A CASE STUDY ON OPTIMAL TRANSPORTATION TIME FRAME OF BLUE CRABS FROM GUJARAT TO TAMILNADU

Author: Dr.Thangaraja Arumugam, Assistant Professor, SCMS School of Technology and Management, Cochin, Kerala.

Co Author: Renuga Krishnaraj, Research Scholar.

Co Author: Dr. Renju Mathai, Assistant Professor, Stenden Qatar University of Applied Science, Doha, Qatar.

Abstract

This study focuses on the transportation cost and transportation time of two various plants which are placed in Tamilnadu and Gujarat. Transportation cost is calculated for per kg of crabmeat, because the crabmeat industries generally uses the third party transportation rather than using own vehicles for their transportation. Transportation time is calculated on the basis of accounting various activities that are involved in the crabmeat operations. The company aims at finding out the transportation cost of Tamilnadu and Gujarat Operations of a crab exporting company. This study has adopted an analytical research design in the view of analysing the transportation cost and time in order to arrive at the better value at which the overall cost and time effort can be optimal. Secondary data which includes the six months of transportation cost and time from two different plants, was collected from a company. Transportation time and cost are analysed by using the tools LCM, Stepping Stone method and PERT analysis.

The LCM or by stepping stone analysis the centre wise transportation time and transportation cost/kg can be calculated and also the company can find the transportation cost/kg for a single trip. Season period the cost may reduce compared to previous seasoned time transportation costs.

The company does not have any specified limits for the usage of diesel in the contracted vehicles. Researchers suggestion is the company can fix the kilometres instead of fixing the mileage for a vehicle. (i.e.,) by fixing the kilometres the company it can calculate the diesel consumption by the vehicle.

This study is suggested by the company from logistics department and the objectives are fixed according to the problem statement in logistics. By using this study the company can define their delivery time to their client by adding the shipment time with the CPM of this research's finding. By using the crabmeat processing timing until it is packed, the ready to ship time and delivery time can be calculated easily.

Introduction

This study focuses on the transportation cost and transportation time of two various plants which are placed in Tamilnadu and Gujarat. Transportation cost is calculated for per kg of crabmeat, because the crabmeat industries generally uses the third party transportation rather than using own vehicles for their transportation. Transportation time is calculated on the basis of accounting various activities that are involved in the crabmeat operations.

The company uses the Tamilnadu crabmeat for their product which is canned, pasteurized, chilled crabmeat. Because of the growing competitors in the local market and reducing of blue crabs in non-seasons the company's sustainability on their production was reduced. To make-up their sustainability the company planned to get the Gujarat crabmeat, this is achieved by the rail and road transportation. The researcher's study is based on this logistics problem and the study explains the process of transportation in two various places and it analyses the variations in transportation cost and time of two different plants

Objectives

This study aims at understanding the crabmeat export process and make a scientific study for finding out the transportation time of Tamilnadu and Gujarat Operations of crab exporting company.

Review of literature

This paper gives the details of the crabs in various places of India, available crabs in each places, the seasons of various crabs, and it mainly talks about the taste which varies on the basis of the size and the gender of the crab. The female crabs are meatier and the male crabs are have bigger

claws. This paper examined with the various types and various places where the crabs are available and also gives the types and selection process of the crab for home and industrial purchase.

This paper examines the distribution of the blue swimmer crabs all over the world and it explains the each component which are involved in the blue crab and its processing methods such as life cycle, harvesting of blue crab, and the net arrangements for crabs while harvesting. These are the basic information about Blue crab and are explained briefly. This paper also gives the Management methods for harvesting, protecting blue crabs for next harvesting and for efficient harvesting, the processing methods of the blue crab into canned crabmeat and the types of meat from the cooked crabs, their grades, and their classifications.

