The Role of Goal Linear Mathematical Models to Improving Supply Chain with Fuzzy Demand

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Abstract

Supply chain management is of great importance, especially in commercial conditions, where supply chain management has become very important for many reasons, including development in many fields, including information technology. Supply chain management is an important issue in industrial companies for its distinctive and important role. As the information technology contributes effectively to reduce the effort human resources and speed and thus contribute to the management of the supply chain effective contribution to the development of optimal production policies (manufactures) and distribution of products and warehouse management, which generates the lowest total costs of the company and this study focused on supply chain management of its importance in this area. The main objective of this study is to focus on the importance of building a model in supply chain management in addition to providing the model in supply chain management using the programming objectives and uncertainty environment represented by ambiguous numbers.

Keywords: model building, supply chain, goal programming, and fuzzy numbers.

1. Introduction

All the industrial companies compete with each other in how to provide the best products, where the demand for goods varies from time to time and thus affect the direct impact on the work of industrial companies and commodities. This requires improving the supply chain management of the company for the purpose of enhancing the production of commodities through the formation of a complete system of decision support while working to obtain raw materials for the manufacture of goods so the importance of supply chain management through the effectiveness of industrial companies so it has a large role and distinctive in companies so will focus these Study on supply chain management and the importance of building a model in supply chain management in addition to providing the model in supply chain management using the programming objectives.

One of the most important features of goal programming, It is an important tool for building decision-making models in the real world where goals are conflicted. And is characterized by adoption of the level of aspiration which determined by the decision maker [7] In 2004, Errol [5] discusses some literature in supply chain optimization and proposed the use of multi-objective evolutionary algorithms to solve for Pareto-optimality in supply chain optimization problems,. Dimitris and Aurelie [4] proposed a general methodology based on robust optimization to address the problem of optimally controlling a supply chain subject to stochastic demand in discrete time, in 2011, Venkatasubbaiah et al [10], are considered and deviation goals, also fuzzy membership functions taken for each objective function.

2. Definition of Supply Chain

Supply chain is a sequence of commercial partners involved in production processes, where raw materials converted into complete products (commodity) or services to meet consumer demand. It deals with the movement of materials from source to the end represented by consumer. It includes purchases, manufacturing, storage, transportation, customer service, demand planning and supply planning [14]. Also it is a group of independent organizations associated with each other through products / services that add value individually or collectively for the purpose of delivery to the final customer [2].

3. Principles and Interest of Supply Chain

The global companies economies around the world have discovered an important source of competitive advantage called "management of supply chain".[3] These include the integrated activities that provide the product to the market, make the customer satisfy and include the manufacturing and the physical distribution and integration of these active ities into one series operations as well as divisions within the organization and these partners They are vendors, carriers, third party companies and IT systems integrators. Within the organization, supply chain refers to a wide range of functional activities. These activities include the related supply chain such as internal and external transport management, warehousing, inventory control, procurement, procurement and supply management. Supply chain also includes production planning, scheduling and processing of orders and customer services in addition to the inclusion of information systems, which are very important to the purpose of monitoring the operations of all these activities and here simply mention that supply chain includes all activities related to the transfer of goods from the raw materials to the users.

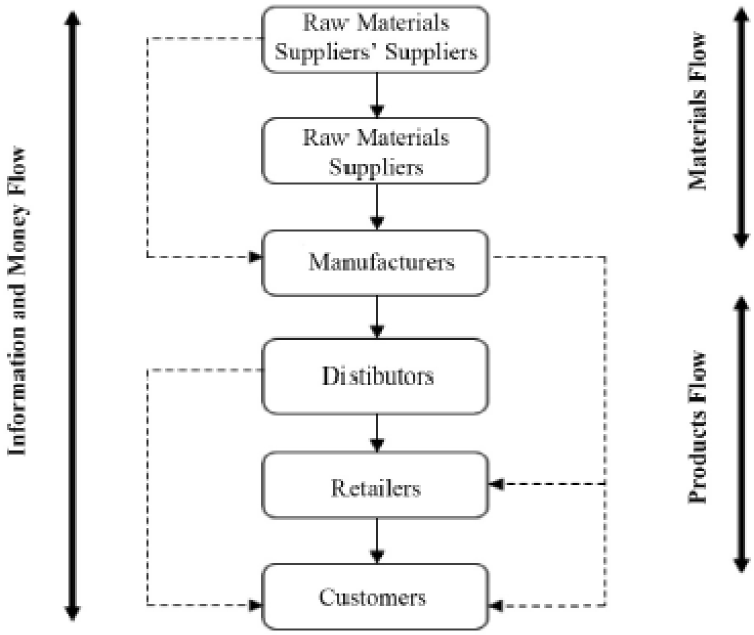

Figure (1) Simple supply chain stages, prepared by [11]

