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Efficient establishment of foreign manufacturing units in India: utilizing operation research approaches amidst changing import regulations

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ABSTRACT

With increasing regulatory policies from countries, companies have to find an efficient way to set up their manufacturing units in other countries as well. Currently majority of the companies set up their manufacturing units in China as they are able to manufacture products at a cheaper price, however this will not work for the long term, as if the companies intend to sell their products in countries with restrictive import policies, they will have to diversify and set up their manufacturing units in that/those countries as well. To select the right location for setting up a manufacturing unit, a company must look into what we classified as Internal and External factors which we will be going in-depth further into the research paper. This research paper sets out to provide a framework to those companies that are looking to set up their own manufacturing units in a country using operation research tools such as Linear programming which includes visualizing the “Internal” factors as a transportation problem. One probable limitation of this research paper is assuming that the current demand for the products in the economy will remain equal to the forecasted demand or demand in the coming years after setting up the manufacturing units, demand will be used in the linear programming problems later in this research paper.

Keywords: Manufacturing Unit, Restrictive Import Policy, Cheaper Price, Linear Programming Problem, Comprehensive Framework, Optimal Location.

1. INTRODUCTION AND OVERVIEW

Efficient establishment of foreign manufacturing units in India: Utilizing operations research approaches amidst changing import regulations. The Indian government enacted the laptop import ban in India on August 3, 2023 under the HSN 8741 category to boost local production cited from [TIMESOFINDIA.COM. (2023, August 4). Ban on laptop imports: Can you buy from abroad, duties to be paid and other things to know. *The Times of India.*]

This ban calls for importers to obtain a license before importing laptops, tablets and other electronic items. The Directorate General of Foreign Trade (DGFT) has deferred the implementation of these import restrictions until October 31, 2023 cited in [Kamath, P. (2023). India laptop import ban: Reasons, impact, and alternatives explained. *coopwb.in.*] Starting November 1, 2023, the clearance of import consignments of the stipulated seven items under the HSN 8741 category will require a valid ‘License for Restricted

Imports'. The HSN 8741 code is meant for devices dealing with data processing. Some people might look at this as an opportunity to improve domestic manufacturing in India, and others fear that it might lead to increase in prices. Companies like Dell have announced that they will invest \$300 million in setting up its manufacturing operations in India.

Global tech giants like Dell, Acer, Samsung, Panasonic, Apple, Lenovo, and HP may face hurdles as they navigate the new import regulations, potentially necessitating price adjustments or profit margin reductions to remain competitive. Through this research paper, we plan on helping corporate companies establish their manufacturing units in India. The methodologies we'll be using in this research paper will be Linear Programming Problem and transportation method. Companies use these methodologies in setting up manufacturing units for various reasons, some of them being Cost savings, tariff and trade regulations, resource allocation, supply chain optimization.

However, our Research paper is not just limited to foreign companies setting up manufacturing units only in India, India here is taken just as a case study due to the new recent import policy. It can also apply to other countries which are going to impose the import ban on various products thus forcing the foreign companies to set up manufacturing units in that/those particular country/ies. It is also not restricted to just Laptop/Gadget/Tech based companies, since many countries have their own import policies on various products, this also applies to all types of companies trying to establish their manufacturing units in a country.