This paper illustrates how the economic concepts introduced in the transportation systems and various costs involved in the transportation in various stages, it gives the significant benefits and costs involving in providing and using transportation systems and how best the costs are allocated to the transportation systems. It describes the interactions between transport and location choices, land values and wages, It introduces the input – output models and some general models and their strengths and limitations.

To effectively manage the supply chains of their customers, 3PLs need to constantly analyse data collected from various sources and convert it into actionable information. Business Intelligence (BI) tools like data warehousing and OLAP can significantly help 3PLs in achieving this objective. By providing a unified view of the entire supply chain, these tools can help improve the functioning of basic 3PL services like transportation management, warehousing, and inventory management. 3PLs can leverage BI tools to provide their clients with information specific to their supply chain, thereby increasing their market responsiveness. BI tools can also help 3PLs improve their own internal organizational functions like human resources and financial management.

The motive of logistics is to get the right goods or services to the right place, at the right time, and in the desired condition and quantity in relation to customers order. Transparent reporting of logistics costs and the related accounting of their cost drivers present a significant factor for the successful management of material flows and the related logistics activities in production

companies. The overall view of the logistics and Supply Chain management in earlier days and in modern days are explained in this paper.

It is presented with the location model and discussed different traditional logistics settings.

For years, researchers and practitioners have primarily investigated the various processes within manufacturing supply chains individually. Recently, however, there has been increasing attention placed on the performance, design, and analysis of the supply chain as a whole. This attention is largely a result of the rising costs of manufacturing, the shrinking resources of manufacturing bases, shortened product life cycles, the leveling of the playing field within manufacturing, and the globalization of market economies.

Network models are possibly still the most important of the special structures in linear programming. In this paper, they examine the characteristics of network models, formulate some examples of these models, and give one approach to their solution. The resulting algorithms are extremely efficient and permit the solution of network models so large that they would be impossible to solve by ordinary linear-programming procedures.

Transport costs and scale economies interact to produce the trade flows observed in the past half-century. The main insight from research is that the relationships between transport costs, production locations, and trade patterns are nonlinear. Falling transport costs first led to countries trading more with countries that were distant but dissimilar. When they fell further, they led to more trade with neighboring countries. Similarly, when transport costs fell from moderate levels, production concentrated in and around large markets. In this paper the researcher discussed about the transportation costs in various countries in at various time period.

This manual is designed to guide blue crab processors in the efficient operation of their firms and in the sanitary production of crab meat. Preparing and implementing an operational plan that complies with state and federal food regulations is the first best step toward the production of wholesome, high quality crab meat free from disease-causing microorganisms.

The supply chain encompasses all activities associated with the flow and transformation of goods from the raw materials stage (extraction), through to end users, as well as the linked information flows. Inventory represents one of the most significant possessions that most businesses possess. It is in direct touch with the user department in its day today activities. This paper examines the

Operation Research for the Supply chain management in two companies and it reveals the analytical models for supply chain management.

Methodology of this study

This study has adopted an analytical research design in the view of analysing the transportation cost and time in order to arrive at the better value at which the overall cost and time effort can be optimal. Secondary data which includes the six months of transportation cost and time from two different plants, was collected from a company. Transportation time and cost are analysed by using the tools LCM, Stepping Stone method and PERT analysis.

Analysis and discussion

Gujarat Plant operations

Generally Procurement involves three steps, they are, Purchasing of crabs, cooking of crabs Transportation of cooked crabs but in Gujarat plant operation, Procurement involves four steps they are, Purchasing of crabs, cooking of crabs, Picking of crabs, Transportation of crab meat
It involves two modes of transportation. They are, Road and Rail transportation
In this, three train routes are selected and executed successfully. Two modes of transportation are combined together to make the transportation efficiently.