4. What are the motives for building of mathematical models?

It is important to realize that the model really knows the relationships it contains. These relationships are largely independent of data in a model and can be used in many different situations with different data**.** The main advantage of a mathematical model in operations research is that it involves a set of mathematical relationships (such as equations and inequality) that correspond to the closest relationships to the real world (such as technological relations, laws of physics and marketing constraints**)**. There are a number of motives for building such models [4]**:**

- The actual practice of building a model often reveals relationships that have not been obvious to many people, and as a result, a greater understanding of the goal is being designed.

- After building the model it is possible to analyze it mathematically to help in propose paths of work.
- It is possible to experiment on the model instead of the reality of the problem.

5. Goal Programming model

The goal programming model seeks to solve all the objectives together. These objectives are important to the decision maker. The linear programming model consists of constraints and one objective function, which either maximizes or minimizes while goal programming model consists of a set of objectives subject to constraints. Goal programming model is a special case of linear programming that can solve multi-objectives which conflictive. It is distinguished from the linear programming model because the objective function includes at least one of the constraints as part of objective function which is either maximized, minimize.

5.1. Lexicographic Method

This method depends mainly on the order of the functions of the target according to the importance of the decision maker, so that the preferred solution we get is a solution that maximizes the functions of the other goal, so there is no exchange between the goals of different levels of precedence, It is expressed mathematically [10]:

$$Min\ f_i(x)$$
$$s.t.: \quad x \in X,\ \ f_\ell(x) = f_\ell^*,\ \ell = 1, \dots, i-1.$$

Constraints ε −(5.2.)

Another approach to conciliatory concurrency proposed by Chankong and Haimes in 1984 is that in this way the decision maker chooses a minimized goal of one of (n) goals. The remaining goals are in the form of less than or equal crisp value [12]. Mathematically, if we have $f_2(x)$ represented the objective function chosen, it would be $p(\varepsilon_2)$ as follows:

$$Min\ f_2(x)$$
$$s.t.:\ f_i(x) \le \varepsilon_i,\ \forall i \in \{1, \dots, n\} \setminus \{2\},\ x \in S.$$

In general, if the goal j , and vector $\{\varepsilon = \varepsilon_1, \dots, \varepsilon_{j-1}, \varepsilon_{j+1}, \dots, \varepsilon_n \in \Re^{n-1}\}$ exist, such represented the optimal solution of problem $P(\varepsilon)$: x^* that,

$$Min\ f_j(x)$$
$$s.t.:\ f_i(x) \le \varepsilon_1,\ \forall i \in \{1, \dots, n\} \setminus \{j\},\ x \in S.$$

5.3. Preemptive Method

The most common processes to formulating goal programming depend on the decision maker to set the desired goals for each criterion and give a systematic order of these criteria through the primitives. Goal programming model can be represented as follows [15]:

$$\min\left[\rho_{1g}\left(C_1 d_1^+ + C_1 d_1^-\right) + \rho_{2g}\left(C_2 d_2^+ + C_2 d_2^-\right) + \dots + \rho_{mg}\left(C_m d_m^+ + C_m d_m^-\right)\right]$$

Subject to:

$$A_i(x) + d_i^- - d_i^+ = a_i,\ i = 1, 2, \dots, m$$
$$d_i^+, d_i^- \ge 0,\ i = 1, 2, \dots, m$$

A_i: A set of goals (i) determine by the decision maker.

d_i^+, d_i^- :Represent positive and negative deviations of the goal (i).

C_i :The weights goal (i) determined by the decision maker.

ρ_{mg} :The priority number m of goal g.