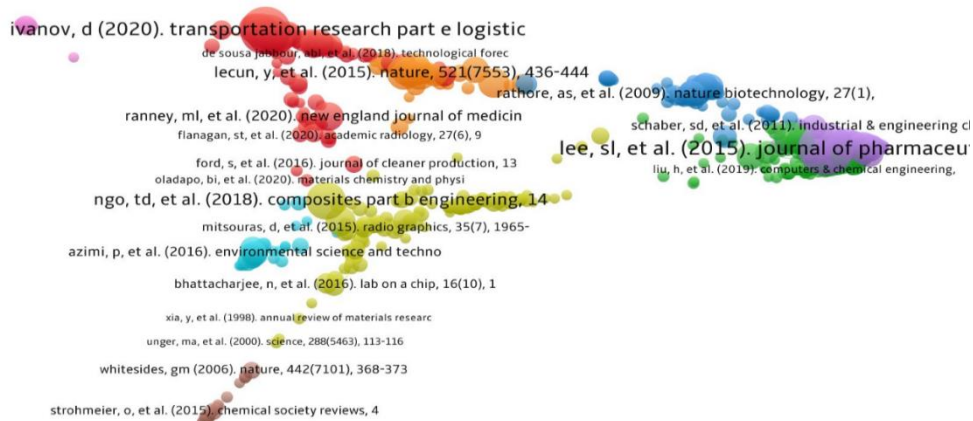
2. LITERATURE REVIEW

The paper Sadleir, C. D. (1970). Use of the Transportation Method of Linear Programming in Production Planning: A Case Study. *Operational Research Quarterly (1970-1977)* has tried to find similar solutions like our research paper however they are more focused on an optimal quantity of production for a manufacturer rather than setting up the unit in a location. The paper primarily focuses on supply constraints and conditions on product mix and used transportation problem method of Linear Programming Problem to find the optimal production capacity. We deal with focusing on the optimal location to set up manufacturing or production units.

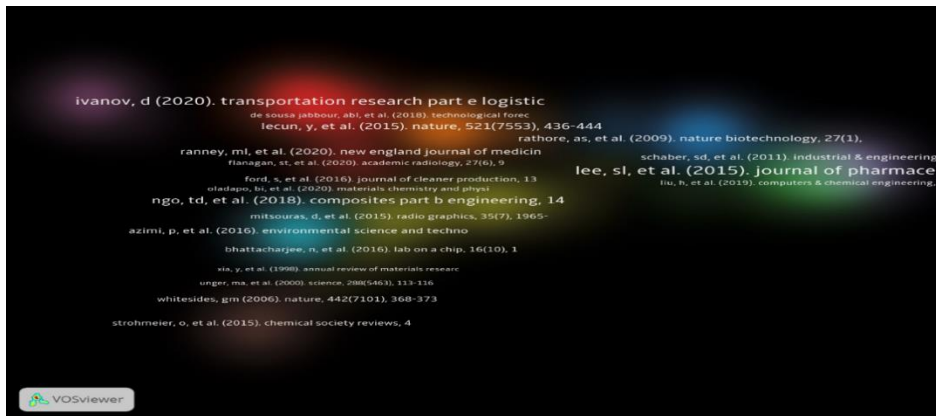
While examining (Mueller, E., & Morgan, J. N. 1962; Baumol, W. J., & Wolfe, P. 1958; Elson, D. G. 1972; Fulton, M., & Hoch, L. C. 1959) it becomes evident that the collective area of study remains strongly inclined towards an exceedingly narrow defined context. Most studies are limited to specific geographic area, neglecting broader comparisons or international perspectives. The focus has mainly been on small scale industries with limited competition, leaving a gap on how these factors apply to larger enterprise. Algorithms have primarily been in context of warehouse management or a specific sector, but their applicability to manufacturing units remains underexplored. Existing research often overlooks the impact of external factors, such as broader business environment of the host country, which can significantly influence economic outcomes.

We came across several papers (Meng, X., & Li, X. 2020; Knox, J. 1951; Dumas, Y., Desrosiers, J., Gelin, E., & Solomon, M. M. 1995) focusing on location sites related to a specific industry. These research papers provided valuable insights and served as a catalyst for our own work. However, they also highlighted a notable gap of how the algorithms and factors used in the research of one industry cannot be used for the optimization of location for another industry that inspired us to embark on our research paper. Below images are the bibliometric analysis using VOSviewer.

Bibliometric Analysis – Link between OR and Manufacturing sector



Density Analysis - Link between OR and Manufacturing sector



Source – The Author: Retrieved from VOSviewer importing data from Dimensions.ai

In figure 1, we have network analysis of the VOSviewer mapping, as evidenced by figure 1, there are multiple research co-citations on the topic transportations in the logistics or supply chain management and also on application of Operations research on pharmaceutical industries.

In the figure 2, we have the Density analysis of the VOSviewer mapping.

Density analysis as suggested by the name shows the Density or the cluster power of each cluster based on the depth of colour.

