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SOME OPTIMAL MANPOWER MODELS WITH DISCRETE TRUNCATED DISTRIBUTIONS

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ABSTRACT

A manpower model is a Statistical description of how change takes place in the organization. Manpower planning is often defined as an attempt to match the supply of people with the jobs available for them. A manpower model is a mathematical description of how change takes place in the system. Manpower modeling is the prime concern for any management of human resources development. In studying the manpower system with Right Truncated distributions, it is observed that the truncation parameter has vital role in the modeling of the manpower system. As this gives the value of the maximum length of service of an organization. The minimum value of such truncation parameter is very important to study the manpower planning models. As the most important factor for the management is to minimize the recruitment. In this paper we develop and analyze a manpower models with discrete truncated distributions. Manpower models with completed length of service (CLS) distributions namely Right truncated Geometric Distribution, Mixed Right truncated Geometric Distribution and double truncated Negative Binomial Distribution are considered and optimum value of the truncation parameters were obtained for minimum value of the recruitment. The analysis is also presented in this paper.

Keywords: Manpower model, Truncated Distributions, Recruitment, Double truncated negative binomial distribution.

1. INTRODUCTION

A manpower model is a statistical description of how change takes place in the organisation. Though British admirals has orginated the modeling of manpower system during second world war, the work of SEAL (1945) can be considered as the poineering work in the field of manpower modeling. Manpower planning is often defined as an attempt to match the supply of people with the jobs available for them. A manpower model is a mathematical description of how change takes place in the system. Manpower modeling is the prime concern for any management of human resources development. Due to the uncertainities involved in the constant process of manpower models, stochastic modeling is needed for development and analysis of the manpower system. Various researcher have developed different manpower models with wide variation in order to suit manpower system of the different organisations.

Generally manpower modeling of an organisation can be categorised into a number of mutually exclusive, exhaustive and homogeneous groups called classes. The classes may correspond to a grade, salary level, age groups or any other classification or combination of classification of interest. Flows are supposed to take place into the system as whole, between classes within the system and between the system and other sources of employment or outside the system. The stocks are the number of people in the classes and the flows are number of members who move between classes

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and in and out of the system. The model for the system express the relationship between the stocks and flows as the system develops in time. Sometimes, we may come across flows of people out of a manpower system called wastage, flows into system called recruitment and flows between different classes of the system may be called transfers, promotions or demotions.

Of all the flows in the manpower system, wastage is most fundamental for manpower planning. Therefore it can be said that successful manpower planning depends on the pattern of wastage. Studying the wastage rate of an organisation requires the study of Completed Length of Service (CLS) distribution of the organization.

Different researcher have considered that the CLS of an employeer in an organisation is continuous and discretes having infinite and finite range by stating the assumptions under which they can apply. While fitting the CLS of an organisation with truncated distributions, the value of the truncation parameters has great importance. As the organisation always wants to minimise the number of recruits, the value of the truncation parameter which minimises the recruitment is said to be the optimal value of the truncation parameter.

In this study an attempt was made to find the optimal value of the truncation parameter which signifies the minimum optimum period of service in the organisation.

2.1 MANPOWER MODELS WITH DISCRETE TRUNCATED DISTRIBUTIONS

In some of the previous studies the CLS of an organisation is assumed to be discrete and having infinite range. This infinite range assumption is meaningful only when the time unit under consideration are very small or the CLS is very large. In many of the organisations having professional and skilled employees, this assumption is not valid and hence the need to development of models with discrete and finite range CLS of the organisation. This leads to the truncation of the discrete distribution at a point, known as Truncation point. This truncation point create a heavy impact on the models with truncated distributions and the value of the truncation parameters gives the number of years of service in the organisation. The optimum value of the truncation parameter, which gives the minimum service required for an individual to stay, tor the minimum number of recruits in a given were calculated for the manpower models having practical importance namely models with Right Truncated Geometric Distribution (R.T.G.D).

After obtaining the optimal values of the truncation parameter for different values of the other parameter values, the analysis is also presented in this paper.

2.2 RIGHT TRUNCATED GEOMETRIC DISTRIBUTION

In this section a brief review of the Right Truncated Geometric Distribution and its distributional properties were presented. The random variable T is said to follow a Right Truncated Geometric Distribution, if the probability mass function of T is of the form

$$P(T) = \frac{q^T p}{1 - q^{B+1}}$$

$$T > 0, 0 < T \leq B \qquad \text{.........(2.2.1)}$$

where B is the truncation parameter.