6. Fundamental of Fuzzy Numbers

Definition 6.1.

The fuzzy subset $\tilde{F}$ universal set ϕ, called the set of pairs $\tilde{F} = \{(\mu_{\tilde{F}}(\varphi), \varphi)\}$ where $\mu_{\tilde{F}}(\varphi)$: $\phi \rightarrow [0,1]$, ϕ in the interval $[0,1]$, is called the membership function of fuzzy set [1].

Definition 6.2.

Fuzzy number is an ordered pair of functions $(y(r), k(r)), r \in [0,1]$, which satisfy the following conditions [1] :

1. $y(r)$ is bounded left continuous non decreasing function over $[0,1]$;
2. $k(r)$ is bounded right continuous non increasing function over$[0,1]$;
3. $y(r) \le k(r)$, $r \in [0,1]$.

We propose to find the solution of supply chain when with demand of any commodity is fuzzy and it is defined as triangle fuzzy numbers. In this case we consider in the part of supply chain in transportation of goods as linear programming problem with fuzzy constraints that may be written as follows [17]:

$$\min Z = \sum_{i=1}^{m}\sum_{j=1}^{n} \upsilon_{ij} q_{ij}$$

Subject to

$$\sum_{j=1}^{n} q_{ij} = S_i, \quad i = 1, 2, \ldots, m$$

$$\sum_{i=1}^{m} q_{ij} = \tilde{\eta}_j, \quad j = 1, 2, \ldots, n$$

Where

Transportation cost per commodity send from source *i* to sink *j*,= υ_{ij}

Quantity of commodity that transported from source *i* to sink *j*,= q_{ij}

Available of each source i (quantity).= S_i

Fuzzy values $\tilde{\eta}_j, j = 1, 2, \ldots, n$ are consider as triangular fuzzy numbers $\tilde{\eta}_j = (\eta_j - \eta_j^L, \eta_j, \eta_j + \eta_j^R),\ j = 1, 2, \ldots, n \quad \eta_j^L < \eta_j,\ \eta_j^R > 0$ and $\sum_{i=1}^{m} q_{ij} = \tilde{\eta}_j,\ j = 1, 2, \ldots, n$,

Triangular fuzzy numbers $\tilde{\eta}_i = (\eta_i - \eta_i^L, \eta_i, \eta_i), \quad i = 1, 2, \ldots, m$ are called left triangular fuzzy number with $\eta_i^L\ (< \eta_i), \quad i = 1, 2, \ldots, m$ and triangular fuzzy numbers $\tilde{\eta}_i = (\eta_i, \eta_i, \eta_i + \eta_i^R), \quad i = \overline{1, m},$ are called right triangular fuzzy number by $\eta_i^R\ (> 0), \quad i = 1, 2, \ldots, m$.

The membership functions for fuzzy constraints:

$$\mu_j^{cons.}\left(\sum_{i=1}^{m} q_{ij}\right) = \begin{cases} 0, \quad \text{when } \sum_{i=1}^{m} q_{ij} < \eta_j - \eta_j^L, \\ \left(\sum_{i=1}^{m} q_{ij} - \eta_j + \eta_j^L\right) \Big/ \eta_j^L, \quad \text{when } \eta_j - \eta_j^L \le \sum_{i=1}^{m} q_{ij} < \eta_i, \\ \left(\eta_j + \eta_j^R - \sum_{i=1}^{m} q_{ij}\right) \Big/ \eta_j^R, \quad \text{when } \eta_i \le \sum_{i=1}^{m} q_{ij} < \eta_j + \eta_j^R, \\ 1, \quad \text{when } \sum_{i=1}^{m} q_{ij} \ge \eta_j + \eta_j^R. \end{cases}$$

By using the *max-min operator* as Zimmermann [9] the linear model becomes:

$$\max \zeta$$

Subject to

$$\sum_{i=1}^{m}\sum_{j=1}^{n} v_{ij} q_{ij} - \zeta(up - lo) \geq lo,$$

$$\sum_{j=1}^{n} q_{ij} - \zeta\eta_i^L \geq \eta_i - \eta_i^L, \qquad ,$$

$$\sum_{j=1}^{n} q_{ij} + \zeta\eta_i^R \leq \eta_i + \eta_i^R,$$

$$0 \leq \zeta \leq 1 \quad q_{ij} \geq 0\,,\ i = 1,2,\ldots,m \quad j = 1,2,\ldots,n\,.$$

