Selection of 3Pl Provider for Soft Drink Distribution: A Case Study
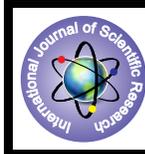
Engineering

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ABSTRACT

This paper presents a model based decision support system for evaluating the third party logistics. Evaluation of third party logistics or best performance of transporter in business is difficult. Multi-criteria methods are used for evaluation of third party logistics for the plant. The proposed system is based on performance ratio and method simple additive weighting. Various multi-criteria decision making methods have been proposed to solve the diverse applications of decision problems. One of the multi-criteria decision taking methods is additive weighting based method. A case of Soft Drink Distribution Company is taken to validate the methodology. The results are presented in the article and a framework for 3PL provider selection is presented.

1. INTRODUCTION

Now a day Supply Chain Management is growing rapidly and the business of Supply Chain Management is increases every places in the world Supply Chain Management includes many logistics function such as transportation, warehousing, distribution management and freight consolidation etc. supply chain management is the man concern to represent this paper and the intention of the research is to identify the most effective ways of choosing a third party logistics provider. There is continuous increase of the third party logistics or contract logistics in company's performance. The main reasons that lead companies to explore outsourcing are their need to reduce inventory, penetrate markets, reduce contracts, and gain expertise. The study of third party logistics evolution can provide guideline for future trends in contract logistics development. This can contribute to future competitive strategy planning; company understands of the way third party logistics can contribute to its corporate plans, and encourage academia to search for further implications for the company's operations(Richardson 1990).

In the uncertainty and complex situations today, it is difficult to measure or evaluate the performance. It has always been an important topic for organizations whatever they are public sector or private sector. Given the growing complexity and uncertainty in many decision situations, helping managers use quantitative models to support their decision-making and planning is an important research topic. In recent years Multi-Criteria methods have been increasingly used for quantitative evaluation of complicated economic or social processes.

2. LITERATURE BACKGROUND

The literature appears to focus on the demand side of 3PL; a large number of studies focus on the extent of 3PL usage across specific countries/regions and industries. A series of annual surveys conducted in the USA by Lieb and colleagues (Lieb, 1992; Lieb and Bentz, 2004, 2005b; Lieb et al., 1993; Lieb and Miller, 2002; Lieb and Randall, 1996) is a well-known example. Main issues examined by such studies include services used, usage rate, contract renewal rates, outsourcing costs and geographical spread of services. Generally speaking, finding indicate the prominence of transport, warehouse and administration-related (Freight payment) services and confirm the continuing growth of logistics outsourcing (Ashenbaum et al., 2005; Lieb and Bentz, 2005b; Murphy and Poist, 1998).

Third party logistics services have been an important trend in logistics management since the 1990's. There is growing interest in third-party logistics or logistics outsourcing among practicing managers and academicians alike as shippers worldwide are increasingly outsourcing their logistical activities in order to reduce supply chain complexities, curtail costs and overheads, and

expand their global reach. By outsourcing logistics, companies are able to not only focus on their core competencies, but also realize better delivery performance and therefore customer satisfaction. And for this better selection of third party logistics is very important. Among the Multi criteria decision matrix problem that are encountered in real life is the personnel selection problem. This problem, from the multi criteria perspective, has attracted the interest of many scholars. One class of approaches that deal with subjectivity includes techniques based on the well-known analytic hierarchy process which reduces complex decisions to a series of pair wise comparisons and synthesizes the results.

Various definitions of Third Party Logistics;

- Third-party Logistics is simply the use of an outside company to perform all or part of the firm's materials management and product distribution function. (Simchi-Levi, 2000)
- A relationship between a shipper and third party which, compared with the basic services has more customized offerings, encompasses a broad number of service function and is characterized by a long-term, more mutually beneficial relationship. (Murphy &Poist, 1998)

Supply chain

A supply chain is essentially a network of suppliers and customers in which every customer is in turn a supplier to the next downstream organization until a finished product reaches the ultimate end customer. It is not only includes the manufacturer and suppliers, but also transporter, warehouses, retailers and customers themselves.