As we can see, in transportation in logistics and supply chain, the density is the highest as it is showing more depth in colour as compared to others.

Therefore, this indicates that there is scope for operations research in transportation, however we have taken a different approach to this topic in our paper.

Our research gap is that-

- We focus more into analyzing, planning and forecasting rather than just creating a linear programming problem based on current/past status of the manufacturing units in a country, this will be explained more in-depth in the coming sections of the paper.
- We provide a comprehensive framework for the Top-level managers of any company to take decisions as to which is the most optimal location to set up their manufacturing units.

3. RESEARCH METHODOLOGY

Essentially the methods we have used in the research paper as discussed above is linear programming (LPP), we have also converted the data into transportation problem which is a subset of LPP. Now since our objective is to provide a framework for the companies to set up their manufacturing units in a country like India with increasing restrictive import regulations. Here is the step-by-step process the companies will have to follow in order to select the most appropriate location for setting up their manufacturing units:

- I. Select the Country in which you want to set up your manufacturing unit.
- II. Consider and evaluate the external factors of each state in that country.
- III. After evaluating the external factors, shortlist atleast 4 to 5 states. (for this research paper we short list 4 states after evaluating external factors)
- IV. Once shortlisting is done, one must now collect the data of the internal factors of those 4 states.
- V. Use those internal factors to construct LPP problems.
- VI. Solve the LPP problem and thus determine the most optimum state/states for setting up the manufacturing unit.

Our primary analysis begins from step 4 onwards. However, we will explain briefly about what we classify as internal and external factors (i.e all steps prior to step 4).

4. ANALYSIS AND FINDINGS

We will be following the steps specified in the methodology,

- I. Select the Country in which you want to set up your manufacturing unit.

The first step sets up the premise for the entire paper, the top management of the company must select which country to set up their manufacturing unit.

They can do so by analyzing the import regulations of each country.

For this research paper we consider India as a case study, as specified earlier in the research paper there are some import regulations set up in India where there is a ban on import of laptops/gadgets, this has forced the foreign companies which

have majority of their manufacturing units set up in countries like china now set up their units in India to be able to cater to the Indian market.

- II. Consider and evaluate the external factors of each state in that country.
The external factors that we consider essential to set up manufacturing units in India or any country are more generic in nature. However, the result of these generic factors may differ from country to country.
The external factors could be-
- a. **Economic Factors:** Economic factors encompass the financial conditions affecting businesses. These include inflation rates, exchange rates, economic growth or recession, interest rates, unemployment levels, consumer spending habits, and overall economic stability. Businesses must monitor these factors to make informed financial decisions and assess market conditions for their products and services.
 - b. **Political and Legal Factors:** Political and legal factors refer to the influence of government policies, laws, and regulations on businesses. This includes government stability, tax policies, trade restrictions, labor laws, intellectual property regulations, and industry-specific regulations. Changes in political leadership or policies can have significant impacts on business operations, market entry, and compliance requirements.
 - c. **Environmental Factors:** Environmental factors are related to the natural world and sustainability concerns. These encompass climate change, environmental regulations, natural disasters, resource availability, sustainability initiatives, and the impact of environmental practices on reputation and customer preferences. Companies increasingly focus on eco-friendly practices and managing their environmental footprint.
 - d. **Social and Cultural Factors:** Social and cultural factors encompass societal trends and preferences that influence business decisions. These include demographic trends, cultural norms, social attitudes, lifestyle changes, and shifts in consumer behavior. Understanding these factors helps businesses tailor their products and marketing strategies to meet changing customer needs.
 - e. **Technological Factors:** Technological factors relate to advances in technology and their impact on industries. This includes the pace of technological innovation, research and development capabilities, automation, artificial intelligence, and cybersecurity threats. Staying technologically competitive is essential in the digital age.
 - f. **Competitive Factors:** Competitive factors involve the actions and strategies of rivals in the marketplace. This includes market share, competition intensity, innovations by competitors, entry of new competitors, competitive pricing, and product differentiation. Businesses must constantly assess their competitive landscape to maintain a strong market position.

The above are the external factors that must be considered by the top management of the foreign company.