7. Clarification of the Reality Situation

1. Company has two factories on two different direction of country. Every of these factories manufacture the same two products and then marketed them to trade salesmen in the same country.
2. The demands from trade salesmen have been tacked for the two next months (April and May), according to the table below:

	Factory 1		Factory 2	
Product	April	May	April	May
1	3650	6250	4750	4250
2	4520	5500	5200	6100

3. Every factory has twenty two days at hand in April and twenty five days at hand in May to manufacture and shipping these products.
4. Inventories of goods are binding at the end of April, and every Factory has capacity stock to 1200 units overall of the two commodity if an increase quantity is manufactured in April for sale in May. In any factory, the holding cost of stock in this case is $2.5 per unit of product1 and $3 per unit of product2.
5. The production cost ($) of each commodity is done below for all process in every factory.

	Factory 1		Factory 2	
Product	Process1	Process2	Process1	Process2
1	60	59	60	65
2	77	80	90	85

6. The average of manufacturing of every product is given of each process in every factory as follows:

	Factory 1		Factory 2	
Product	Process1	Process2	Process1	Process2
1	120	135	129	115
2	100	140	150	132

7. The expected revenue to the firm when a factory sells the commodity to trade salesmen by $85 per unit of product1 and $115 per unit of product2. It also may be factory shipping to the opposite side of the country. At this case, an addition shipping cost of $10 per unit of product1 and $8 per unit of product2 is undertaken [6].
8. The management striving to answer the following questions:
- Determine how much of each commodity must be manufacture and stock in every production process of every factory in duration (April, May).
- How much every factory must be sold of each commodity and how much every factory must ship of each commodity in every month to the other trade wholesalers.
- The objective of company is to specify which feasible policy ought to maximize the revenue of sales. A facilitated diagram of the supply chain is below:

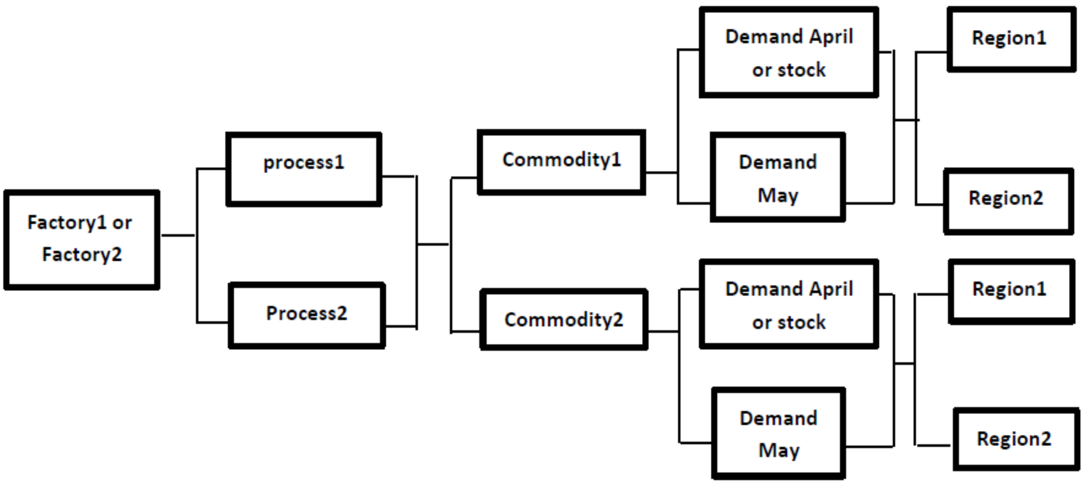

Figure (2) illustrated simplified of supply chain of reality situation (prepared by author)

8. Modeling the problem to maximize the net revenue (profit) by Linear Programming

Definition of decision variables:

Q_{ijklm} : *Quantity of commodity* (i) *that produced in month* (j) *in factory* (k) *according to process* (l) *and sold in zone* (m).

v_{im} : *The quantity of commodity* (i) *that is stored to be sold in May in zone* (m).

