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Techniques of Manpower Planning

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ABSTRACT

Humans are considered as the most crucial, volatile and potentially unpredictable resource which an organization utilizes. Manpower planning seeks to make the links between strategy, structure and people more explicit. The purpose of manpower planning is to get a better matching between manpower requirement and manpower availability. Manpower planning is particularly suitable for the application of statistical techniques. The aim of this paper is to review the models which have been developed, concentrating on their assumptions and applications. The paper concludes with some notes on possible future development.

Keywords : Manpower, Manpower Planning, Manpower Planning Techniques

Introduction:

Mathematics and Statistics have done much more work on the development of models of manpower systems in the years. If the organization fails to place and direct human resources in the right areas of the business, at right time and right cost, serious inefficiencies are likely to occur creating considerable operational difficulties or even business failure. In order to achieve this co – ordination of demand and supply is required, together with the monitoring and assessment of productivity and technological changes.

Many manpower models play a dominant role in efficient design and control of manpower system. Models developed for manpower systems can be categorized into three main groups, namely: The demand models, supply models, and control models. The demand models are concerned with the prediction of future demand for manpower. This involves looking at productivity changes, technological changes, market forces, trend, and corporate strategies. The supply models are concerned with predicting the future supply of manpower. This involves having knowledge of current manpower stock, recruitment and wastage patterns, working conditions, promotion policy, and labor market trends. The control models on the other hand have two aspects: maintainability (maintaining a given structure) and attainability (feasibility of attaining a desired structure).

The strategic manpower planning literature is in general divided into two complementary approaches. One approach is based on a stochastic process formulation; the other is based on an optimization formulation. The aim of this paper is to review the models which have been developed, concentrating on their assumptions and applications.

Need of Manpower planning:

Manpower Planning is a two-phased process because manpower planning not only analyses the current human resources but also makes manpower forecasts and thereby draw employment programmes. Manpower Planning is advantageous to firm in following manner:

1. Shortages and surpluses can be identified so that quick action can be taken wherever required.
2. All the recruitment and selection programmes are based on manpower planning.

3. It also helps to reduce the labour cost as excess staff can be identified and thereby overstaffing can be avoided.
4. It also helps to identify the available talents in a concern and accordingly training programmes can be chalked out to develop those talents.
5. It helps in growth and diversification of business. Through manpower planning, human resources can be readily available and they can be utilized in best manner.
6. It helps the organization to realize the importance of manpower management which ultimately helps in the stability of a concern.

Types of Model available:

In this section, various modeling techniques which have been used in manpower planning will be considered.

Thomas R. Robbins and Terry P. Harrison describes manpower planning with limited hiring opportunities in which they have presented the value of stochastic modeling.

In which they have describe The objective function of the program maximizes the difference between billable revenue, and payroll costs, recruiting costs, training costs, and the expected cost of firing and subcontracting with following constraints. (1) The overall staff balance constraint; it states that in every skill and grade category the net change in manpower is equal to the number of new hires, less the number lost to attrition or termination. (2) All new hires and retooled resources are designated as in training for one period. (3) The number of billable resources according to demand and supply. (4) An upper limit on the proportion of billable resources that can be subcontracted. (5) Balances the number of retrained resources.

A. Srinivasan, P. Mariappan and S. Dhivya presented Stochastic models on time to recruitment in a two grade manpower system using different polices of recruitment. A two grade organization in which depletion of manpower occurs due to its policy decisions is considered. They have constructed two mathematical models in which employing two different univariate recruitment policies, based on shock model approach. But the mean and variance of the time to recruitment are obtained for both the models under different conditions.

S.Parthasarathy, M.K.Ravichandran & R.Vinoth presented an application of Stochastic models with grading system in

manpower planning. They introducing two grades of marketing personnel in the organization, the expected time to recruitment is obtained allowing for the mobility of manpower from one category to the other where there is more of depletion. In their study grade represents technical and non-technical personnel. Suppose an organization faces the shortage of in technical personal that it can be compensates/shared by some of non-technical (they must have knowledge at the time of recruitment) personnel at certain period because the organization is not to recruit immediately. So the shortage of manpower in higher grades can be compensating by the lower grades having some knowledge about other grades and the vice-versa to some extent. In this paper instead of considering the usual distribution such as exponential, gamma, weibull etc., for threshold, an alternative distribution namely exponentiated exponential distribution (EE distribution) is used.