- III. After evaluating the external factors, shortlist atleast 4 to 5 states. (for this research paper we short list 4 states after evaluating external factors)

The top management must evaluate each state in the country based on the above listed external factors, preferably create a pro and cons list of each country based on these factors, allocate weights to each pro and cons, and shortlist atleast 4 to 5 states best suitable for setting up the manufacturing unit.

For this case study, we assume that the foreign company shortlists 2 states best suitable for setting up their manufacturing units.

The states being Delhi and Mumbai.

- IV. Once shortlisting is done, one must now collect the data of the internal factors of those 4 states.

5. THIS EXAMPLE IS TAKEN FOR SIMPLIFICATION; REAL EXAMPLE WOULD BE DIFFICULT TO UNDERSTAND WITH HUGE NUMBERS.

We have considered hypothetical data because we do not intend to limit ourselves to a specific industry or sector, our objective is to provide a framework to the companies.

Manufacturing Units: The company plans to set up manufacturing units in

- Delhi
- Mumbai

- Bangalore.

Suppliers: These are the locations or suppliers from which the company sources its raw materials. In this case, let's consider four suppliers:

- A
- B
- C
- D.

Supply: The supply capacity of each supplier, representing the availability of raw materials. We'll assume

- Supply_A = 200 units
- Supply_B = 300 units
- Supply_C = 150 units
- Supply_D = 250 units

Manufacturing Unit Demand: The expected demand for raw materials at each manufacturing unit:

- Demand_Delhi = 120 units
- Demand_Mumbai = 180 units
- Demand_Bangalore = 170 units

Transportation Cost: The cost of shipping one unit of raw material from each supplier to each manufacturing unit. We'll use random costs for illustration:

- C_A_Delhi = 400 per unit
- C_A_Mumbai = 500 per unit
- C_A_Bangalore = 500 per unit
- C_B_Delhi = 500 per unit
- C_B_Mumbai = 400 per unit
- C_B_Bangalore = 700 per unit
- C_C_Delhi = 600 per unit
- C_C_Mumbai = 800 per unit
- C_C_Bangalore = 500 per unit
- C_D_Delhi = 700 per unit
- C_D_Mumbai = 600 per unit
- C_D_Bangalore = 400 per unit

Zone	State	City	CIS Center Address	Phone	Products Supported*	Holiday	Timings
North	ND	New Delhi	Service Provider : M/s Regeneris (India) Private Limited, Upper Ground Floor, Devika Tower, Nehru Place, New Delhi-110019 (Landmark: Behind Modi Tower)	011-46035120/21	Laptops & Tablets	Sunday	9:30AM - 6:30PM
North	HR	Gurgaon	Service Provider : Re-Boot IT Solutions, Lg-5, Devi Palace, Opp: Raj Cinema, Old Delhi Road, Gurgaon-122001, Haryana	0124-4047626	Laptops & Tablets	Sunday	9:30AM - 6:30PM
North	PB	Chandigarh	Service Provider : M/s Swastik Computers, S.C.O. 98-99-100, FF, SEC-17-D, Chandigarh-160017	0172- 2713743	Laptops & Tablets	Sunday	9:30AM - 6:30PM
North	PB	Chandigarh	Service Provider : Skope Infotek S.C.O -2443-44, 2nd Floor, C-32-33, Sector 22-c, Chandigarh- 160022	0172-3915386	Tablets Only	Sunday	9:30AM - 6:30PM
North	PB	Bathinda	Service Provider : M/s Macrotech Computer; F-77,Backside Hotel Gulfam,opp to thukral hospital, Civil Lines, Bathinda-151001	0164-5008751	Tablets Only	Sunday	9:30AM - 6:30PM