The distribution function of T is

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$$F(T) = \frac{1-q^{T+1}}{1-q^{B+1}} \qquad \text{..........(2.2.1)}$$

The expected value of T is

$$\mu = E(T) = \frac{pq+q^2-q^{B+1}-q^b p^{B+1}}{1-q^{B+1}} \qquad \text{..........(2.2.3)}$$

2.2.1 MANPOWER MODEL WITH RIGHT TRUNCATED GEOMETRIC DISTRIBUTION :

In the manpower model with Right Truncated Geometric Distribution, the complete length of service distribution of an organization is Right Truncated Geometric Distribution is as given in equation (2.2.1). The corresponding distribution function and expected length of service are as given in equation (2.2.2) and (2.2.3) respectively.

Then the survival function of the model is

$$G(T) = 1 - F(T)$$

$$= \frac{q(q^T-q^B)}{1-q^{B+1}} \qquad \text{.........(2.2.1.1)}$$

The force of separation known as rate of loss intensity or labour wastage can be obtained as

$$L(T) = \frac{p^{(T)}}{1-F(T)}$$

$$= \frac{q^T-1}{(q^T-q^B)} \qquad \text{.........(2.2.1.2)}$$

The renewal mass function of the model is

$$h\,(T) = p\,(T) + \frac{F(T)\sum_{S=0}^{T} p(S)}{\sum_{S=0}^{T} G(S)}$$

$$= \frac{p}{1-q^{B+1}}\left[q^T + \frac{(1-q^{T+1})^2}{q-q^{T+2}-(T+1)q^B p(1-q^{B+1})}\right] \qquad \text{.........(2.2.1.3)}$$

2.2.2 OPTIMAL RECRUITMENT POLICIES OF THE MONPOWER MODEL WITH RIGHT TRUNCATED GEOMETRIC DISTRIBUTION :

In this section the expected number of recruits and the variance of the number of recruits for the manpower model mentioned in the earlier section and (2.2.1) are obtained by following the analogous arguments of Bartholomew (1973).

Let n be the average number of recruits of the organization during the period (O,T) i.e., the sum of total employees left the organization at various time points in the interval of time (O,T).

Therefore $\bar{n}_T = N\sum_{i=1}^{T} h_i$

where h_i is the replacement rate at time i and N is the size of the organisation.

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Therefore
$$\bar{n}_T = NF(T)\sum_{i=1}^{T}\frac{p}{1-q^{B+1}}\left[q^i + \frac{\left(1-q^{i+1}\right)^2}{q-q^{i+2}(i+1)q^B p\left(1-q^{B+1}\right)}\right] \quad ....(2.2.2.1)$$

As the organization always wants to minimize the number of recruits, the optimal value of the truncation parameter of the model can also be obtained by minimizing $\overline{n}_T$ with respect to the truncation parameter B. Since the truncation parameter is discrete, one can use the first order difference condition for optimizing $\overline{n}_T$ with respect to B for fixed values of the other parameter P. The first order difference condition required to obtain the optimal value of B say B* is

$$\overline{n}(T, B^* - 1) \le \overline{n}(T, B^*) \le \overline{n}(T, B^* + 1) \quad .... (2.2.2.2)$$

where $\overline{n}$ (T,B) is the expected number of recruits required during the period (O,T). Since B is the parameter under consideration for optimization it is also included as a functional variate. This condition implies

$$\Delta\overline{n}(T, B^* - 1) \le 0 \le \Delta\overline{n}(T, B^*) \quad .... (2.2.2.3)$$

where Δ is the symbol for first order difference.

TABLE 2.2.1

p = 0.5. p = 0.5

B \ T	1	2	3	4	5
2	• • •	• • •	• • •	• • •	• • •
3	20.5	• • •	• • •	• • •	• • •
4	100.085	50.81	24.722	• • •	• • •
5	118.863	60.845	30.656	15.332	• • •
6	123.722	62.606	31.436	15.744	7.876
7	124.916	62.774	31.435	15.727	7.866
8	125.137	62.691	31.36	15.683	7.842
9	125.127	62.609	31.309	15.655	7.828
10	125.083	62.558	31.28	15.646	7.82
11	125.048	62.53	31.265	15.633	7.816
12	125.026	62.515	31.258	15.629	7.814
13	125.014	62.508	31.254	15.627	7.813
14	125.007	62.504	31.252	15.626	7.813
15	125.004	62.502	31.251	15.625	
16	125.002	62.501	31 .25	15.625	
17	125.001	62.5	31.25		
18	125	62.5			
19	125				

