CHAPTER - 3

EXPECTED TIME FOR RECRUITMENT IN A TWO GRADED MANPOWER SYSTEM WITH GEOMETRIC THRESHOLDS AND CORRELATED INTER-DECISION TIMES

1.1. INTRODUCTION

In this chapter, an organization having two grades of marketing personnel is considered, where the inter-decision times are exchangeable and constantly correlated exponential random variables. The exit of personnel takes place from each one of the grades with regard to the policy decisions made by this organization. Two mathematical models are considered which differ from each other in terms of the mobility of manpower from one grade to the other and the mean and variance of the time for recruitment is obtained for both the models.

Sathiyamoorthy and Parthasarathy (2002) have obtained the mean and variance of the time for recruitment in a two graded manpower system when (i) loss of manpower is a continuous random variable (ii) threshold for loss of manpower for the two grades are continuous random variables and (iii) the inter-decision times form a sequence of independent and identically distributed random variables.

The rest of this chapter is organized as follows: In section 3.2, model description is given for Model I and the analytical expressions for the mean and variance of the time for recruitment are derived. In section
3.3, model description is given for Model II and the explicit expressions for the mean and variance of the time for recruitment are derived. In Section 3.4, the mean and variance of the time for recruitment are obtained for both the models by assuming specific distribution as special case. In section 3.5, the results are numerically illustrated and the relevant conclusions are stated in section 3.6.

3.2. **MODEL I (Maximum Model)**

The description of the maximum model is stated below.

**Assumptions**

1. An organization consisting of two grades of marketing personnel is considered.

2. The organization takes decision at random epochs in \((0, \infty)\). At every decision making epoch, a random number of persons quit the organization resulting in an associated loss of manpower to the organization.

3. The loss of manpower is linear and cumulative.

4. The mobility or transfer of person from one grade to the other where there is more depletion is permitted.

5. Each grade has its individual random threshold for the number of exits.
6. If the cumulative number of exits crosses the maximum of the two thresholds, the recruitment is made at this point. In other words, the time for recruitment is the maximum of the time taken to cross the threshold in each grade.

7. The inter-decision times between successive exits are exchangeable and constantly correlated exponential random variables.

8. The process which generates the exits, the sequence of depletions and the thresholds are mutually independent.

Notations

\( X_i \) : a discrete random variable that denotes the number of persons leaving the organization at the \( i^{th} \) decision making epoch \( i = 1, 2, \ldots \). Here \( X_i \)'s are identical and independently distributed random variables.

\( Y_i \) : time between the \((i-1)^{th}\) and \(i^{th}\) decision making epochs, \( Y_i \)'s are exchangeable and constantly correlated exponential random variables.

\( V_i(t) \) : probability that there are exactly \( k \) decision making epochs in \((0, t] \)

\( Z_i \) : a discrete random variable that denotes the threshold level for the \( i^{th} \) grade, following geometric distribution with parameter
\[ \theta_j, \ j = 1, 2 \]

\[ H() : \text{distribution function of } Z = \max(Z_1, Z_2) \]

\[ F^*(x) : \text{cumulative distribution function of } \sum_{i=1}^{k} X_i \]

\[ T_j : \text{time taken for threshold crossing in the } j^{th} \text{ grade due to depletion, } j = 1, 2 \]

\[ T : \text{a continuous random variable that denotes the time for recruitment and } T = \max(T_1, T_2) \]

\[ L(t) : \text{cumulative distribution of } T \]

\[ L*(s) : \text{Laplace-Stieltje's transform of } L(t) \]

\[ R : \text{correlation between any } Y_i \text{ and } Y_j, \ i \neq j \]

\[ a : \text{mean of } Y_i, \ i = 1, 2, \ldots \]

\[ \psi(n, x) = \int_0^x e^{-c} e^{n-1} dc \]

\[ b = a(1 - R) \]

\[ m = \frac{1}{1 + bs} \]

\[ E(T) : \text{mean time for recruitment} \]
\( \nu(T) \) : variance of the time for recruitment.

**MAIN RESULT**

The probability distribution of \( T \), Laplace-Stieltje's transform of the distribution of \( T \) and the mean and variance of \( T \) are obtained below.