η_{ijm} : *The require of commodity* (i) *in month in* (j) *zone* (m).

K_{ikl} : *The average production of commodity* (i) *in factory* (k) *according to process* (l).

τ_{ikm} : *transporation cost of commodity* (i) *from factoy* (k) *to zone* (m).

D_j : *Numbers of disposal days in month* (j).

where $i=1,2,\ j=a,m,k=1,2,l=1,2,m=1,2.$

The objective function which is represented the net revenue of sales by:

Net profit = selling price of product (i) – unit manufacture cost of product (i) – inventory cost of product (i) – transportation cost of product (i)

$$\begin{aligned}\max z =\ & 12q_{1a111}+15q_{1a121}+13q_{1a112}+15q_{1a122}+13q_{1a211}+09q_{1a221}+09q_{1a222}+12q_{1m111}\\ & +13q_{1m211}+13q_{1a212}+\ 9q_{1m222}+15q_{1m121}+15q_{1m122}+09q_{1m221}+13q_{1a212}+12q_{1m112}\\ & +27q_{1a111}+20q_{2a121}+27q_{2a112}+20q_{2a122}+16q_{2a211}+19q_{2a221}+19q_{2a222}+27q_{1m111}\\ & +16q_{2m212}+16q_{2m222}+19q_{2m121}+20q_{2m121}+20q_{2m221}+19q_{21212}+16q_{2m112}+27q_{2m211}\\ & -2.5v_{1a}-2.5v_{1m}-3v_{2a}-3v_{2m}\end{aligned}$$

Subject to

$$q_{1m111}+q_{1m211}+q_{1m221}+q_{1m121}+v_{1a}\le 3650$$
$$q_{2m111}+q_{2m211}+q_{2m121}+q_{2m221}+v_{2a}\le 5500$$
$$q_{1m112}+q_{1m122}+q_{1m212}+q_{1m222}+v_{1m}\le 5200$$
$$q_{2m112}+q_{2m122}+q_{2m212}+q_{2m222}+v_{2m}\le 6250$$

$$q_{1a111}+q_{1a211}+q_{1a221}+q_{1a121}-v_{1a}\le 4750$$
$$q_{2a111}+q_{2a211}+q_{2a121}+q_{2a221}-v_{2a}\le 4250$$
$$q_{1a112}+q_{1a122}+q_{1a212}+q_{1a222}-v_{1m}\le 5200$$
$$q_{2a112}+q_{2a122}+q_{2a212}+q_{2a222}-v_{2m}\le 6100$$

$$\begin{aligned}& 0.01q_{1a111}+0.008q_{2a111}+0.01q_{1a112}+0.008q_{2a112}+0.007q_{1a121}\\ & +0.007q_{1a122}+0.01q_{1a112}+0.006q_{2a121}+0.006q_{2a122}\le 2500\end{aligned}$$
$$\begin{aligned}& 0.007q_{1a211}+0.006q_{2a211}+0.007q_{1a212}+0.006q_{2a212}+0.009q_{1a221}\\ & +0.009q_{1a222}+0.007q_{1a212}+0.007q_{2a221}+0.007q_{2a222}\le 3750\end{aligned}$$
$$\begin{aligned}& 0.006q_{2m121}+0.006q_{2m122}+0.01q_{1m111}+0.008q_{2m111}+0.01q_{1m112}\\ & +0.008q_{2m112}+0.007q_{1m121}+0.007q_{1m122}+0.01q_{1m112}\le 1500\end{aligned}$$
$$\begin{aligned}& 0.007q_{1m211}+0.006q_{2m211}+0.007q_{1m212}+0.006q_{2m212}+0.009q_{1m221}\\ & +0.009q_{1m222}+0.007q_{1m212}+0.007q_{2m221}+0.007q_{2m222}\le 3700\end{aligned}$$
$$v_{1a}+v_{1m}+v_{2a}+v_{1m}\le 1200$$
$$q_{ijklm}\ge 0, v_{ij}\ge 0, i=1,2\ ,\ j=a,m\ ,k=1,2\ ,l=1,2\ ,m=1,2.$$