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TABLE 2.2.2

p = 0.6, q = 0.4

B \ T	1	2	3	4	5
2	• • •	• • •	• • •	• • •	• • •
3	• • •	• • •	• • •		• • •
4	63.604	23.626	7.465	• • •	• • •
5	85.875	35.002	13.917	5.426	• • •
6	92.751	37.623	15.107	6.041	2.408
7	94.951	38.23	15.322	6.133	2.453
5	95.662	38.367	15.358	6. 144	2.458
9	95.892	38.396	15.362	6. 145	2.458
10	95.966	38.4	15.361	6.145	
11	95.989	38.401	15.361	6.144	
12	95.997	38.4	15.36	6.144	
13	95.999	38.4	15.36		
14	96				
15	96				

TABLE 2.2.3

p = 0.7, q = 0.3

B \ T	1	2	3	4	5
2	• • •	• • •	• • •	• • •	• • •
3	• • •	• • •	• • •	• • •	• • •
4	27.349	3.326	• • •	• • •	• • •
5	51.351	15.078	4.083	0.931	• • •
6	59.138	17.951	5.355	1.574	0.451
7	61.714	18.664	5.608	1.68	0.502
8	62.571	18.841	5.658	1.698	0.509
9	62.857	18.885	5.668	1. 7	0.51
10	52.952	18.896	5.67	1.701	0.51
11	62.984	18.899	5.67	1.701	
12	62.995	18.9			
13	62.998	18.9			
14	62.999				
15	63				
16	63				

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TABLE 2.2.4

p = 0.8, q = 0.2

B \ T	1	2	3	4	5
2	• • •	• • •	• • •	• • •	• • •
3	• • •	• • •	• • •	• • •	• • •
4	• • •	• • •	• • •	• • •	• • •
5	19.817	2.502	• • •	• • •	• • •
6	27.948	5.427	0.96	0. 127	• • •
7	30.65	6. 157	1.216	0.235	0.043
8	31.55	6.339	1.267	0.252	0.05
9	31.85	6.385	1.277	0.255	0.051
10	31.95	6.396	1.279	0.256	0.051
11	31.983	6.399	1.28	0.256	
12	31.994	6.4	1.28		
13	31.998	6.4			
14	31.999				
15	32				
16	32				

The calculated values of the truncation parameter for different combinations of the value of p and q are presented in tables (2.2.1) to (2.2.4) and the following information can be inferred.

For p = 0.5 and q = 0.5, the optimal value of the truncation parameter B is 18, 17, 16, 15 and 14 in the time duration (0,1), (0,2), (0,3), (0,4) and (0,5) respectively. For p = 0.6 and q 0.4, the optimal value of the truncation parameter B is 14, 12, 12, 11 and 9 in the time duration (0,1), (0,2), (0,3), (0,4) and (0,5) respectively. For p = 0.7 and q = 0.3, the optimal value of the truncation parameter B is 15, 12, 10, 10 and c? respectively in the time duration (0,1), (0,2), (0,3), (0,4) and (0,5) respectively. For p = 0.8 and q = 0.2, the optimal value of the truncation parameter B is 15, 12, 11, 10 and 9 in the tine duration (0,1), (0,2), (0,3), (0,4) and (0,5) respectively. Also as p is increasing the optimal value of the truncation parameter B is decreasing.

2.3 MANPOWER MODELS WITH MIXED RIGHT TRUNCATED GEOMETRIC DISTRIBUTION:

In the manpower model with Mixed Right Truncated Geometric Distribution (MRTGD) the probability mass function of the CLS distribution of the organisation is the MRTGD with parameters p_1, p_2 and λ

Here the CLS distribution of the model is

$$P(T) = \left[\frac{q_1 T p_1}{1 - {q_1}^{B+1}}\right] + (1 - \lambda)\left[\frac{q_2 T p_2}{1 - {q_2}^{B+1}}\right]$$

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$$0 \le \lambda \le 1$$ …….(2.3.1)

The distribution function of the model is

$$F(T) = \lambda\left[\frac{1-{q_1}^{T+1}}{1-{q_1}^{B+1}}\right] + (1-\lambda)\left[\frac{q_2 T p_2}{1-{q_2}^{B+1}}\right]$$

…….(2.3.2)