Now \( Z \) being the maximum of two geometric random variables, the distribution of \( Z \) is found to be

\[ 1 - H(z) = P(Z > z) = \left( \tilde{\theta}_1 \right)^z + \left( \tilde{\theta}_2 \right)^z - \left( \tilde{\theta}_1 \tilde{\theta}_2 \right)^z \]  \( \ldots (3.2.1) \)

\[ P[\text{threshold level is not crossed in the first k decisions}] = P\left( \sum_{i=1}^{k} X_i < Z \right) \]

Invoking to the law of total probability and using \( (3.2.1) \),

\[ P\left( \sum_{i=1}^{k} X_i < Z \right) = \sum_{n=0}^{\infty} P\left( Z > n / \sum_{i=1}^{k} X_i = n \right) P\left( \sum_{i=1}^{k} X_i = n \right) \]

\[ = \sum_{n=0}^{\infty} P\left( \sum_{i=1}^{k} X_i = n \right) P(Z > n) \]

\[ = \sum_{n=0}^{\infty} P\left( \sum_{i=1}^{k} X_i = n \right) \left[ \left( \tilde{\theta}_1 \right)^* + \left( \tilde{\theta}_2 \right)^* - \left( \tilde{\theta}_1 \tilde{\theta}_2 \right)^* \right] \]

\[ = \sum_{n=0}^{\infty} P\left( \sum_{i=1}^{k} X_i = n \right) \left( \tilde{\theta}_1 \right)^* + \sum_{n=0}^{\infty} P\left( \sum_{i=1}^{k} X_i = n \right) \left( \tilde{\theta}_2 \right)^* - \sum_{n=0}^{\infty} P\left( \sum_{i=1}^{k} X_i = n \right) \left( \tilde{\theta}_1 \tilde{\theta}_2 \right)^* \]

i.e.

\[ P\left( \sum_{i=1}^{k} X_i < Z \right) = \left( A(\tilde{\theta}_1) \right)^* + \left( A(\tilde{\theta}_2) \right)^* - \left( A(\tilde{\theta}_1 \tilde{\theta}_2) \right)^* \]  \( \ldots (3.2.2) \)
where \( A(\bar{\theta}) = \sum_{n=0}^{\infty} P(X = n)(\bar{\theta})^n \) \( \ldots \) (3.2.3)

Now

\[
P(T > t) = \sum_{k=0}^{\infty} P \begin{cases} \text{exactly } k \text{ decisions in } (0,t] \text{ and the threshold level is} \\ \text{not crossed} \end{cases}
\]

\[
= \sum_{k=0}^{\infty} V_1(t) P\left( \sum_{i=1}^{k} X_i < Z \right)
\]

\[
= \sum_{k=0}^{\infty} [F_k(t) - F_{k+1}(t)] P\left( \sum_{i=1}^{k} X_i < Z \right)
\]

\[
L(t) = 1 - P(T > t)
\]

\[
= 1 - \sum_{k=0}^{\infty} [(F_k(t) - F_{k+1}(t))] P\left( \sum_{i=1}^{k} X_i < Z \right)
\]

Using (3.2.1),

\[
L(t) = 1 - \sum_{k=0}^{\infty} [F_k(t) - F_{k+1}(t)] A(\bar{\theta})^k - \sum_{k=0}^{\infty} [F_k(t) - F_{k+1}(t)] A(\bar{\theta})^k + \sum_{k=0}^{\infty} [F_k(t) - F_{k+1}(t)] A(\bar{\theta}, \bar{\theta})^k
\]

\[
= (1 - A(\bar{\theta})) \sum_{k=1}^{\infty} F_k(t) A(\bar{\theta})^{k-1} + (1 - A(\bar{\theta})) \sum_{k=1}^{\infty} F_k(t) A(\bar{\theta})^{k-1} - (1 - A(\bar{\theta})) \sum_{k=1}^{\infty} F_k(t) A(\bar{\theta})^{k-1}
\]

\( \ldots \) (3.2.4)

