

Operations Research Significance to Human factors and Environmental Consideration

Mobin Ahmad

Department of Mathematics, Faculty of Science, Jazan University, Saudi Arabia

ABSTRACT: *There are a ton of techniques which are applicable to this present reality area/designation - relocation problems. Typically the results of those techniques have depended upon a gathering of criteria that are one of a kind to each problem separately. The conventional way more often than not utilizes cost minimization or benefit expansion models. Ordinarily, the area assignment problem concerns itself with the exchange off between the expense of building and operating facilities to take care of item demand and the expense of transportation among numerous others. Studies made in the past have uncovered that the essential variables of site choice all together of importance classification were labour availability, site accessibility and nearness to the interest destinations. In these days the circumstance is changed, factors like environmental consideration, labour quality, accessibility of utilities and personal satisfaction are the primary location considerations. From the previously mentioned it is unmistakably obvious that unadulterated cost minimization or benefit expansion models are no more as pertinent in today's vitality and environment conscious time. Dismissal of elements like life quality, pollution control, safeguarding of assets and stylish parameters could hurt the manufacturing capabilities lastly could prompt unusual results by expansion to operating costs considerably more than tax cuts, low wages or transportation costs subtract.*

KEYWORDS: *Facility location - allocation - relocation problem, environment protection, human values.*

I. INTRODUCTION

At the duration of past two decades facility location science has pulled in consideration of communities from the scholarly space and in addition from the business space. A great deal of big companies make utilization of science notwithstanding for smaller importance choices, permitting in this manner no less than a position of all day job for unrivaled representative that has the appropriate information and conceivable outcomes. Office location problems have attracted researchers from a ton of different inquiring areas as the operational research, the information technology, the science, the connected mechanics, the geology, the funds and the promoting and in addition experts from different parts of work. At office location problems each of the above gatherings gives accentuation in different aspects which is up to the needs, the foundation and the scientific origin. The people who research and work in office location problems have different background and different needs. As needs be, everyone makes diverse method for resolution for these problems taking into consideration different elements and criteria. Maybe the most innovative errand in making a decision for area/designation – migration office is to pick the variables that are important for that choice [1-4]. Office location decision concerns those utilities which need to locate, relocate or they amplify their activities. The process of decision covers the assurance, the examination, the assessment and the decision between the alternative solutions. Plants of mechanical units, stockrooms, distribution centre's, and retail transfer spots are trademark establishments among parcel of others that worry office area. The decision of districts for office area starts normally with the making of new organization while for those which are being used this happens after the ascertainment of requirement for extra productive faculty. After the need of additional modern unit establishment takes after the search of "most optimal "place.

II. FACILITY LOCATION APPLIED FACTORS

Facility location factors have not changed or they have changed daintily since the art of operational research continues utilizing them. Labour costs, ground costs, buildings costs, transports costs, operation costs, tax motives and other financing criteria are the all the more generally used factors. The point of facility location problem solution is the blend of these variables so as to accomplish lower cost per created item unit. We can watch that while the office location decisions precede be founded on the monetary components that point in the augmentation of benefit or in the minimization of cost, natural, tasteful, environmental and social impacts increment and have real importance. The target of augmentation of profit or minimization of costs in the process of facility location is self-evident; however there is an unanswerable inquiry on the off chance that this goal can be accomplished when the majority of the connected solving processes reject the not quantitative factors, just like the immaterial factors that estimate quality of life and environment [5]. The optimization models and different operational research techniques like the linear programming can dissect the associations between the

financial variables, without thinking about the way that the individual's decision concerns are not to be provoked neither to be viable when they are sent to work and to live in a place does not satisfy them.