Component of supply chain management:

- **Logistics :**It can be defined as the science pertaining to the movement of materials and services along with its information.
- **Strategy:** In supply chain strategy the determination of stages and whether each supply chain functions will be performed inbound or outbound.

Selection criteria for 3Pl providers:

Several criteria for 3PL choice have been discussed in the literature; typically, these include cost, service quality and reliability, flexibility, responsiveness to requests and financial stability. Some criteria are developed with specific client needs in mind, while others are common for all circumstances (Bagchi and Virum, 1996). There is contrasting evidence on the relative importance of price; some authors (Van Laarhoven and Sharman, 1994) rank it as top.

3. METHODOLOGY

Simple Additive Weighting (SAW) which is also known as

weighted linear combination or scoring methods is a simple and most often used multi attribute decision technique. The method is based on the weighted average. An evaluation score is calculated for each alternative by multiplying the scaled value given to the alternative of that attribute with the weights of relative importance directly assigned by decision maker followed by summing of the products for all criteria. The advantage of this method is that it is a proportional linear transformation of the raw data which means that the relative order of magnitude of the standardized scores remains equal.

Huang et al, (2005).Studied Multi-Attribute Utility Theory (MAUT) where it elicits an individual decision maker's preferences for single attributes and develops a utility function by the mathematical formulation to add up the preferences of the entire set of attributes when evaluating alternatives. The method SAW is a common aggregation method of MAUT for decision makers, which does not consider the different preferential levels and preferential ranks for each decision maker's assessment of alternatives in a decision group. Process of SAW consist of these steps:

Step 1:
- Construct pairwise comparison matrix (n × n) for criteria with respect to objectives by using Saaty's 1-9 scale of pairwise comparison shown in Table 1:

Table 1: Saaty's 1-9 scale of pairwise comparisons

Intensity of importance	Definition	Explanation
1	Equal importance	Two activities contribute equally to the objective
2	Weak or slight	
3	Moderate importance	Experience and judgment slightly favor one activity over another
4	Moderate plus	
5	Strong importance	Experience and judgment strongly favor one activity over another
6	Strong plus	
7	Very strong	An activity is favored very strongly over another
8	Very, very strong	
9	Extreme strong	The evidence favoring one activity over another is of the highest possible order of affirmation

- For each comparison, we will decide which of the two criteria is most important, and then assign a score to show how much more important it is.
- Compute each element of the comparison matrix by its column total and calculate the priority vector by finding the row average.
- Weighted sum matrix is found by multiplying the pairwise comparison matrix and priority vector.
- Dividing all the elements of the weighted sum matrix by their respective priority vector element.
- After that test of consistency calculated for the conformation of the selection or comparison of the criteria's.
- Compute the average of this value to obtain λ_{max}.
- Find the consistency index ,CI, as follows:

$$CI = \frac{\lambda max - n}{n-1} Eq. (1)$$

Where n is the matrix size.

- Calculate the consistency ratio, CR, as follows:

$$CR = \frac{CI}{RI} Eq. (2)$$

- Judgment consistency can be checked by taking the consistency ratio (CR) of CI with the appropriate value in Table 2. The CR is acceptable, if it does not exceed 0.10. If it is more, the judgment is inconsistent. To obtain a consistent matrix, judgment should be reviewed and improved.

Table 2: Average random consistency (RI)

Size of matrix (n)	Random consistency
1	0
2	0
3	0.58
4	0.9
5	1.12
6	1.24
7	1.32
8	1.41
9	1.45
10	1.49

Step 2:
Construct a decision matrix (m × n) that includes m personnel and n criteria. Calculate the normalized decision matrix for positive

$$nij = \frac{rij}{rj}, i = 1 ...m, \quad j = 1 .....n \quad Eq. (3)$$
And for negative criteria:

$$n_{ij} = r_i / r_{ij} , i = 1 ...m, \quad j = 1 .....n \; Eq. (4)$$

r_j is a maximum number of r in the column of j:

Evaluate each alternative, A_i by the following formula:

$$A_i = \sum wj. xij \quad Eq. (5)$$

Where X_{ij} is the score of the i_{th} alternative with respect to the j_{th} criteria ,w_j is the weighted criteria.

