the cost to import the goods. On other hand, the subjective assist to get optimum solution depending on the data collected from the few last years and the budget required for the future. Finally, the MOM can help both sides to make good relation during updating the plan to enhance the well planning to overcome the difficulties that can be faced by any of them.

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Table 1. China's Main Arms Customers by Region, 1982-1991

| Region | Value (U.S. \$ million) | Share of China's Total Arms Sales (%) |
|---------------------|----------------------------|--|
| Arab world and Iran | 13,225 | 82.2 |
| South Asia | 1,260 | 7.9 |
| East Asia | 1,005 | 6.3 |
| Africa | 435 | 2.7 |
| North America | 30 | 0.19 |
| East Europe | 10 | 0.06 |

Table 2. Export & import between the China & Egypt

| Years | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|--------------|--------|---------|---------|---------|---------|--------|
| Import China | 152.8 | 187.9 | 211.4 | 216.8 | 239.7 | 423.7 |
| Export China | 937.3 | 1398 | 1934.1 | 2975.7 | 4431.5 | 5816.7 |
| Total | 1090.1 | 1585.9 | 2145.5 | 3192.5 | 4671.2 | 6240.4 |
| Amount | 784.5- | 1210.1- | 1722.7- | -2758.9 | -4191.8 | -5393 |

Table 3. Volume of export of 5 items from China to Egypt for 6 years

| Item/years | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|----------------|------|------|------|------|------|------|
| X ₁ | 23 | 27 | 30 | 31 | 37 | 56 |
| X ₂ | 38 | 46 | 51 | 52 | 57 | 87 |
| X ₃ | 27 | 35 | 41 | 42 | 43 | 73 |
| X ₄ | 17 | 23 | 27 | 28 | 35 | 71 |
| X ₅ | 48 | 56 | 62 | 64 | 68 | 137 |
| Total | 153 | 187 | 211 | 217 | 240 | 424 |

Table 4. Volume of import of 5 items from Egypt to China for 6 years

| Item/years | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|----------------|------|------|------|------|------|------|
| Y ₁ | 161 | 229 | 335 | 530 | 809 | 1173 |
| Y ₂ | 183 | 261 | 373 | 623 | 905 | 1179 |
| Y ₃ | 145 | 236 | 341 | 545 | 809 | 1119 |
| Y ₄ | 254 | 351 | 455 | 582 | 891 | 1101 |
| Y ₅ | 194 | 321 | 430 | 695 | 1018 | 1244 |
| Total | 937 | 1398 | 1934 | 2975 | 4432 | 5816 |

Table 5. Amount expected the export on 2011

| Type\Item | X ₁ | X ₂ | X ₃ | X ₄ | X ₅ | Total |
|-----------|----------------|----------------|----------------|----------------|----------------|--------|
| Export | 2501 | 2493 | 2564 | 2660 | 2982 | 13,200 |

Table 6. Amount expected the import on 2011

| Type\Item | Y ₁ | Y ₂ | Y ₃ | Y ₄ | Y ₅ | Total |
|-----------|----------------|----------------|----------------|----------------|----------------|-------|
| Import | 234 | 273 | 223 | 253 | 287 | 1270 |

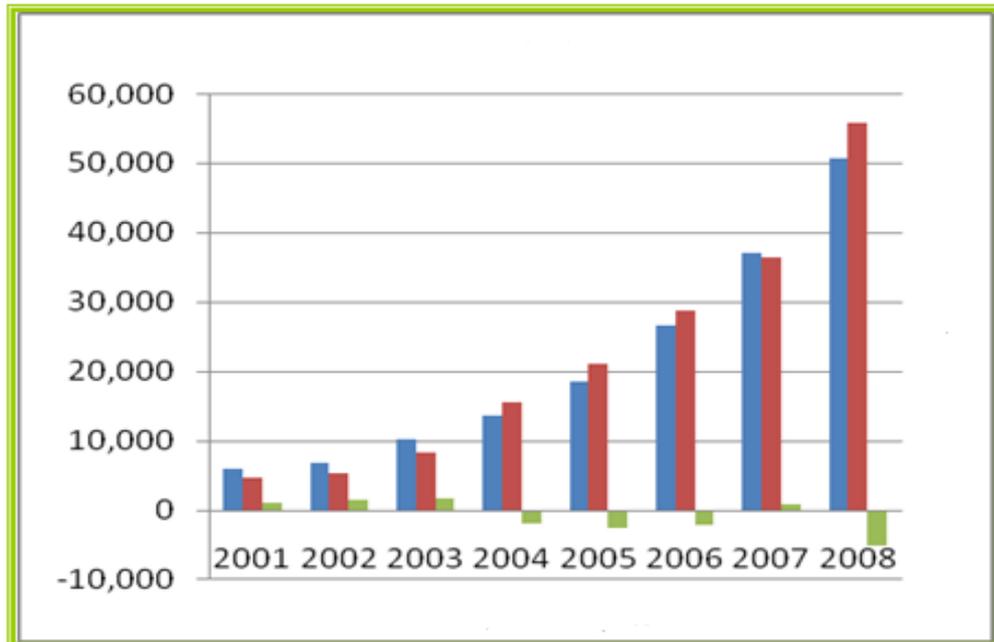


Figure 1. Trading volume between China & Arab countries