North	PB	Ludhiana	Service Provider : M/s Swastik Computers, Khurana complex, flat no 4, 2nd floor, kochar market chowk, Ludhiana - 141001	0161-4679988	Tablets Only	Sunday	9:30AM - 6:30PM
North	PB	Jalandhar	Service Provider : M/s Swastik Computers, SCF6, 2nd Floor, Above Times Of India Office, GTB Nagar, Jalandhar-144001	9781997516	Tablets Only	Sunday	9:30AM - 6:30PM
North	PB	Amritsar	Service Provider : M/s A.H.D Communications, 15t Floor,Bhai Ghaniyan Mkt, Nr Bus Stand,GT Road, Amritsar-143001	0183-5012999	Tablets Only	Sunday	9:30AM - 6:30PM
North	RJ	Jaipur	Service Provider : M/s Shree Krishna computers, G-3, Shree Gopal Tower, Krishna Marg, C-Scheme, Jaipur- 302001 Landmark (Near Ahinsha Circle)	0141-4014220	Laptops & Tablets	Sunday	9:30AM - 6:30PM
North	RJ	Jodhpur	Service Provider : M/s Elite Tech Services,No: 215, Second Floor, Achaleshwar Complex, Opp. Old University Campus, Ratanada Road, Jodhpur - 342001	0291-3246944	Tablets Only	Sunday	9:30AM - 6:30PM
North	RJ	Kota	Service Provider : M/s Expert Computers, G-8, Deep Shree Parisar, Opp. Hdfc Bank Jhalawar Road, Kota-324007	0744-2361240	Tablets Only	Sunday	9:30AM - 6:30PM
North	UT	Dehradun	Service Provider : M/s Hervet Technologies, C-2, Ambika Complex, 2nd floor, Ballapur Chowk,Dehradun - 248001	0135-2766555	Tablets Only	Sunday	9:30AM - 6:30PM
North	UP	Noida	Service Provider : Creativecomp Infotech Pvt. Ltd, B-1, Basement, Bhagmal Complex, Near Sec-16 Metro, Opp. Wipro, Sector - 15, Nayabans, Noida, Gautam Budha Nagar - 201301	0120-4571666	Laptops & Tablets	Sunday	9:30AM - 6:30PM
North	UP	Lucknow	Service Provider : M/s Creativecomp Infotech Pvt. Ltd., Lg-5, Tej Kumar Plaza, 75, Hazratganj, Lucknow-226001 (Landmark: Opp Darool Safa)	0522-4060505	Laptops & Tablets	Sunday	9:30AM - 6:30PM
North	UP	Agra	Service Provider : M/s Deya I.T Solutions , 26/2/4-106-F, Sanjay Place, Agra - 282002	0562-4057172	Tablets Only	Sunday	9:30AM - 6:30PM
North	UP	Allahabad	Service Provider : M/s Palash Infotech, Ug 4, Vinayaka Central Plaza, B1-35, M.G. Marg, Civil Lines, Allahabad - 211001	9235599990	Tablets Only	Sunday	9:30AM - 6:30PM
North	UP	Bareilly	Service Provider : M/s Famous Computers,Shop No. 22, 2nd Floor, Novelty Plaza, Near Deenanath Lassi, Bareilly - 243001	9359555134	Tablets Only	Sunday	9:30AM - 6:30PM
North	UP	Gorakhpur	Service Provider : M/s Creativecomp Infotech Pvt Ltd., Pushpanjali Complex, Shahi Market, Cinema Road, Gorakhpur-273001	0551-2205151	Tablets Only	Sunday	9:30AM - 6:30PM
North	UP	Kanpur	Service Provider : M/s Creativecomp Infotech Pvt Ltd., 119/31B, Jain Hind Lane, Nasimabad, Gumti No.05 Kanpur-208012	0512-2212403/9936300994	Tablets Only	Sunday	9:30AM - 6:30PM
North	UP	Varanasi	Service Provider : M/s Creativecomp Infotech Pvt Ltd., Vinay Kunj, Chandrika Nagar, One Ashutosh Complex, E-66, Mahanadi 221010	0542-2227550	Tablets Only	Sunday	9:30AM - 6:30PM

Source – Dell annual report

This is Dell ltd's data about the where most of its cost of goods sold is applied.

However, the sales of each state/district must be collected via primary research or more extensive research, we limited ourselves to hypothetical scenario of supply and demand for a company like dell.
 In this case we consider the COGS as the demand constraint and the raw materials supplied as supply constraint.
 However, deriving data for a vehicular company is much easier as compared to a tech company, below image is the example.