**Table 1: Three Routes from Gujarat to Tamilnadu Transportation:**

Path 1:		Path2		Path3 : Road	
Meat weight	100 kg (4 T.C Box)	Meat weight	100 kg (4 T.C Box)	Meat weight	100 kg (4 T.C Box
Destination 1	Rs.200/- (4*50)	Destination 1	Rs.160/- (4*40)	Delivery Charges	Rs.240/- (4*60)
Destination 2	Rs.600/-	Destination 2	Rs.250/-	Incidental Expenses	Rs.200/-
Destination 3	Rs.940/- (4*235)	TOTAL	Rs.410/-	Toll gate charges	Rs.80/-
Delivery Charges	Rs.160/- (4*40)			Destination	Rs.1250/-

| TOTAL | Rs.2150/- | | | TOTAL | Rs.1770/- |
| *Cost/kg* | *21.5* | *Cost/kg* | *4.1* | *Cost/kg* | *17.7* |

The above table describes the three different routes of transportation of crabmeat from destination one to destination two. Each derives different kinds of cost and time. The overall cost has been calculated and further it has been analysed using PERT and CPM for time and cost analysis.

Table2: PERT ANALYSIS FOR GUJARAT

Critical path tasks	Estimations			PERT Expected time	SD	V
	Optimistic	Most likely	Pessimistic			
Cooking & Icing (A)	5.3	6	8	6.22	0.5	0.20
Waiting time (B)	5.3	6	8	6.22	0.5	0.20
Picking & Debacking (C)	8	10	11	9.83	0.5	0.25
Waiting time for transportation (D)	24	26.3	27	26.03	0.5	0.25
Transport to Chennai (E)	38	39	40	39.00	0.3	0.11
Chennai to Tuticorin (F)	11	11.3	12	11.37	0.2	0.03
Transport to Tuticorin(G)	52	53	54	53.00	0.3	0.11
Transport to Tirunelveli(H)	49	50	51	50.00	0.3	0.11
Tirunelveli to Company(I)	3	3.3	4	3.37	0.2	0.03
Railway station to company(J)	1	1.3	2	1.37	0.2	0.03
Waiting time(K)	2	6	6.5	5.42	0.8	0.56
Processing time(L)	8	10	12	10.00	0.7	0.44
Pasteurization time(M)	4.2	4.25	4.3	4.25	0.0	0.00
TOTAL	210.800	226.450	239.800	226.067	4.833	2.329
PROBABILITY OF COMPLETION				59.91663598		
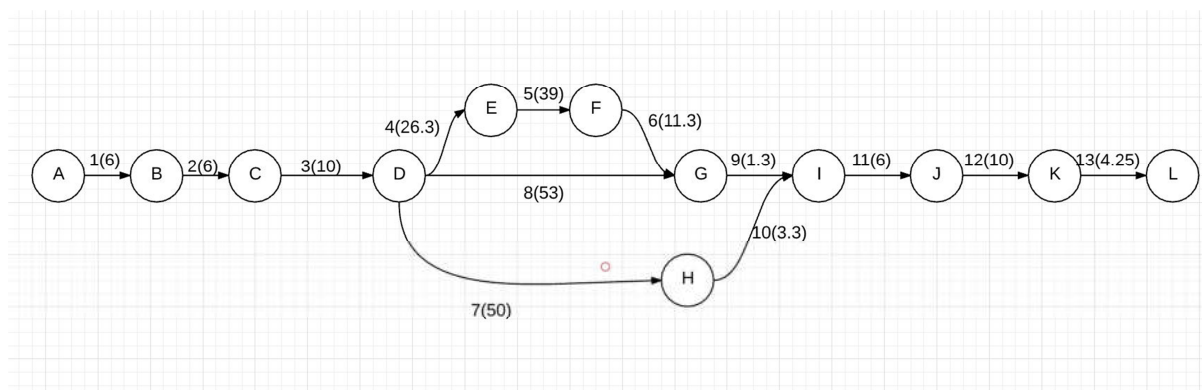
Figure 1: PERT Chart Gujarat