This methodology is designed in order to select and consider suitable criteria and personnel in one of Coca-Cola Company respectively. The way of data collection that is applied for this phase is questionnaire. By using Comparison matrix the weights of criteria will be computed. After computing weights of criteria, specifying of consistency Rate will be executed. If consistency of data is more than 0.1. After CR is less than 0.1, it indicates sufficient consistency. In that time, we use SAW method for ranking personnel. The procedure of methodology has been shown in figure 1:
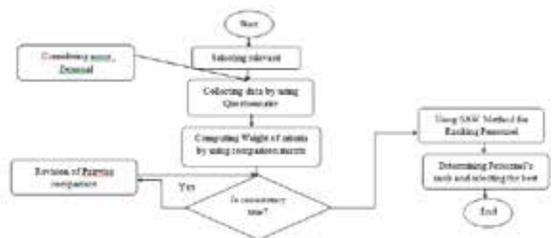

Figure 1: Flow chart of Procedure of SAW

4. ORGANIZATIONAL PROFILE

Hindustan Coca-Cola Beverage Private Limited situated at Rajagrh (M.P.). Main branch of this plant is situated at Gujarat, where ten pipelines are available for the cold drinks production and production rate and supply of product is maximum. Whereas in Pilukhedi plant one pipeline is available so production rate as compared to main plant is very low. Supply of the product of Pilukhedi plant at maximum places of Madhya Pradesh.

Which Product of this plant:
- Thums Up
- Limca
- Kinley soda
- Coke
- Sprite

Soft drinks purchase to other plant, like Maaza, Fanta, Frooti etc.

Supply of products of this plant at all over Madhya Pradesh; by road. Hence the third party logistics is lead the important role for transportation. In this plant seven transporter are available for the supply. And according to plant requirement it is sufficient transporter for this plant. In this plant in off season per day 3,000 to 4,000 product supply whereas in on season this requirement is increases 20,000 to 30,000. Now a day in this plant works on the SAP software. All over process from taking order to shipment works on SAP. Selection of third party logistics is based on main criteria which are minimum cost, but it is common think of all other plant or companies other criteria's like availability of vehicles, experience, fleet strength, better understanding, and so on. Transporters have three types of vehicles are available like LCV (4 ton), HCV (9 ton), TAU (16 ton).

In this Coca-Cola plant PET lines are available, in which plastic bottles are manufactured and preform for the plastic bottles purchase to other plant. Glass bottles are purchased to other plant and fill the bottles by liquids in this plant. A bottle filling to packing process is machinable. For every process departments are divided according to works, like order taking process by RTM department, production process by production department, order passes according to customer account checking process by financial department, product shipment process by shipment department and so on. By departmental works whole process on plant is systematic and efficiently works. Also water treatment plant are available in this plant in which firstly water treated by systematic process and hard water converted into mineral water to test water .3 micron, after this water is uses for drink and for filling bottles for kinley water.

5. DISCUSSION

By using twelve criteria like below, Coca-Cola Company wants to best one or two third party logistics which have satisfied the requirement for supply. These criteria have been mentioned in Table 3 as follows:

Table: 3 Criteria's Name

Criteria	Name of Criteria
C1	Fleet strength
C2	Quality
C3	Warehousing
C4	Service level
C5	Managerial capability
C6	Technical capability
C7	Tracking & identification system
C8	Experience
C9	Cost
C10	Flexibility
C11	Information sharing
C12	Knowledge

The weights of criteria have been computed by using comparison matrix. Meanwhile, Data was gathered from five expert's opinion with questionnaire in one of sector of Coca-Cola Company by using scale values of 1-5 as shown in Table 4 and it has been shown in Table 5:

Table 4: Specifying the scale values of 1-5

Intensity of importance	Definition
1	Equal importance
2	Moderate importance
3	Strong importance
4	Very strong
5	Extreme importance

The criteria's name which is comparison between each other's is shown in Table 3. And this criteria give specify scale value according to soft drink distribution company transporter's or 3PL providers, which shown in Table 4.

The comparison matrix shown in Table 5, indicating the relative importance of the criterion in the columns compared to the criterion in the rows. This comparison is right means consistence, so apply the test of consistency. The Test of consistency is calculated by various steps, which are shown below. According to Table 2; for test of consistency apply on only ten factors and we have twelve factors so we calculate the consistency by remove firstly the last two factors, and after that remove first two factors.