Taking Laplace-Stieltje's transform on both sides

\[
L^*(s) = \left(1 - A(\bar{\theta})\right) \sum_{k=1}^{\infty} F_k^*(s) A(\bar{\theta})^{k-1} + \left(1 - A(\bar{\theta})\right) \sum_{k=1}^{\infty} F_k^*(s) A(\bar{\theta})^{k-1}
\]
As in Gurland (1955), the cumulative distribution function $F_i(t)$ is given by

$$F_i(t) = (1 - R) \sum_{i=0}^{\infty} \frac{(kR)^i}{(1 - R + kR)^{i+1}} \left[ \frac{\psi(k + 1, t/b)}{(k + i - 1)!} \right]$$  \hspace{1cm} (3.2.6)$$

From (3.2.6), it can be shown that

$$F_k^*(s) = \frac{m^k}{1 + \frac{kR(1 - m)}{1 - R}}$$  \hspace{1cm} (3.2.7)$$

and

$$\left( \frac{d}{ds} F_k^*(s) \right)_{s=0} = -ak$$

and

$$\left( \frac{d^2}{ds^2} F_k^*(s) \right)_{s=0} = b^2 \left[ \frac{(1 + R^2)k^2}{(1 - R)^3} + \frac{(1 + R)k}{(1 - R)} \right]$$  \hspace{1cm} (3.2.8)$$

From (3.2.5) and (3.2.7), one can show that

$$E(T) = \left( -\frac{d}{ds} L^*(s) \right)_{s=0}$$

$$= (1 - A(\bar{\theta}_1)) \sum_{k=1}^{\infty} ak(A(\bar{\theta}_1))^{k-1} + (1 - A(\bar{\theta}_2)) \sum_{k=1}^{\infty} ak(A(\bar{\theta}_2))^{k-1}$$
\[-(1 - A(\delta, \theta)) \sum_{k=0}^{\infty} ak(A(\delta, \theta))^{k-1}\]

\[= a \left[ (1 - A(\delta_1))(1 - A(\delta_2))^2 + (1 - A(\delta_2))(1 - A(\delta_2))^2 - (1 - A(\delta_1))(1 - A(\delta_2))^2 \right]\]

i.e., \(E(T) = \frac{b}{1 - R} \left\{ \frac{1}{(1 - A(\delta_1))} + \frac{1}{(1 - A(\delta_2))} - \frac{1}{(1 - A(\delta_2))^2} \right\}\) .... (3.2.9)

Again,

\[E(T^2) = \left( \frac{d^2}{ds^2} L(s) \right)_{s=0}\]

i.e. \(E(T^2) = 2 \left( \frac{b}{1 - R} \right)^2 \left[ \frac{1 + R^2 A(\delta_1)}{(1 - A(\delta_1))^2} + \frac{1 + R^2 A(\delta_2)}{(1 - A(\delta_2))^2} - \frac{1 + R^2 A(\delta_1, \delta_2)}{(1 - A(\delta_1, \delta_2))^2} \right]\)

...(3.2.10)

Using (3.2.9) and (3.2.10),

\[V(T) = E(T^2) - (E(T))^2\]

i.e. \(V(T) = 2 \left( \frac{b}{1 - R} \right)^2 \left[ \frac{1 + R^2 A(\delta_1)}{(1 - A(\delta_1))^2} + \frac{1 + R^2 A(\delta_2)}{(1 - A(\delta_2))^2} - \frac{1 + R^2 A(\delta_1, \delta_2)}{(1 - A(\delta_1, \delta_2))^2} \right]\)

\[-\left( \frac{b}{1 - R} \right)^2 \left( \frac{1}{(1 - A(\delta_1))} + \frac{1}{(1 - A(\delta_2))} - \frac{1}{(1 - A(\delta_1, \delta_2))} \right)^2\]\n
...(3.2.11)

(3.2.9) and (3.2.11) give the mean and variance of the time for recruitment

for Model I
3.3 MODEL – II (Minimum Model)

The description of the minimum model is stated below.

Assumptions

1. An organization consisting of two grades of marketing personnel is considered.

2. The organization takes decision at random epochs in \((0, \infty)\). At every decision making epoch, a random number of persons quit the organization resulting in an associated loss of manpower to the organization.

3. The loss of manpower is linear and cumulative.

4. The mobility or transfer of person from one grade to the other where there is more depletion is permitted.

5. Each grade has its individual random threshold for the number of exits.

6. If the cumulative number of exits crosses any one of the thresholds for the first time, the recruitment is made at this point. In other words, the time for recruitment is the minimum of the time taken to cross the threshold in each grade.