Among these three routes, the delivery time to their client by adding the shipment time with the CPM of this research's finding which clearly denotes that the crabmeat transportation critical path has been found. It poses to be the effective timing. By using the crabmeat processing timing until it is packed, the ready to ship time and delivery time can be calculated easily
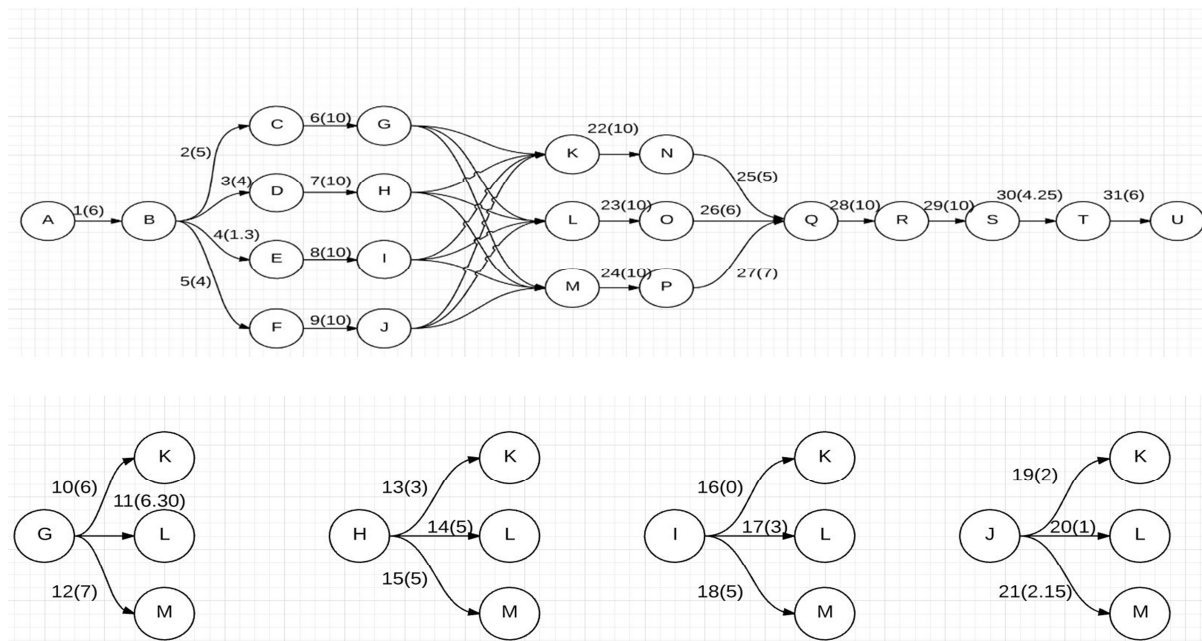
Figure 2: PERT Chart Tamilnadu

Among these three routes, the delivery time to their client by adding the shipment time with the CPM of this research's finding which clearly denotes that the crabmeat transportation critical path has been found. It poses to be the effective timing. The different cluster of nodes and decisions have been analysed and the effective route is fixed in the above chart.

The LCM or by stepping stone analysis the centre wise transportation time and transportation cost/kg can be calculated and also the company can find the transportation cost/kg for a single trip. Season period the cost may reduce compared to previous seasoned time transportation costs.

The company does not have any specified limits for the usage of diesel in the contracted vehicles. Researchers suggestion is the company can fix the kilometres instead of fixing the mileage for a vehicle. (i.e.,) by fixing the kilometres the company it can calculate the diesel consumption by the vehicle.