The expected length of the service of the model is

$$\mu = \lambda\left[\frac{p_1 q_{1+q_1^2-q_1^{B+1}-{p_1}^{B}\, q_1^{B+1}}}{{p_1}^{(1-q_1^{B+1})}}\right]$$
$$+(1-\lambda)\left[\frac{p_2 q_{2+q_2^2-q_2^{B+1}-{p_2}^{B}\, q_2^{B+1}}}{{p_2}^{(1-q_2^{B+1})}}\right]$$

……. (2.3.3)

The survival function of the model is

$$\text{G(T)} = 1 - \text{F (T)}= \frac{(1-q_1^{B+1})(1-q_2^{B+1})-\lambda(1-q_1^{T+1})(1-q_2^{B+1})-(1-q_2^{T+1})(1-q_1^{B+1})(1-\lambda)}{(1-q_1^{B+1})(1-q_2^{B+1})}$$ ……. (2.3.4)

The approximate renewal mass function of the model is

$$h\,(T) = p\,(T) + \frac{F(T)\sum_{S=0}^{T} p(S)}{\sum_{S=0}^{T} G(S)}$$

$$= Z_1 + \frac{Z_2 Z_3}{Z_4 - Z_5 - Z_6}$$

where

$$Z_1 = \frac{\lambda(1-q_2^{B+1})(q_1 T p_1)+(1-\lambda)(1-q_1^{B+1})(q_2 T p_2)}{(1-q_1^{B+1})(1-q_2^{B+1})}$$
$$Z_2 = p_1 p_2[\lambda(1-q_1^{T+1})(1-q_2^{B+1}) + (1-\lambda)(1-q_1^{B+1})(1-q_2^{T+1})]$$
$$Z_3 = [\lambda(1-q_2^{B+1})(1-q_1^{T+1}) + (1-\lambda)(1-q_1^{B+1})(1-q_2^{T+1})]$$
$$Z_4 = p_1 p_2 (T+1)(1-q_1^{B+1})(1-q_2^{B+1})$$
$$Z_5 = [\lambda(1-q_2^{B+1})p_2]\,[p_1(T+2)-(1-q_2^{T+2})]$$
$$Z_6 = [(1-\lambda)p_1(1-q_1^{B+1})]\,[p_2(T+2)-(1-q_2^{B+2})]$$ …….(2.3.5)

Let $\overline{n}_T$ be the average number of recruits of the organization during the period (0,T)

$$\overline{n}_T = N\sum_{i=1}^{T} h_i$$

There fore

$$= N\sum_{i=1}^{T}\left[X_1 + \frac{X_2 X_3}{X_4 - X_5 - X_6}\right]$$

where,

$$X_1 = \frac{\lambda(1-q_2^{B+1})(q_1^i\, p_1)+(1-\lambda)(1-q_1^{B+1})(q_2^i\, p_2)}{(1-q_1^{B+1})(1-q_2^{B+1})}$$
$$X_2 = p_1 p_2\left[\lambda\left(1-q_1^{i+1}\right)\left(1-q_2^{B+1}\right) + (1-\lambda)\left(1-q_1^{B+1}\right)\left(1-q_2^{i+1}\right)\right]$$
$$X_3 = \left[\lambda\left(1-q_2^{B+1}\right)\left(1-q_1^{i+1}\right) + (1-\lambda)\left(1-q_1^{B+1}\right)\left(1-q_2^{i+1}\right)\right]$$

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$X_4 = p_1 p_2 (i+1)(1-q_1^{B+1})(1-q_2^{B+1})$

$X_5 = [\lambda(1-q_2^{B+1})p_2]\,[p_1(i+2)-(1-q_2^{i+2})]$

$$X_6 = [(1-\lambda)p_1(1-q_1^{B+1})]\,[p_2(i+2)-(1-q_2^{B+2})] \quad ....(2.3.6)$$

2.3.1 OPTIMAL RECRUITMENT POLICIES OF THE MANPOWER MODEL WITH MIXED RIGHT TRUNCATED GEOMETRIC DISTRIBUTION :

The optimal values of the parameters of the model can also be obtained by minimising $\overline{n}_T$ with respect to the truncation parameter B. Since the truncation parameters is discrete, one zan use the first Oder differences condition for optimizing $\overline{n}_T$ with respect to B for fixed values of p , p and λ.

