

OPERATION RESEARCH PAPER

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ABSTRACT

The purpose of this research papers to see if the MODI method is effectively work for this and can able to get the desired result like the minimized cost of transportation of the products from the warehouse to the retail stores of METRO Wholesale Market.

INTRODUCTION

METRO Cash & Carry India offers close to 7,000 world-class products across a multitude of categories - such as fruits & vegetables, general grocery, dairy, frozen & bakery products, fish & meat, confectionery, detergents & cleaning supplies, health & beauty products, media & electronics, household goods and apparel - all under one roof, and at transparent, low wholesale prices. This helps us improve our customers' offerings, while providing them with a reliable supply source. Analyzing the local requirements, a large percentage of the goods are sourced locally and are tailor-made to meet the specific demands of the region. METRO Wholesale including six in Bangalore, four in Hyderabad, two each in Mumbai and Delhi, and one each in Kolkata, Jaipur, Jalandhar, Zirakpur, Amritsar, Vijayawada, Ahmedabad, Surat, Indore, Lucknow

METHOD THAT IS USED TO SOLVE PROBLEM

THE TRANSPORTATION PROBLEM

The transportation problem is a special type of linear programming problem where the objective consists in **minimizing transportation cost** of a given commodity from a number of **sources** or **origins** (e.g. factory, manufacturing facility) to a number of **destinations** (e.g. warehouse, store). Each source has a limited supply (i.e. maximum number of products that can be sent from it) while each destination has a demand to be satisfied (i.e. minimum number of products that need to be shipped to it). The cost of shipping from a source to a destination is directly proportional to the number of units shipped.

Product Chosen for Research

So, for this project we have chosen the Fresh Meat and Poultry Products so here are the details

Variety

You'll be amazed at the range of choices we offer:

- Get any cut you want with our skilled butchers on hand
- Frozen and fresh meats available
- Imported meats can be sourced as per your needs

RAW MEAT

- Chicken: Fresh Whole, Portion Cuts – Boneless, Drumsticks, Lollypop, etc.
- Mutton (Lamb/Goat): Whole Carcass, Leg, Shoulder, Boneless, Chops, etc.

Imported Range

Meat: Frozen Imported Mutton Cuts from New Zealand

Fresh Chilled Delicatessen Meats: Cold Cuts, smoked and cured meats range in Poultry and Pork

PACKAGED MEAT

Mutton & Lamb – Mutton mince, Popcorn, Nuggets, Burger Patty, Keema

Chicken - Samosa, Sausages, Burger Patty, Salami, Nuggets

Imported - Spanish Toast Ham, Smoked Pancetta Ham, Turkey Nuggets

Warehouse from which the Products are bought

Arabian Exports Pvt.Ltd.

M.K.R Frozen Food Exports Pvt. Ltd.

P.M.L Industries Pvt. Ltd.

Retail Store

Metro Wholesale Shahdara

Metro Wholesale Parsvnath Mall

Metro Wholesale Noida

OUR RESEARCH

The first thing is that the metro wholesale market is been three different places in Delhi like in Shahdara, Parvsnath mall and in Noida. All these wholesale market has been connected with the different warehouses for their product the warehouse like Arabian Exports Pvt. ltd., MKR Frozen Food Exprts Pvt. Ltd. and also the PML industries Pvt ltd.

In this ordering from store to warehouse is completely automated i.e., after less in stock of that product the team from placing order placed an order from these warehouses and then order the products as per there data like how much they have the demand of that product Or what is the response from the customer.

the transportation of the product is from the different warehouse.

so under this there is the table which is made which states the demand of the individual store and how much they have ordered. according to the customer need in that area.

INDIVIDUAL STORE DEMAND OF PRODUCT

Products Meat Range	Amount per kg	Quantity in KG	METRO MARKET SHAHDARA	METRO MARKET (MALL)	METRO MARKET NOIDA
CHICKEN FRESH WHOLE	349	200	80	80	40
MUTTON LAMB WHOLE	820	150	60	50	40
MUTTON LEG	1000	140	50	45	45
CHICKEN BONELESS	420	120	50	40	30
CHICKEN LOLLYPOP	360	130	70	35	25
CHICKEN DRUMSTICK	310	110	40	30	40

FROZEN MUTTON	950	100	30	30	40
FROZEN CHICKEN	920	120	40	35	45
PORK	320	100	50	35	15

TOTAL = 5449 KGS

CALCULATION

SO WE WILL SOLVE THE PROBLEM BY THE MODI METHOD AND SHOW THE MINIMUM TRANSPORTATION COST OF THAT PRODUCT BY THE HELP OF EXCEL SOLVER

PRODUCT:- MUTTON (LAMB)	METRO MARKET					
		SHAHDARA	MALL	NOIDA		
		D1	D2	D3		
WAREHOUSE (ARABIAN EXPORTS PVT. LTD)	S1	20	35	55		60
MKR FROZE FOOD	S2	30	25	25		50
PML INDUSTRIES PVT. LTD.	S3	50	45	15		40
		50	50	50		150
		D1	D2	D3	CONSTRAINTS	SUPPLY
	S1	50	10	0	60	60
	S2	0	40	10	50	50
	S3	0	0	40	40	40
	CONSTRAINTS	50	50	50		
	DEMAND	50	50	50		150
		TOTAL TRANSPORTATION COST			3200	

USING BY THE VAM

Minimum Transportation Cost Calculator | VAM Calculator

Number of Rows Number of Columns

Create **Reset**

	D1	D2	D3	Supply
S1	<input type="text" value="20"/>	<input type="text" value="35"/>	<input type="text" value="55"/>	<input type="text" value="60"/>
S2	<input type="text" value="30"/>	<input type="text" value="25"/>	<input type="text" value="25"/>	<input type="text" value="50"/>
S3	<input type="text" value="50"/>	<input type="text" value="45"/>	<input type="text" value="15"/>	<input type="text" value="40"/>
Demand	<input type="text" value="50"/>	<input type="text" value="50"/>	<input type="text" value="50"/>	

Calculate

Total Minimum Cost

$(40 \times 15 + 10 \times 25 + 50 \times 20 + 10 \times 35 + 40 \times 25)$

3200

CONCLUSION

So by all the calculations done through the excel solver and other online platforms we get the same answer i.e. RS. 3200 for the product Mutton Lamb from the warehouse to the retail stores and therefore this is the minimum transportation cost.

and also, I think that excel solver is more accurate and also it takes the less time for me to calculate the minimum transportation cost of metro wholesale market.

So therefore, in final I can suggest them to use this method and in order to get the minimum transportation cost of product.

BIBLIOGRAPHY

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3. <https://www.metro.co.in/products-world>
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- FOR CALCULATION OF PROBLEM

EXCEL SOLVER (MICROSOFT EXCEL)

OTHER ONLINE PALATFORM

<https://www.easycalculation.com/operations-research/minimum-transportation-vogel-approximation-method.php>