Table 5: Criteria by comparison matrix

CRITERIA	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12
C1	1	0.33	0.25	0.5	0.25	4	0.5	0.33	4	0.2	0.2	0.25
C2	3	1	0.25	4	0.33	5	5	3	5	0.33	0.3	2
C3	4	4	1	5	2	5	5	4	5	3	0.5	4
C4	2	0.25	0.2	1	0.2	4	2	0.5	4	0.2	0.2	0.33
C5	4	3	0.5	5	1	5	5	4	5	2	0.3	4
C6	0.25	0.2	0.2	0.25	0.2	1	0.33	0.25	2	0.2	0.2	0.25
C7	2	0.2	0.2	0.5	0.2	3	1	0.33	4	0.2	0.2	0.25
C8	3	0.33	0.25	2	0.25	4	3	1	5	0.25	0.2	0.5
C9	0.25	0.2	0.2	0.25	0.2	0.5	0.25	0.2	1	0.2	0.2	0.2
C10	5	3	0.33	5	0.5	5	5	4	5	1	0.3	3
C11	5	4	2	5	3	5	5	5	5	4	1	5
C12	4	0.5	0.25	3	0.25	4	4	2	5	0.33	0.2	1
TOTAL	33.5	17.01	5.63	31.5	8.38	45.5	36.1	24.61	50	11.9	3.7	20.78

Test of Consistency:

Test of consistency is applied for the right selection of factors which is compared with each other's. If the consistency rate is less than 0.1 then it is indicating sufficient consistency. The following steps will show how the test of consistency will be done.

Test of consistency is applied only less than or equal to ten factors hence we are test of consistency applying on two conditions:

➤ Firstly we remove last two factors and test the consistency:

Table 6: Comparison Matrix for starting Ten Factors

CRITERIA	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
C1	1	0.33	0.25	0.5	0.25	4	0.5	0.33	4	0.2
C2	3	1	0.25	4	0.33	5	5	3	5	0.33
C3	4	4	1	5	2	5	5	4	5	3
C4	2	0.25	0.2	1	0.2	4	2	0.5	4	0.2
C5	4	3	0.5	5	1	5	5	4	5	2
C6	0.25	0.2	0.2	0.25	0.2	1	0.33	0.25	2	0.2
C7	2	0.2	0.2	0.5	0.2	3	1	0.33	4	0.2
C8	3	0.33	0.25	2	0.25	4	3	1	5	0.25
C9	0.25	0.2	0.2	0.25	0.2	0.5	0.25	0.2	1	0.2
C10	5	3	0.33	5	0.5	5	5	4	5	1
TOTAL	24.5	12.5	3.38	23.5	5.13	36.5	27.1	17.6	40	7.58

Table 7: Standard Matrix for Starting Ten Factors

CRITERIA	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	WEIGHTS
C1	0.041	0.026	0.074	0.0213	0.049	0.11	0.018	0.019	0.1	0.026	0.048435
C2	0.122	0.08	0.074	0.1702	0.064	0.137	0.185	0.17	0.125	0.044	0.117141
C3	0.163	0.32	0.296	0.2128	0.39	0.137	0.185	0.227	0.125	0.396	0.245104
C4	0.082	0.02	0.059	0.0426	0.039	0.11	0.074	0.028	0.1	0.026	0.058055
C5	0.163	0.24	0.148	0.2128	0.195	0.137	0.185	0.227	0.125	0.264	0.189632
C6	0.01	0.016	0.059	0.0106	0.039	0.027	0.012	0.014	0.05	0.026	0.026515
C7	0.082	0.016	0.059	0.0213	0.039	0.082	0.037	0.019	0.1	0.026	0.04813
C8	0.122	0.026	0.074	0.0851	0.049	0.11	0.111	0.057	0.125	0.033	0.079177
C9	0.01	0.016	0.059	0.0106	0.039	0.014	0.009	0.011	0.025	0.026	0.022066
C10	0.204	0.24	0.098	0.2128	0.097	0.137	0.185	0.227	0.125	0.132	0.165745
TOTAL											1

In order to calculate computing Weighted Sum Vector (WSM) ; which is obtained by the sum of each factor comparison value is multiplied by its weights. This is shown in Table 8.