Basing on the argument as was given in section (2.2.2), the optimal value of B say B* satisfies the condition

$$\Delta\,\overline{n}(I, B^* - 1) \le 0 \le \Delta\overline{n}(T, B^*) \quad ....(2.3.1.1)$$

where Δ is the symbol for first order difference.

TABLE 2.3.1

$p_1 = 0.5 \quad q_1 = 0.5 \quad p_2 = 0.2 \quad q_2 = 0.8 \quad \lambda = 0.2$

T / B	1	2	3	4	5
2	• • •	• • •	• • •	• • •	• • •
3	0.908	• • •	• • •	• • •	• • •
4	0.46	0.706	1.622	• • •	• • •
5	0.362	0.445	0.599	0.89	• • •
6	0.317	0.36	0.436	0.53	0.673
7	0.291	0.317	0.359	0.414	0.482
8	0.273	0.292	0.321	0.357	0.399
9	0.262	0.275	0.297	0.324	0.353
10	0.253	0.263	0.281	0.302	0.324
11	0.247	0.255	0.269	0.287	0.305
12	0.242	0.249	0.261	0.276	0.292
13	0.239	0.244	0.255	0.269	0.282
14	0.236	0.24	0.251	0.263	0.275
15	0.234	0.238	0.247	0.258	0.27
16	0.232	0.236	0.244	0.255	0.266
17	0.231	0.234	0.242	0.252	0.262
18	0.23	0.233	0.241	0.25	0.26
19	0.229	0.232	0.239	0.249	0.258
20	0.229	0.231	0.238	0.247	0.256
21	0.228	0.23	0.237	0.246	0.255
22	0.228	0.23	0.237	0.246	0.254

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23	0.227	0.229	0.236	0.245	0.254
24	0.227	0.229	0.236	0.244	0.252
25	0.227	0.229	0.236	0.244	0.252
26	0.227	0.228	0.235	0.244	0.252
27	0.227	0.228	0.235	0.243	0.252
28	0.227	0.228	0.235	0.243	0.252
29	0.227	0.228	0.235	0.243	0.251
30	0.226	0.228	0.235	0.243	0.251
31	0.226	0.228	0.235	0.243	0.251
32	0.226	0.228	0.234	0.243	0.251
33	0.226	0.228	0.234	0.243	0.251

TABLE 2.3.2

$p_1 = 0.6 \quad q_1 = 0.4 \quad p_2 = 0.3 \quad q_2 = 0.7 \quad \lambda = 0.2$

T / B	1	2	3	4	5
2	• • •	• • •	• • •	• • •	• • •
3	1.176	3.662	• • •	• • •	• • •
4	0.679	0.926	1.36	• • •	• • •
5	0.549	0.656	0.793	0.965	• • •
6	0.49	0.555	0.629	0.709	0.795
7	0.458	0.504	0.554	0.603	0.652
8	0.438	0.475	0.513	0.549	0.582
9	0.427	0.457	0.489	0.517	0.542
10	0.419	0.446	0.473	0.497	0.517
11	0.413	0.438	0.463	0.484	0.502
12	0.41	0.433	0.456	0.475	0.491
13	0.407	0.429	0.451	0.47	0.484
14	0.405	0.427	0.448	0.466	0.48
15	0.404	0.425	0.446	0.463	0.476
16	0.403	0.424	0.444	0.461	0.474
17	0.403	0.423	0.443	0.46	0.473
18	0.402	0.423	0.443	0.459	0.471
19	0.402	0.422	0.442	0.458	0.471
20	0.402	0.422	0.442	0.458	0.47
21	0.402	0.422	0.442	0.457	0.47
22	0.402	0.422	0.441	0.457	0.47
23	0.402	0.422	0.441	0.457	0.469

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$p_1 = 0.7 \quad q_1 = 0.3 \quad p_2 = 0.3 \quad q_2 = 0.7 \quad \lambda = 0.2$

B \ T	1	2	3	4	5
2	• • •	• • •	• • •	• • •	• • •
3	1.232	3.963	• • •	• • •	• • •
4	0.698	0.962	1.428	• • •	• • •
5	0.56	0.674	0.819	1.003	• • •
6	0.498	0.567	0.646	0.731	0.823
7	0.465	0.514	0.567	0.62	0.671
8	0.444	0.484	0.524	0.562	0.597
9	0.432	0.465	0.498	0.529	0.555
10	0.423	0.453	0.482	0.508	0.529
11	0.418	0.445	0.471	0.494	0.513
12	0.414	0.439	0.464	0.485	0.502
13	0.411	0.436	0.46	0.479	0.495
14	0.41	0.433	0.456	0.475	0.49
15	0.408	0.431	0.454	0.472	0.487
16	0.408	0.43	0.452	0.47	0.484
17	0.407	0.429	0.451	0.469	0.483
18	0.407	0.429	0.451	0.468	0.482
19	0.406	0.428	0.45	0.468	0.481
20	0.406	0.428	0.449	0.467	0.48
21			0.449	0.467	0.48
22				0.467	0.48
23				0.466	0.479