By using the package program WINQSB [8], the optimal solution is:

$$q_{1a211}^{opimal}=597,\quad q_{2a111}^{optimal}=2500,\ q_{2a221}^{optimal}=2000,\ q_{2a222}^{optimal}=6100,$$
$$q_{2m111}^{optimal}=2771,\ q_{2m211}^{optimal}=2629,\ q_{2a111}^{optimal}=1051,\quad v_{2m}^{optimal}=1200$$
$$and\quad z^{optimal}=358,866$$

9. Priorities of the Management of the Company According to the Goal Programming and Fuzzy Demands

The management of company aspiring to find extra solution and diversiform of alternatives of optimal solution. It has a paramedical of objectives in a priority and as well wants to know the policy to improving the revenue of sales and in this model some of right hand side of constraints of demand is fuzzy numbers are consider as triangular fuzzy numbers as follow:

$$3650=(3625,3650,3657),\ 5500=(5490,5500,5565),$$
$$5200=(5195,5200,5215),4250=(4248,4250,4260),$$

And also the priorities of goals are:

1. The company obtains on and maintain of revenue of sales 320,000 $.
2. Implementing a manufacture in factory1 5500 units in April.
3. Aspiration level of achievement of fuzzy constraints (ζ) equal to 0.5.

Let us transformed the linear programming model toward integrated model consists of goal programming and fuzzy numbers as well as founds the optimal solution.

$$\min\left\{\begin{array}{l} Goal1\left(\rho_1(d_1^-)\right) \qquad + \\ Goal2\left(\rho_2\,(d_2^-+d_2^+)\right)+ \\ Goal3\left(\rho_3\,(d_3^-+d_3^+)\right) \end{array}\right\}$$

Subject to

Constraint of net revenue of sales

$$12q_{1a111}+15q_{1a121}+13q_{1a112}+15q_{1a122}+13q_{1a211}+09q_{1a221}+09q_{1a222}+12q_{1m111}+$$
$$13q_{1m211}+13q_{1a212}+\ 9q_{1m222}+15q_{1m121}+15q_{1m122}+09q_{1m221}+13q_{1a212}+12q_{1m112}+$$
$$27q_{1a111}+20q_{2a121}+27q_{2a112}+20q_{2a122}+16q_{2a211}+19q_{2a221}+19q_{2a222}+27q_{1m111}+$$
$$16q_{2m212}+16q_{2m222}+19q_{2m121}+20q_{2m121}+20q_{2m221}+19q_{21212}+16q_{2m112}+27q_{2m211}$$
$$-2.5v_{1a}-2.5v_{1m}-3v_{2a}-3v_{2m}+d_1^- - d_1^+ = 320,000$$

Constraint of manufacture level of commodity1

$$0.01q_{1a111}+0.008q_{2a111}+0.01q_{1a112}+0.008q_{2a112}+0.007q_{1a121}$$
$$+0.007q_{1a122}+0.01q_{1a112}+0.006q_{2a121}+0.006q_{2a122}+0.006q_{2m121}$$
$$+0.006q_{2m122}+0.01q_{1m111}+0.008q_{2m111}+0.01q_{1m112}+0.008q_{2m112}$$
$$+0.007q_{1m121}+0.007q_{1m122}+0.01q_{1m112}+d_2^- - d_2^+ = 5500$$

$$\zeta + d_3^- - d_3^+ = 0.5$$

$$12q_{1a111}+15q_{1a121}+13q_{1a112}+15q_{1a122}+13q_{1a211}+09q_{1a221}+09q_{1a222}+12q_{1m111}+$$
$$13q_{1m211}+13q_{1a212}+\ 9q_{1m222}+15q_{1m121}+15q_{1m122}+09q_{1m221}+13q_{1a212}+12q_{1m112}+$$
$$27q_{1a111}+20q_{2a121}+27q_{2a112}+20q_{2a122}+16q_{2a211}+19q_{2a221}+19q_{2a222}+27q_{1m111}+$$
$$16q_{2m212}+16q_{2m222}+19q_{2m121}+20q_{2m121}+20q_{2m221}+19q_{21212}+16q_{2m112}+27q_{2m211}$$
$$-2.5v_{1a}-2.5v_{1m}-3v_{2a}-3v_{2m}-\zeta(367,233-332,465)\geq 332,465,$$