RANK	ZONE	STATE	FY19 Q1 Sales	FY19 Q2 Sales	FY19 Q3 Sales	FY19 Q4 Sales	FY19 Sales (Apr'18-Mar'19)
1	WEST	Maharashtra	90,281	92,713	88,209	83,277	3,54,480
		Gujarat	74,480	74,723	66,849	68,711	2,84,763
		Rajasthan	43,247	41,897	42,140	44,736	1,72,020
		Madhya Pradesh	35,099	32,943	31,859	36,241	1,36,142
		Chattisgarh	13,134	13,163	13,179	13,802	53,278
		Goa	5,311	6,041	5,664	5,189	22,205
		TOTAL	2,61,552	2,61,480	2,47,900	2,51,956	10,22,888
2	NORTH	Uttar Pradesh	79,300	72,377	68,263	79,876	2,99,816
		Delhi	53,447	48,054	41,520	50,901	1,93,922
		Haryana	48,831	44,428	41,659	52,753	1,87,671
		Punjab	27,906	27,014	26,032	30,268	1,11,220
		Jammu & Kashmir	16,772	17,737	16,396	15,842	66,747
		Uttaranchal	13,887	11,646	13,216	13,370	52,119
		Himachal Pradesh	10,164	9,775	10,223	9,318	39,480
		Chandigarh	8,301	8,434	7,936	8,773	33,444
		TOTAL	2,58,608	2,39,465	2,25,245	2,61,101	9,84,419
		3	SOUTH	Kerala	65,242	70,124	58,077
Karnataka	59,478			61,187	49,989	56,646	2,27,300
Tamil Nadu	58,754			60,312	46,916	53,646	2,19,628
Telangana	32,382			31,991	31,460	32,076	1,27,909
Andhra Pradesh	26,481			33,251	23,213	25,492	1,08,437
Pondicherry	1,916			1,932	1,470	1,697	7,015
TOTAL	2,44,253			2,58,797	2,11,125	2,28,753	9,42,928
4	EAST	West Bengal	28,502	28,408	23,993	23,916	1,04,819
		Assam	21,358	22,882	20,820	20,597	85,657
		Bihar	18,593	16,775	14,467	17,375	67,210
		Jharkhand	14,662	15,398	16,830	14,298	61,188
		Orissa	14,162	15,639	15,859	14,809	60,469
		Meghalaya	2,371	2,590	2,948	2,455	10,364
		Nagaland	1,527	1,641	1,795	1,511	6,474
		Tripura	1,474	1,416	1,379	1,289	5,558
		Manipur	1,446	1,344	1,574	1,418	5,782
		Arunachal Pradesh	1,162	1,073	1,194	1,192	4,621
		Sikkim	891	998	870	982	3,741
		Mizoram	811	910	1,137	1,135	3,993
		Andaman & Nicobar	538	508	602	472	2,120
		TOTAL	1,07,497	1,09,582	1,03,468	1,01,449	4,21,996
ALL INDIA			8,71,910	8,69,324	7,87,738	8,43,259	33,72,231

Source: BHP website

In the above image we have data of vehicular sales across multiple different states, so in this case we can consider the sales as a constraint, and companies can use this data to forecast their sales if they consider setting up their manufacturing unit in one of the states.

V. Use those internal factors to construct LPP problems.

	A	B	C	D	Demand
Delhi	400	500	600	700	280
Mumbai	500	400	800	600	380
Bangalore	500	700	500	400	340
Supply	275	300	225	200	1000

Constraints:

- Supplier Constraints:
 - Supplier 1 capacity= $x_{11}+x_{21}+x_{31} \geq 275$.
 - Supplier 2 capacity= $x_{12}+x_{22}+x_{32} \geq 300$.
 - Supplier 3 capacity= $x_{13}+x_{23}+x_{33} \geq 225$.
 - Supplier 4 capacity= $x_{14}+x_{24}+x_{34} \geq 200$.
- Demand Constraints:
 - Delhi Demand= $x_{11}+x_{12}+x_{13}+x_{14} \leq 280$.
 - Mumbai Demand= $x_{21}+x_{22}+x_{23}+x_{24} \leq 380$.
 - Bangalore Demand= $x_{31}+x_{32}+x_{33}+x_{34} \leq 340$.
- Non negativity Constraints:
 - $X_{ij} \geq 0$ for all i & j