7. The inter-decision times between successive exits are exchangeable and constantly correlated exponential random variables.
8. The process which generates the exits, the sequence of depletions and the thresholds are mutually independent.

Notations

\( X_i \): a discrete random variable that denotes the number of persons leaving the organization at the \( i^{th} \) decision making epoch

\( i = 1,2,\ldots \) Here \( X_i \)'s are identical and independently distributed random variables.

\( Y_i \): time between the \((i-1)^{th}\) and \( i^{th} \) decision making epochs,

\( Y_i \)'s are exchangeable and constantly correlated exponential random variables

\( V_k(t) \): probability that there are exactly \( k \) decisions making epochs in \((0,t]\)

\( Z_j \): a discrete random variable that denotes the threshold level for the \( j^{th} \) grade, following geometric distribution with parameter \( \theta_j \),

\( j = 1,2 \)

\( H(\cdot) \): distribution function of \( Z = \min (Z_1,Z_2) \)

\( F_k(\cdot) \): cumulative distribution function of \( \sum_{i=1}^{k} Y_i \)

\( T_j \): time taken for threshold crossing in the \( j^{th} \) grade due to depletion, \( j = 1,2 \)

\( T \): a continuous random variable that denotes the time for
recruitment and \( T = \min (T_1, T_2) \)

\[ L(t) : \quad \text{cumulative distribution function of } T \]

\[ L^*(s) : \quad \text{Laplace-Stieltje's transform of } L(t) \]

\[ R : \quad \text{correlation between any } Y_i \text{ and } Y_j, \ i \neq j \]

\[ a : \quad \text{mean of } Y_i, \ i = 1, 2, \ldots, \]

\[ \psi(n,x) : \quad \int_0^x e^{-\varepsilon n-1} d\varepsilon \]

\[ b : \quad a(1 - R) \]

\[ m : \quad \frac{1}{1 + bs} \]

\[ E(T) : \quad \text{mean time for recruitment.} \]

\[ V(T) : \quad \text{variance of the time for recruitment.} \]

**MAIN RESULT**

The probability distribution of \( T \), Laplace-Stieltje's transform of the distribution of \( T \) and the mean and variance of \( T \) are obtained below.

Now \( Z \) being the minimum of two geometric random variables, the distribution of \( Z \) is found to be

\[ 1 - H(y) = (\overline{\theta}_1 \theta_2)^y \]
As in section 3.2, it can be shown that

\[ P\left(\sum_{i=1}^{k} X_i < Z\right) = (A(\bar{\theta}, \bar{\phi}))^k \]  \hspace{1cm} \ldots(3.3.1)

\[ L(t) = 1 - \sum_{k=0}^{\infty} \left[(F_k(t) - F_{k+1}(t))P\left(\sum_{i=1}^{k} X_i < Z\right)\right] \]

and

\[ L^*(s) = (1 - A(\bar{\theta}, \bar{\phi}) \sum_{k=1}^{\infty} \left[F_k^*(s)(A(\bar{\theta}, \bar{\phi}))^{k-1}\right] \]

\hspace{1cm} \ldots(3.3.2)

where \( A(\bar{\theta}, \bar{\phi}) \) is given by (3.2.3),

From (3.3.2),

\[ E(T) = \left(-\frac{d}{ds} L^*(s)\right)_{s=0} \]

\[ = (1 - A(\bar{\theta}, \bar{\phi})) \sum_{k=1}^{\infty} ak(A(\bar{\theta}, \bar{\phi}))^{k-1} \]

i.e.

\[ E(T) = \frac{a}{(1 - A(\bar{\theta}, \bar{\phi}))} \]  \hspace{1cm} \ldots(3.3.3)

As in section 3.2, it is found that

\[ E(T^2) = 2\left(\frac{b}{1 - R}\right)^2 \left[\frac{1 + R^2 A(\bar{\theta}, \bar{\phi})}{1 - A(\bar{\theta}, \bar{\phi})^2}\right] \]

\hspace{1cm} \ldots(3.3.4)
(3.3.3) and (3.3.5) give the mean and variance of the time for recruitment for Model II.