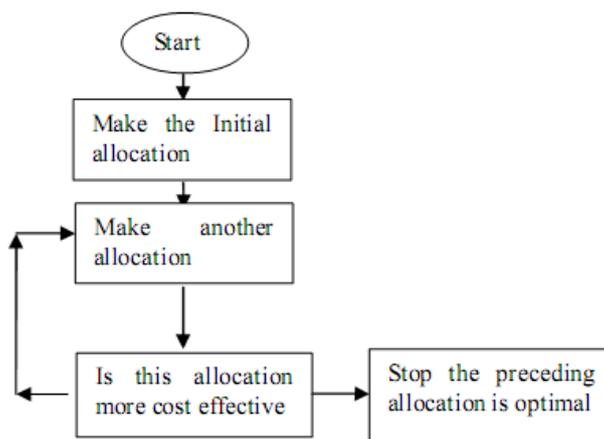
Quantitative measurable and qualitative non measurable criteria: Mainly, the facility location solving models practically are connected for the most part keeping in mind the end goal to handle the enormous real problems with measurable characteristic criteria with important nevertheless complexity. Flowingly, the subjective area factors basically are not incorporated in the dominant part of reported models. However, in a ton of cases, the subjective elements are those that cause worries to the pioneers who are responsible for the location choice. Numerous researchers have proposed numerous assessments and factors as important criteria for the office area/allocation problem. These components incorporate the presence of transportation infrastructures, the expense of transport, the accessibility of work, the expense of life, the accessibility and the nearness in crude material, vicinity in the business sectors, size of business sectors, accomplishment of positive focused spot, expected increase of markets, inclinations of salary and populace, expense and accessibility of modern soil, conjunction with different ventures, expense and accessibility of foundations, assessment benefits, ecological appraisals, assessment of risk, participation of interest in the advantage of big business. The subjective variables are basic yet regularly unmanageable and more often than not are utilized by the organization for the examination of results in spite of as components in an area/portion model [6]. Such elements are the personal satisfaction, the nature of environment, the worldwide political circumstance, the global rivalry; o Todd made an arrangement of pointers with a specific end goal to classify different urban communities that depend on an unpredictable aftereffect of such area components. Overlooking the human factor in the facility location process it can cost lavishly to the relating venture. The organizations of endeavors ought not overlook the way that the quantities of results of facility location processes do not check the staff and the figures don't deliver the outcomes. The staff makes an undertaking to work, no conversely. The people are the devices with which a venture creates the outcomes that are additionally its objective. Up to nowadays, environmental factors or factors that concern the personal satisfaction are not considered as variables or are formulated generally just as confinements in the facility location process.

III. SIGNIFICANCE OF OPERATIONS RESEARCH

Because of Operation Research's multidisciplinary character and application in varied fields, it has a splendid future, provided people dedicated to Operation Research study can meet the needs of society [7]. A portion of the problems in the territory of clinic administration, vitality protection, environmental pollution, and so forth have been tackled by Operation Research masters and this means Operation Research can likewise contribute towards the improvement in the social life and ranges of worldwide need. The Operation Research approach is especially valuable in adjusting clashing targets (objectives or interests) where there are numerous option blueprints accessible to the leaders. In a hypothetical sense, the optimum decision must be one that is best for the association in general it is frequently called the global optimum. A decision that is best for one or more segments of the association is typically called suboptimum decision. Operation Research attempts to resolve the irreconcilable circumstances among different segments of the association and looks for the optimal solution which may not be acceptable to one department but is in light of a legitimate concern for the organization as an entirety. Operation Research is worried with giving the chief decision aids (or guidelines) got from: i) A total system orientation, ii) Scientific methods of investigation, and iii) Models of reality, generally in view of quantitative measurement and techniques. Other than its utilization in industry, this new technique was likewise used in various financial problems which came up after the war. Operation Research has come to be utilized as a part of an expansive number of territories, for example, problems of traffic, question of choosing an appropriate admission structure for public transport, or modern procedure like metal taking care of. Its utilization has now stretched out to scholastic circles, for example, the problems of communication of information, socio-financial fields and national planning.

IV. TRANSPORTATION TECHNIQUE

Transportation technique is a special group of problems to with linear programming and other quantitative techniques have been extensively applied. These problems are typically resource allocation problems with a minimization or maximization goal, such as minimization of cost, maximization of operating efficiency and so forth. The physical distribution of product increases the cost. Multi-plant companies with wide range of warehouse are interested in minimizing the transportation cost. The main objective is to minimize the level of distribution of supply point to demand point that is made by organization for every shipment. It is what warehouse should be within exact term of it demand to make clear supply and reduce down the overall cost of physical distribution. The transportation method for solving the physical distribution or transportation problem is an iterative, like the simple method [12].

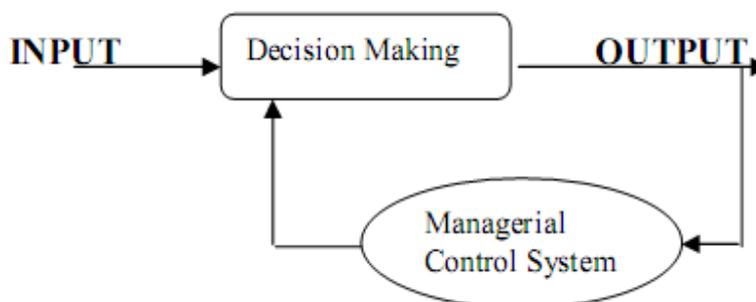


V. DECISION MAKING

Decision-making sometimes plays voluntarily and involuntarily, where one decides to take an action or to stand in a situation and where the other does not know what it would be. Therefore, it implies that decision-making is primarily a reasoning process. Reasoning is subjective by nature, which can be rational or irrational. All types of human decision-making are basically logical processes. This process has its roots in both the mindful as well as the unconscious mind and always involves three stages described below:

- **Cognition Stage:** It is the initial point of mind that searched facts in the surroundings in decision making process.
- **Assembly Stage:** The assemblies of predictable facts obtained in the initial stage (cognition stage) are usable information to represent the second stage.
- **Testing Stage:** At this point the decision maker evaluates the first stage in term of their relevancy to a given problem. Either a decision is made or not and any number of managerial action programs are the outcome of this intellectual process [12].