VI. Solve the LPP problem and thus determine the most optimum state/states for setting up the manufacturing unit.

	A	B	C	D	Demand		
Delhi	195	0	85	0	280	280	
Mumbai	80	300	0	0	380	380	
Bangalore	0	0	140	200	340	340	
Supply	275	300	225	200	1000		
	275	300	225	200			
Demand=Supply					Balanced.	transportation cost	439000

- The figures in **YELLOW** represents the number of units transported from the manufacturer to the respective City.
- Total Transportation Cost would be:
 $195(400) + 85(600) + 80(500) + 300(400) + 140(500) + 200(400) = 78000+51000+40000+120000+70000+80000 = 4,39,000.$
- Out of the 3 cities, one city will have the Head Quarters and the other 2 cities will have Exclusive Stores.
- To choose the best city for Head Quarters, we found the transportation cost of each city to find the most optimal location.
- Total transportation cost:
 For Delhi: $195(400) + 85(600) = 1,29,000$ (demand=280)
 For Mumbai: $80(500) + 300(400) = 1,60,000$ (demand=380)
 For Bangalore: $140(500) + 200(400) = 1,50,000$ (demand=340)
- Per unit cost for finding the optimal location to setup headquarters.
 Delhi: $129000/280 = 460.71$
 Mumbai: $160000/380 = 421.05$
 Bangalore: $150000/340 = 441.18$
- In the above example, least cost of transportation per unit is in Mumbai.
 Hence, the optimal location to setup **Headquarters/Manufacturing unit is Mumbai** as it has more demand and less cost.
 Delhi and Bangalore will have Exclusive Stores or be the second/third preference.

Limitations

1. The premise of this research study is relying on the fact that corporations can no longer only depend on China for their production facilities and raw materials, and that countries would be increasing their import controls.
2. We have restricted ourselves to only four states and have taken into account a small number of factors and limits; nevertheless, the corporations can consider a large number of variables and more states to develop a transportation problem around them.
3. This study paper is better suited for industrial firms that focus on producing goods or physical products rather than providing services.
4. The assumption that the economy's present product demand will continue to match projections or future demand when manufacturing facilities are established is a significant study restriction. Demand is a crucial component in linear programming, but it's also vital to take into account how stable it will be over time.
5. We have not conducted primary research therefore we do not have the data for the suppliers and created a transportation problem based on a hypothetical scenario, however, the companies can easily get the data and create a problem in a similar way as ours.

6. CONCLUSION

This study examines the increasing difficulty businesses encounter while establishing overseas manufacturing facilities, especially in nations whose import laws are subject to change. Due to economic benefits, many businesses have historically relied on manufacturing in nations like China; but, as global trade changes, production locations must become more diverse. The paper focuses on the Indian setting and offers a framework for using operations research approaches, such as linear programming and data translation into transportation issues, to choose the best site for manufacturing units. In our case, the most optimal location to set up manufacturing unit is Mumbai, Bangalore and Delhi are in the next preference.

The first section of the paper describes the steps taken by the Indian government to increase domestic production by imposing import restrictions, such as the ban on laptop imports. Global technology behemoths like Dell, Acer, Samsung, and others are now interested in setting up manufacturing operations in India as a result of this regulatory move.

The purpose of this study is to help corporate entities make well-informed decisions on where to locate their manufacturing units by applying Operations Research methodologies. This architecture can be customised for a wide range of industries and nations with changing import laws, not only tech firms or India alone.

Examining the body of research, it is clear that earlier investigations frequently had a restricted scope, concentrating only on particular sectors, geographical areas, or small-scale businesses. Many have failed to consider the influence of outside variables, and there has been a dearth of research into the transferability of algorithms from one business to another.

This is filled by the research paper, which provides a flexible framework that integrates external and internal aspects, uses linear programming, and helps businesses adapt to the dynamics of changing global trade. The statement highlights the significance of Operations Research in facilitating effective decision-making while establishing production facilities to adapt to changing import laws.

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