Table 3: The result of PERT analysis of optimal Tamilnadu and Gujarat transportations

PERT Result		Tamilnadu transportations		Gujarat transportations	
Standard Deviation (SD)	√ (V)	A→ B→ C→ D→ E→ F→ G→ I→ J→ K→ L	CPM = 5 days 15 min	A→B→C→G→M→P→Q→R→S→T→U	CPM = 3 days 3hr 25 min
Variance (V)	((Pessimistic-Optimistic)/6)²	= 6++10+26.3+39+11.3+1.3+6+10+4.25 = 120.15 min		6+5+10+7+10+7+10+10+4.25+6 = 75.25 min	
PERT Expected Duration	(Optimistic+ (4*Most likely)+Pessimistic)/6)				

Conclusion

This study focuses on the logistics department and the objectives are fixed according to the problem statement in logistics. By using this study the company can define their delivery time to their client by adding the shipment time with the CPM of this research's finding. The crabmeat processing timing until it is packed, the ready to ship time and delivery time can be calculated easily. The researcher has got the insight of the logistical approach on the crabmeat transportation across districts in terms of the cost and time. The techniques used in this study has been adopted for the requirement of the situation.

REFERENCE

Blue swimmer crab - By, R.Swainston , March 2011. Published in Fisheries Fact sheet, Department of Fisheries, Government of Western Australia.

The role of transportation in logistics chain – By, yung-yu TSENG, July 2005. Published in Eastern Asia Society for Transportation Studies.

The Economics of Transportation Systems: Development and operations – By, T.Donna Chen, Jan 2013. Published in Department of Transportation, Kansas State University, Emerald Publishers.

The Time Cost Distance Model – By, Jose Maria Rubiato Elizalde, June 2012. Published in United Nations ESCAP Publications.

Activity Based Management of Logistic costs in a Manufacturing Company: A case of increased Visibility of Logistics costs – By, Julijana Krajnc, Bojana Korosec, Dec 2011. Published in Prompt Traffic & Transportation.

Maximizing Supply Chain Performance in the Transportation and Logistics Industry – By, Klavdij Logozar, Oct 2010. Published in Cognizant Business Counselling Publications.

Business Intelligence and Logistics – By, Srinivasa Rao P, Saurabh Swarup, April 2008. Published in Eastern Asia Society for Transportation Studies.

Logistics Strategies and Tools – By, Elke Glistau, Michael Schenk, May 2013. Published in Otto-von-Guericke-University Magdeburg, Germany.

Introduction to Logistics and Supply Chain Mnagement – By, Jaroslaw Witkowski, May 2014. Published in Wroclaw University of Economics Publications.

Quantitative methods for Support of Managerial Decision-Making in Logistics – By, Vladimira Vlckova, Fillip Exnar, Otakar Machac, May 2012. Published in 7th International Scientific Conference "Business and Management", Vilnius, Lithuania.

The Impact of Product Recovery on Logistics Network Design – By, M.Fleischmann, P.Beullens, Nov 2000. Published in INSEAD R&D Publications, France.

Supply Chain Design and Analysis: models and Methods –By, Benita M. Beamon, June 1998. Published in International Journal of Production Economics.

Logistics costing in Manufacturing Companies – By, Zoltan BOKOR, May 2000. Published in Journal of Transport Economics, Buddapest University of Technology and Economics.

Logistics Performance Definition and Measurement – By, Garland Chow,   Trevor D. Heaver and Lennart E. Henriksson, 1994. Published in International Journal of Physical Distribution & Logistics Management.

Network Models for minimizing transportation cost – By, Kenneth Small, cliford Winston and J.Yan, 2005. Published in Travel time and Reliability, University of Irvine.

Transport cost and Specialization – By, Boons, A.N.A.M,1998. Published in International Journal of Production Economics.

Quality Assurance and Operating Policy Manual for BLUE CRAB INDUSTRY - By, George J. Flick, Thomas E. Rippen, Geoferry M. Knobl, Cameron R. Hackney , William H. Robinson, January 1994. Published in Virginia Sea Grant Publication.

An analytical study on the Development of some supply chin inventory models – By, Navin Ahlawat, 2012. A thesis Submitted to the Shri Jagdish Prasad Jhabarmal Tibrewala University, for the degree of Doctor in Philosophy in Management.