### 3.4 SPECIAL CASE

Suppose the number of exits $X_i$ is following Poisson distribution with parameter $\alpha$. Then,

$$A(\theta) = \sum_{n=1}^{\infty} P(X = n) \theta^n = \sum_{n=1}^{\infty} \frac{e^{-\alpha} \alpha^n}{n!} (\theta)^n$$

$$= e^{-\alpha} \sum_{n=1}^{\infty} \frac{(\alpha \theta)^n}{n!} = e^{-\alpha} \left(1 - \theta\right)$$

i.e., $A(\theta) = e^{-\alpha \theta}$ \hspace{1cm} \ldots(3.4.1)

Now

$$A(\theta, \theta_2) = e^{-\alpha \left(1 - \theta \theta_2\right)} = e^{-\alpha \left(\frac{1}{2} \theta_1^2 + \frac{1}{2} \theta_2^2 - \theta_1 \theta_2\right)}$$

\hspace{1cm} \ldots(3.4.2)

Using (3.4.1) and (3.4.2) in (3.2.8),

$$E(T) = \left(\frac{b}{1 - R}\right) \left[ \frac{1}{1 - e^{-\alpha \theta_1}} + \frac{1}{1 - e^{-\alpha \theta_2}} - \frac{1}{1 - e^{-\alpha \left(\theta_1 + \theta_2 - \theta_1 \theta_2\right)}} \right]$$

\hspace{1cm} \ldots(3.4.3)
Using (3.4.1) in (3.2.11),

\[ V(T) = 2 \left( \frac{b}{1-R} \right)^2 \left\{ \frac{1 + R^2 e^{-\alpha \theta_1}}{(1 - e^{-\alpha \theta_1})^2} + \frac{1 + R^2 e^{-\alpha \theta_2}}{(1 - e^{-\alpha \theta_2})^2} - \frac{1 + R^2 e^{-\alpha (\theta_1 + \theta_2 - \theta_1 \theta_2)}}{(1 - e^{-\alpha (\theta_1 + \theta_2 - \theta_1 \theta_2)})^2} \right\} \]  

... (3.4.4)

\[ \left( \frac{b}{1-R} \right)^2 \left\{ \frac{1}{1 - e^{-\alpha \theta_1}} + \frac{1}{1 - e^{-\alpha \theta_2}} - \frac{1}{1 - e^{-\alpha (\theta_1 + \theta_2 - \theta_1 \theta_2)}} \right\}^2 \]

(3.4.3) and (3.4.4) give the mean and variance of the time for recruitment for Model I.

Using (3.4.2) in (3.3.3),

\[ E(T) = \left( \frac{b}{1-R} \right) \frac{1}{1 - e^{-\alpha (\theta_1 + \theta_2 - \theta_1 \theta_2)}} \]  

... (3.4.5)

Using (3.4.1) in (3.3.6),

\[ V(T) = 2 \left( \frac{b}{1-R} \right)^2 \left\{ \frac{1 + R^2 e^{-\alpha (\theta_1 + \theta_2 - \theta_1 \theta_2)}}{(1 - e^{-\alpha (\theta_1 + \theta_2 - \theta_1 \theta_2)})^2} - \left( \frac{b}{1-R} \right)^2 \left\{ \frac{1}{1 - e^{-\alpha (\theta_1 + \theta_2 - \theta_1 \theta_2)}} \right\}^2 \right\} \]  

... (3.4.6)

(3.4.5) and (3.4.6) give the mean and variance of the time for recruitment for Model II.
3.5. **NUMERICAL ILLUSTRATION**

The mean and variance of the time for recruitment for both the models are calculated by varying \( R \) and keeping \( \theta_1, \theta_2, \alpha \) and \( b \) fixed and the results are tabulated below.