TABLE 2.3.4

$p_1 = 0.8 \quad q_1 = 0.2 \quad p_2 = 0.5 \quad q_2 = 0.5 \quad \lambda = 0.2$

B \ T	1	2	3	4	5
2	86.722	• • •	• • •	• • •	• • •
3	1.903	2.625	• • •	• • •	• • •
4	1.355	1.546	1.735	• • •	• • •
5	1.195	1.296	1.377	1.447	• • •
6	1. 131	1.202	1.252	1.288	1.318

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7	1 . 101	1.161	1 . 198	1.222	1.239
8	1.087	1 . 141	1. 173	1. 191	1.203
9	1.08	1.132	1. 161	1.177	1. 186
10	1.077	1.127	1.155	1.169	1.178
11	1.075	1 . 124	1.152	1.166	1.174
12	1.075	1.123	1.151	1. 164	1.171
13	1.074	1.123	1. 149	1. 163	1.17
14	1.074	1. 122	1 . 149	1. 163	1.17
15		1.122			1. 17
16					1. 17
17					1. 169
18					1 . 169

The calculated values of the truncation parameter for different combinations of the other parameters are presented tables (2.3.1) to (2.3.4) and the following inferences can be Made.
For p_1 = 0.5, q_1 =0.5, p_2 =0.2, p_2 =0.8 and λ = 0.2, the optimal value of the truncation parameter B is 23, 26, 26, 33 and 29 in the time duration (0,1), (0,2), (0,3), (0,4) and (0.5) respectively. For p_1 = 0.6, q_1 = 0.4, p_2 = 0.3, q_2 = 0.7 and λ = 0.2, the optimal value of the truncation parameter B is 18, 19, 22, 21 and 23 in the time duration (0,1), (0,2), (0,3), (0,4) and (0,5) respectively. For p_1 = 0.7, q_1 = 0.3, p_2 = 0.3, q_2 = 0.7 and λ = 0.2, the optimal value of the truncation parameter B is 19, 19, 20, 23 and 23 in the time duration (0,1), (0,2), (0,3), (0,4) and (0,5) respectively. For p_1 = 0.8, q = 0.2, p_2 = 0.5, p_2 = 0.5 and λ = 0.2, the optimal value of the truncation parameter B is 13, 14, 13, 13 and 17 in the time duration (0,1), (0,2), (0,3), (0,4) and (0,5) respectively. Also as p is increasing the optimal value of the truncation parameter is decreasing. Same is in case with p_2. It is also observed that the truncation parameter is also depending on the parameter λ.
In this section the inferences about the optimal values of the truncation parameter in different manpower models are presented. In case of manpower models with Right Truncated Geometric Distribution, the optimal values of the Truncation parameters are decreasing as time duration is decreasing and decreasing as p increases. The sharpness of this decrease is less as the values of the p are decreasing. In case of manpower models with Mixed Right Truncated Geometric Distribution also, the optimal values are decreasing the Time duration is increases and values of p are increasing.

SUMMARY AND CONCLUSION

A review on the manpower modeling reveals that most of the manpower models have been analyzed through the complete length of the service (CLS) distribution of the organization. While considering CLS, the manpower systems were modeling through different discrete and continuous distributions having infinite and finite range. In case of finite range distributions, the distributions are right

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truncated basing on the assumption that the maximum service of an individual in the organization is finite. So, in case of manpower modeling with truncated distribution, truncation parameters has vital role in recruitment policies and hence the estimations of optimal value of the truncation parameter is necessary for the minimum recruitment level.

The Manpower Models with some discrete truncated distributions namely right truncated geometric distribution, mixed right truncated geometric distribution and are considered and after obtaining the average number of recruiters of the organization during the period (O,T) for minimizing the number of recruits, the optimal values of the truncation parameters were obtained for different combinations of the other parameters by using finite order difference conditions.

In general in all the manpower models studied it is observed that as the time duration increasses the values of the turncation parameter decreasing.

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