Table 8: Calculation of Weighted Sum Vector

CRITERIA	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10		WEIGHTS		WSV
C1	1	0.33	0.25	0.5	0.25	4	0.5	0.33	4	0.2		0.048		0.504
C2	3	1	0.25	4	0.33	5	5	3	5	0.33		0.117		1.394
C3	4	4	1	5	2	5	5	4	5	3		0.245		2.874
C4	2	0.25	0.2	1	0.2	4	2	0.5	4	0.2		0.058		0.635
C5	4	3	0.5	5	1	5	5	4	5	2	*	0.19	=	2.279
C6	0.25	0.2	0.2	0.25	0.2	1	0.33	0.25	2	0.2		0.027		0.277
C7	2	0.2	0.2	0.5	0.2	3	1	0.33	4	0.2		0.048		0.512
C8	3	0.33	0.25	2	0.25	4	3	1	5	0.25		0.079		0.89
C9	0.25	0.2	0.2	0.25	0.2	0.5	0.25	0.2	1	0.2		0.022		0.233
C10	5	3	0.33	5	0.5	5	5	4	5	1		0.166		2.024

In following division corresponding cell must be divided each other. For example, in below Table 9; the value of 10.5 has been extracted from 0.504 divided by 0.048 and so on, get CV.

Table 9: Calculation of Consistency Vector

WSV		WEIGHTS		CV
0.504		0.048		10.5
1.394		0.117		11.915
2.874		0.245		11.731
0.635		0.058		10.948
2.279	/	0.19	=	11.995
0.277		0.027		10.259
0.512		0.048		10.667
0.89		0.079		11.266
0.233		0.022		10.591
2.024		0.166		12.193
Avg.				11.206

$$\lambda = \frac{10.5 + 11.915 + 11.731 + 10.948 + 11.995 + 10.259 + 10.667 + 11.266 + 10.591 + 12.193}{10}$$

$$\lambda = 11.206$$

- Calculating Amount of Consistency Index (CI)

λ = Average of consistency vector

$$CI = \frac{\lambda - N}{N - 1}$$

N = Size of Matrix

$$CI = \frac{11.206 - 10}{10 - 1}$$

$$CI = .134$$

- Calculating Consistency rate:

$$CR = \frac{CI}{RI}$$

Where RI = Random Index
CI = Consistency Index

- RI value is taking by Table 2; which is depending on the matrix size here;

N = 10 ;

RI = 1.49

$$CR = \frac{0.134}{1.49}$$

Result obtained that our consistency is sufficient, for this Ten Factors; because Consistency Rate is less than 0.1.

➢ Second condition is that consistency test is applied on last Ten Factors and removes Starting Two Factors. In this calculation for Weights and WSV are same, And whole calculation are same as above.

Table 10: Comparison Matrix for Last Ten Factors

CRITERIA	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12
C3	1	5	2	5	5	4	5	3	0.5	4
C4	0.2	1	0.2	4	2	0.5	4	0.2	0.2	0.33
C5	0.5	5	1	5	5	4	5	2	0.33	4
C6	0.2	0.25	0.2	1	0.33	0.25	2	0.2	0.2	0.25
C7	0.2	0.5	0.2	3	1	0.33	4	0.2	0.2	0.25
C8	0.25	2	0.25	4	3	1	5	0.25	0.2	0.5
C9	0.2	0.25	0.2	0.5	0.25	0.2	1	0.2	0.2	0.2
C10	0.33	5	0.5	5	5	4	5	1	0.25	3
C11	2	5	3	5	5	5	5	4	1	5
C12	0.25	3	0.25	4	4	2	5	0.33	0.2	1
TOTAL	5.13	27	7.8	36.5	30.6	21.28	41	11.38	3.28	18.53

By rounding off the number to three decimal places, we will get Consistency Vector (CV). In following division corresponding cell must be divided each other. For example, In Table 11; the value of 11.963 has been extracted from 2.249 divided by 0.188 and so on.