J. B. Esther Clara and A. Srinivasan presented a stochastic model for the expected time to recruitment in a single graded manpower system with two thresholds using univariate max policy.

S. Nirmala and M. Jeeva have used optimization approach and developed a mathematical model which minimizing the manpower system cost during the recruitment and promotion period which are determined by the changes that take place in the system. It resulted in the form of recursive optimization, a dynamic programming. In that optimal number of recruits and promotions made so that the total cost incurred is minimum in the manpower planning system along with the various costs like recruitment costs, promotion costs, overstaffing costs, wastage costs and retention costs. There are two types of cost have been taken into account namely fixed and variable costs. The model has been found to be analogous to the Wagner-Whitin model in a production or inventory situation. The major limitation of the model is the fact that it is considered in isolation from the various constraints and operating policies under which a manpower system operates. As another constraint of the model is that, it is assumed that there is no overstaffing in the higher grade. This model can also be discussed without this constraint as further work.

S.Parthasarathy, R.Vinoth, and M.Chitra, made an attempt to determine the expected time to recruitment and its variance when threshold follows gamma distribution. with following assumption. (1) Exit of person from an organization takes place whenever the policy decisions regarding targets, incentives, and promotions are made. (2) The exit of every person from the organization results in a random amount of depletion of manpower (in man hours). (3) The process of depletion is linear and cumulative. (4) The inter arrival times between successive occasions of wastage are independent and identically distributed (i.i.d.) random variables. (5) If the total depletion exceeds a threshold level Y which is itself a random variable, the breakdown of the organization occurs. In other words recruitment becomes inevitable. The process, which generates the exits, the sequence of depletions and the threshold are mutually independent. And they conclude if the completed length of service increases (i.e., number of people leaving the job) the time to recruitment in an organization de-

creases. When the shape parameter increases the expected time to recruitment also increases. While fixing λ and b. So, we observed that when threshold follows gamma distribution which prolong the recruitment period. In all the cases when inter-arrival increase the time to recruitment decreases.

Akaninyene U. Udom and Peter I. Uche have done study on the use of time as an optimality performance criterion in manpower control. They have examines the condition under which a manpower system modeled by a differential equation is controllable and uses time as an optimality performance criterion in controlling the manpower system with quadratic index in both state and control spaces. The concept of time as an optimality performance criterion is used to obtain an optimal recruitment control vector for the manpower system via the necessary condition of Pontryagin theorem. It is also shown that the optimal recruitment control vector minimizes the control time globally. The condition under which the system is controllable is also examined.

K. Nilakantan, Jayaram K. Sankaran and B.G. Raghavendra have constructed a model of hierarchical manpower systems –called the proportionality Markov manpower system model, which follow proportionality policies in recruitment and promotion of their staff, ostensibly with a view to safeguard the career interests of their existing employees. They took the study of a class of Markov manpower systems wherein the recruitment to each level or grade of the organization is restricted to a strict proportion of the promotions to it. Such restrictive covenants on the number of new employees recruited from external sources to a grade vis-a` -vis the number of employees promoted to it from within the organization, were often introduced into the promotion and recruitment policies of many organizations, especially in countries wherein the inter-organizational mobility of employees was low or wherein alternative employment opportunities were limited, and was the genesis of these policies. Their model yields a more practicable means of control of the system. It also has the additional advantage that it can be used to achieve a desired blend of existing and fresh external manpower in an organization. These results can be of use in organizations, which outsource a part of their work.

Future Developments:
The most common opinion expressed by those contacted during the survey was that there is at present no need for any more sophisticated models than those already described. However, there may well be a need for improved presentation of results, particularly since many organizations have been using computer – based models in batch rather then interactive mode. The minority who did see some scope for improved models suggested two main areas for investigation: the trade – offs between short – term and long – term manpower needs; and the recruitment process, particularly its links with pay schemes and short – term succession planning.

Overall, the field of manpower planning still offers considerable opportunity for Operation research workers, especially those who are willing to operate in an environment with a qualitative rather than quantitative emphasis.

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