Constraints with fuzzy numbers (Demands)

$$q_{1m111}+q_{1m211}+q_{1m221}+q_{1m121}+v_{1a}-25\zeta \geq 3650-25,$$
$$q_{1m111}+q_{1m211}+q_{1m221}+q_{1m121}+v_{1a}+2\zeta \leq 3650+2,$$
$$q_{2m111}+q_{2m211}+q_{2m121}+q_{2m221}+v_{2a}-10\zeta \geq 5500-10$$
$$q_{2m111}+q_{2m211}+q_{2m121}+q_{2m221}+v_{2a}+15\zeta \leq 5500+15$$

$$q_{1m112}+q_{1m122}+q_{1m212}+q_{1m222}+v_{1m}-5\zeta \geq 5200+5$$
$$q_{1m112}+q_{1m122}+q_{1m212}+q_{1m222}+v_{1m}+15\zeta \leq 5200+15$$
$$q_{2m112}+q_{2m122}+q_{2m212}+q_{2m222}+v_{2m}-2\zeta \geq 6250+2$$
$$q_{2m112}+q_{2m122}+q_{2m212}+q_{2m222}+v_{2m}+10\zeta \leq 6250+10$$

Crisp constraints

$$q_{1a111}+q_{1a211}+q_{1a221}+q_{1a121}-v_{1a} \leq 4750$$
$$q_{2a111}+q_{2a211}+q_{2a121}+q_{2a221}-v_{2a} \leq 4250$$
$$q_{1a112}+q_{1a122}+q_{1a212}+q_{1a222}-v_{1m} \leq 5200$$
$$q_{2a112}+q_{2a122}+q_{2a212}+q_{2a222}-v_{2m} \leq 6100$$

$$0.01q_{1a111}+0.008q_{2a111}+0.01q_{1a112}+0.008q_{2a112}+0.007q_{1a121}$$
$$+0.007q_{1a122}+0.01q_{1a112}+0.006q_{2a121}+0.006q_{2a122} \leq 2500$$
$$0.007q_{1a211}+0.006q_{2a211}+0.007q_{1a212}+0.006q_{2a212}+0.009q_{1a221}$$
$$+0.009q_{1a222}+0.007q_{1a212}+0.007q_{2a221}+0.007q_{2a222} \leq 3750$$
$$0.006q_{2m121}+0.006q_{2m122}+0.01q_{1m111}+0.008q_{2m111}+0.01q_{1m112}$$
$$+0.008q_{2m112}+0.007q_{1m121}+0.007q_{1m122}+0.01q_{1m112} \leq 1500$$
$$0.007q_{1m211}+0.006q_{2m211}+0.007q_{1m212}+0.006q_{2m212}+0.009q_{1m221}$$
$$+0.009q_{1m222}+0.007q_{1m212}+0.007q_{2m221}+0.007q_{2m222} \leq 3700$$

Non- negative constraints

$q_{ijklm} \geq 0, v_{ij} \geq 0, i = 1,2\ , j = a, m\ , k = 1,2\ , l = 1,2\ , m = 1,2, 0 \leq \zeta \leq 1$

$d_i^+, d_i^- \geq 0$

The Results: The optimal solution of model with fuzzy numbers and priorities of three goals, given by:

$$q_{1a211}^{O.F} = 547, \quad q_{2a111}^{O.F} = 2350, q_{2a221}^{O.F} = 2000, q_{2a222}^{O.F} = 6025,$$

$$q_{2m111}^{O.F} = 2771, q_{2m211}^{O.F} = 2629, q_{2a111}^{O.F} = 1080, \quad v_{2m}^{O.F} = 1200,$$

$$\zeta = 0.5, and \quad z^{O.F} = 3200,000$$

10. Conclusions

This study demonstrated the importance of model building in supply chain management as the model was presented using the programming objectives and uncertainty environment represented by fuzzy numbers. This study presented two fundamental idealists, the first identifying the construction of models in the supply chain, and the other example dedicated to model building with highlights of priorities of goal programming as well as when the demands in this model are uncertainty (fuzzy numbers), we using the package program WIN QSB to find the optimal solution. Finally we recommend developing this study by adding sensitivity analysis to enhance the results of model.

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