Table 11: Calculation of Consistency Vector

WSV	WEIGHTS	CV
2.249	0.188	11.963
0.523	0.049	10.673

1.836		0.151		12.159
0.275		0.026		10.577
0.415	/	0.04	=	10.375
0.702		0.064		10.969
0.229		0.022		10.409
1.504		0.125		12.032
2.983		0.254		11.744
0.905		0.079		11.456
Avg.				11.236

$$\lambda = \frac{11.963 + 10.673 + 12.159 + 10.577 + 10.375 + 10.969 + 10.409 + 12.032 + 11.744 + 11.456}{10}$$

$$\lambda = 11.236$$

- Calculating Amount of Consistency Index (CI)

λ=Average of consistency vector

$$CI = \frac{\lambda - N}{N - 1}$$

N = Size of Matrix

$$CI = \frac{11.236 - 10}{10 - 1}$$

$$CI = .137$$

- Calculating Consistency rate:

$$CR = \frac{CI}{RI}$$

Where RI = Random Index

CI = Consistency Index

- RI value is taking by Table 2; which is depending on the matrix size here;

$$N = 10 ; RI = 1.49$$

$$CR = \frac{0.137}{1.49}$$

$$CR = 0.092$$

Result obtained that our consistency is sufficient, for this Ten Factors; because Consistency Rate is less than 0.1.

After that we get result that the all factors consistency is sufficient for the evaluation of third party logistics in Coca-Cola plant.

After this we found the performance of 3PL; by applying SAW method which shown in below. And standard matrix which calculates the weights of the each criteria show in Table 12. Average of each criteria rows which value is obtained by dividing the each value of comparison matrix by sum of comparison matrix column total.

Table 12: Standard matrix

CRITERIA	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	WEIGHTS
C1	0.03	0.0194	0.0444	0.016	0.03	0.088	0.01	0.013	0.08	0.02	0.1	0.012	0.034749
C2	0.09	0.0588	0.0444	0.127	0.039	0.11	0.14	0.122	0.1	0.03	0.1	0.096	0.085038
C3	0.119	0.2352	0.1776	0.159	0.239	0.11	0.14	0.163	0.1	0.25	0.1	0.192	0.168251
C4	0.06	0.0147	0.0355	0.032	0.024	0.088	0.06	0.02	0.08	0.02	0.1	0.016	0.041291
C5	0.119	0.1764	0.0888	0.159	0.119	0.11	0.14	0.163	0.1	0.17	0.1	0.192	0.135212
C6	0.007	0.0118	0.0355	0.008	0.024	0.022	0.01	0.01	0.04	0.02	0.1	0.012	0.020856
C7	0.06	0.0118	0.0355	0.016	0.024	0.066	0.03	0.013	0.08	0.02	0.1	0.012	0.034685
C8	0.09	0.0194	0.0444	0.063	0.03	0.088	0.08	0.041	0.1	0.02	0.1	0.024	0.054754
C9	0.007	0.0118	0.0355	0.008	0.024	0.011	0.01	0.008	0.02	0.02	0.1	0.01	0.017719
C10	0.149	0.1764	0.0586	0.159	0.06	0.11	0.14	0.163	0.1	0.08	0.1	0.144	0.117416
C11	0.149	0.2352	0.3552	0.159	0.358	0.11	0.14	0.203	0.1	0.34	0.3	0.241	0.221048
C12	0.119	0.0294	0.0444	0.095	0.03	0.088	0.11	0.081	0.1	0.03	0.1	0.048	0.068981
TOTAL													1

Average of the each criteria of each transporter in real condition or real data collected by the plant which is shown in Table 13.

For evaluate the best performance sum of, average of each factors which values is collected by Coca-Cola plant third party lo-

gistics of each transporter multiplied by weights. This is shows in Table 14.