The decision making task may be defined as input –output system as shown in fig.



Every decision making task results in an output which is an evidence of the decision taken. On the input side a large number of variables may be listed. These variables can be classified in terms of the traditional factors. Underlying this input-output system is feed –back loop identified as managerial control systems.

VI. OPERATIONS RESEARCH IN DIFFERENT SECTORS

- Finance, Budgeting and Investment
- Marketing
- Physical Distribution
- Purchasing
- Personnel
- Production
- Research and Development
- Supply and chain management
- Inventory planning
- Product mix
- Staff allocation and resource allocation
- Capital Budgeting

Impact Of Operations Research: Impact of OR on agriculture: OR Technique like as linear programming, Dynamic programming and simulation outlines some problems encountered with these. OR application for agriculture has mainly been developed by university, colleges and state government. The agriculture is one of the Indian largest industries therefore OR could have made a significant contribution to decision making [8-10]. The industry with large number of small individual business does not permit any specialization in management function.

The following are few field where OR has its great impact for decision making process:

- Marketing
- Finance and investment
- Purchasing
- Production
- Research and Development

VII. CONCLUSIONS

The qualitative factors are basic however often unmanageable and usually are utilized by the administration of enterprises for the analysis of comes about notwithstanding for the estimation of them for and attendance in a solving model of facility location/allocation problem. Amid the solving process of facility location/allotment problems the usage qualitative and as a rule non measurable criteria, in the meantime with quantitative and measurable, constitutes undeniable necessity. The choice making process for facility location/assignment must include qualitative and also quantitative factors. The pioneers can no more ignore the impact of particularly decisive and sensitive factors as the quality of life, environmental sensitivity and so forth. Moreover, the process could get to be particularly decisive, if a big number of qualitative factors is available. For this situation be that as it may, the choice process can be exceptionally difficult and be denied of consequence and flexibility. Endeavors that have ended up with the utilization of GP "goal programming" model produced an optimal solution that was proved however impassible in changes in the structure of priority. Development of this method it seems to give to the persons who are responsible for the basic leadership and to the analysts the occasions for the incorporation of important factors of office area/allocation problem the quantitative and qualitative factors comprehensive. The AHP (Analytical Hierarchy Process) model has been regularly utilized and provided some type arrangement of alternative solutions of facility location problem, however different restrictions for different solutions are circumvented from this model, as an outcome the unique proposed solution with this method, is frequently an unfeasible choice. In this way consequently, and different important factors will likewise be supposed to take part in the process. The combination of GP "goal programming" and AHP (Analytical Hierarchy Process) models extend the attendance of such factors.

REFERENCES

- [1]. Atthirawong W, MacCarthy B. An application of the analytical hierarchy process to international location decisionmaking. in the proceedings of the 7th Cambridge Research Symposium on International Location Decision-Making 2005.
- [2]. Donnelly A, Jones M, Tadhg O, and Byrne G. Selecting environmental indicator for use in strategic environmental assessment. *Environmental Impact Assessment Review* 2007; 27: 161- 175
- [3]. Vaidya SO, Kumar S. Analytic hierarchy process: An overview of applications. *European Journal of Operational Research* 169 (2006) 1–29 2006; 169: 1-29.
- [4]. Satyadevi.C, *Quantitative Techniques*, S.Chand & Com.LTD. 2009.
- [5]. Kapoor, V.K., *Operation Research*, Sultan Chand and Sons, Seventh Edition, 2001.
- [6]. Mahadevan, B., *Operations Management: Theory and Practice*, Pearson Education, Third edition, 2008.
- [7]. Chary, S. N., *Production and Operation Management*, Tata McGraw-Hill Publishing Company Limited, Second edition 2000.
- [8]. *Operations research - contemporary role in managerial decision making: IJRRAS* 3 (2) May 2010 Agarwal & al.PP- 200-208.
- [9]. Kapoor, V.K., *Operation Research*, Sultan Chand and Sons, Seventh Edition, 2001.
- [10]. Chary, S. N., *Production and Operation Management*, Tata McGraw-Hill Publishing Company Limited, Second edition 2000.