Table 13:Average of each criteria of each transporter

NAME	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12
GT	3.8	3.6	4.25	4.4	4	2.75	3.75	4	2.67	4	3.88	3.83
LBT	3.8	4.6	4.25	4	4.45	3	3.75	3.8	2.67	4.33	4.5	4.33
VT	3.4	4.5	4.25	3.8	4.36	2.75	4	4	2.83	4	4.63	4.17
RTC	3.1	3.7	4.25	4.2	4.36	3	4	4.4	2.83	4	4.25	4
MST	3.7	4.4	4.25	3.9	4.09	2.75	4	4.2	3	4	4.5	4.33
SCM	3.5	3.8	4	4	4.09	2.75	4	3.4	2.67	4.67	4.38	4.33
GRL	3.2	3.9	4.5	4.1	4	2.5	3.75	4	2.33	4.33	4.25	4

Table 14:Performance matrix

NAME	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12		WEIGHTS		PERFOR-MANCE
GT	3.8	3.6	4.25	4.4	4	2.75	3.75	4	2.67	4	3.88	3.83		0.035		3.918
LBT	3.8	4.6	4.25	4	4.45	3	3.75	3.8	2.67	4.33	4.5	4.33		0.085		4.255
VT	3.4	4.5	4.25	3.8	4.36	2.75	4	4	2.83	4	4.63	4.17	*	0.168	=	4.208
RTC	3.1	3.7	4.25	4.2	4.36	3	4	4.4	2.83	4	4.25	4		0.041		4.076
MST	3.7	4.4	4.25	3.9	4.09	2.75	4	4.2	3	4	4.5	4.33		0.135		4.174
SCM	3.5	3.8	4	4	4.09	2.75	4	3.4	2.67	4.67	4.38	4.33		0.021		4.080
GRL	3.2	3.9	4.5	4.1	4	2.5	3.75	4	2.33	4.33	4.25	4		0.035		4.073
														0.055		
														0.018		
														0.117		
														0.221		
														0.069		

Result: In this research we prepare questionnaire on five point Likert scale and got them filled by seven transporters of soft drink distribution plant. According to this we calculated the best performance of one transporter out of seven transporters. In which we evaluate the performance of the transporter. After calculating we found that Lucky Bagga Transport (LBT) is best performing on selected criteria. Though these are little difference between transporters, but LBT is better than others in Quality and Managerial capability. Otherfactors are approximately same as others.

5. CONCLUSION

In this study we presented a Multi criteria decision Making Methodology for selection of best performance of transporter in Coca-Cola plant. The method is applied using data from a case organization (Coca-Cola plant in Madhya Pradesh). To increase the efficiency and ease of use of proposed model, Simple software such as MS Excel can be used. Evaluation of the transporter or third party logistics on the basis of proposed criteria only will be sufficient for the future application of the model and implementation of this evaluation via simple software will speed up the process. It is better than current practice because it is easy and efficient to work on MS-EXCEL for the plant manager. Logistics management is most important for a soft drink industry as it constitute bulk of it's cost structure. Any savings in distribution cost may result in increases of market shares and increases of profit of plant.

Limitations of the study

The study focuses only on the third party logistics service providers. The study has not taken into consideration the perspective of 3PL service users. The view of the 3PL service user could affect the result of the success factor for the 3PL service provider.

This study is limited to only Soft drink plant 3PL service provider. The research can be improved by taking consideration of the any other industries or plants like other soft drink industries and bear industries.

Future Scope of Research

This study presents important findings for logistics manager. The factors like cost reduction ,continuous improvement, Knowledge based skills, project management skills, global capabilities, skilled logistics professionals, real time access to information and route & load optimization are the most important factors for success as a third party logistics provider. This will not only give competitive advantage but also help to gain market share. As the organization increase its market share it has to give more importance to breadth of service offered, integration among internal 3PL system, flexibility and adaptability and focus on specific industry for continuous growth of the business.

In this research we find the better performance of 3PL, and in presents and future also 3PL play most important role for increases the profit with cost minimization and better service provider to the customer for all industries. 3PL providers are the ability to scale space, labor, and transportation according to inventory needs. Business with seasonal periods can enjoy stress free transitions between industry ups and downs, having the ability to utilize more space and resources when needed. Hence better 3PL selection is important.

Recommendation to case organization

- It is recommended that a holistic approach of selecting 3PL provider may be adopted by the organization covering multiple factors simultaneously. This will help organization to access true capabilities of 3PL providers.
- A healthy competition can be initiated among service provider which may help them improve their services.
- A proper rating system must be installed for continuous monitoring of performance of the 3PL provider.

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