**TABLE - 4**

| \( R \) | \( \theta_1=0.3, \ \theta_2=0.1, \ \alpha=0.1, \ b=0.4 \) |
|-----------------|-----------------|-----------------|-----------------|-----------------|
|                | \( E(T) \)      | \( V(T) \)      | \( E(T) \)      | \( V(T) \)      |
| Model I        | Model II        | Model I         | Model II        |
| -1.0           | 21.36131        | 5.506022        | 1213.13         | 88.74643        |
| -0.8           | 23.73479        | 6.117802        | 1128.604        | 83.59454        |
| -0.6           | 26.70164        | 6.882528        | 1065.07         | 80.23614        |
| -0.4           | 30.51616        | 7.865746        | 1052.154        | 80.94919        |
| -0.2           | 35.60219        | 9.176703        | 1155.284        | 90.70412        |
| 0              | 42.72262        | 11.01204        | 1530.737        | 121.2651        |
| 0.2            | 53.40328        | 13.76506        | 2599.388        | 204.0843        |
| 0.4            | 71.20437        | 18.35341        | 5728.395        | 440.7234        |
| 0.6            | 106.8066        | 27.53011        | 17041.12        | 1283.778        |
| 0.8            | 213.6131        | 55.06022        | 91416.94        | 6771.157        |
The mean and variance of the time for recruitment for both the models are calculated by varying $\alpha$ and keeping $\theta_1$, $\theta_2$, $b$ and $R$ fixed and the results are tabulated below.

**Table - 5**

<table>
<thead>
<tr>
<th>$\alpha$</th>
<th>$\theta_1=0.3$, $\theta_2=0.1$, $b=0.4$ and $R=0.6$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$E(T)$</td>
</tr>
<tr>
<td><strong>Model I</strong></td>
<td><strong>Model II</strong></td>
</tr>
<tr>
<td>0.1</td>
<td>106.8066</td>
</tr>
<tr>
<td>0.2</td>
<td>53.65365</td>
</tr>
<tr>
<td>0.3</td>
<td>35.93619</td>
</tr>
<tr>
<td>0.4</td>
<td>27.07758</td>
</tr>
<tr>
<td>0.5</td>
<td>21.76252</td>
</tr>
<tr>
<td>0.6</td>
<td>18.21922</td>
</tr>
<tr>
<td>0.7</td>
<td>15.68838</td>
</tr>
<tr>
<td>0.8</td>
<td>13.7903</td>
</tr>
<tr>
<td>0.9</td>
<td>12.31408</td>
</tr>
<tr>
<td>1.0</td>
<td>11.13316</td>
</tr>
</tbody>
</table>
The mean and variance of the time for recruitment for both the models are calculated by varying \( b \) and keeping \( \theta_1, \theta_2, \alpha \) and \( R \) fixed and the results are tabulated below.

**Table - 6**

<table>
<thead>
<tr>
<th>( b )</th>
<th>( \theta_1=0.3, \theta_2=0.1, R=0.6 ) and ( \alpha=0.1 )</th>
<th>( E(T) )</th>
<th>( V(T) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model I</td>
<td>Model II</td>
<td>Model I</td>
<td>Model II</td>
</tr>
<tr>
<td>0.1</td>
<td>26.70164</td>
<td>6.882528</td>
<td>1065.67</td>
</tr>
<tr>
<td>0.2</td>
<td>53.40328</td>
<td>13.76506</td>
<td>4280.279</td>
</tr>
<tr>
<td>0.3</td>
<td>80.10492</td>
<td>20.64758</td>
<td>9585.628</td>
</tr>
<tr>
<td>0.4</td>
<td>106.8066</td>
<td>27.53011</td>
<td>17041.12</td>
</tr>
<tr>
<td>0.5</td>
<td>133.5082</td>
<td>34.41264</td>
<td>26626.74</td>
</tr>
<tr>
<td>0.6</td>
<td>160.2098</td>
<td>41.29517</td>
<td>38342.51</td>
</tr>
<tr>
<td>0.7</td>
<td>186.9115</td>
<td>48.17769</td>
<td>52188.42</td>
</tr>
<tr>
<td>0.8</td>
<td>213.6131</td>
<td>55.06022</td>
<td>68164.47</td>
</tr>
<tr>
<td>0.9</td>
<td>240.3148</td>
<td>61.94275</td>
<td>86270.65</td>
</tr>
<tr>
<td>1.0</td>
<td>267.0164</td>
<td>68.82528</td>
<td>106507.00</td>
</tr>
</tbody>
</table>
3.6. CONCLUSION

From the above tables, it is found that

i) a) Mean time for recruitment increases with R for both Models I and II while the other parameters are fixed.

b) Variance of the time for recruitment decreases up to a certain stage and then increases as R increases for both Models I and II while the other parameters are fixed.

ii) Mean and Variance of the time for recruitment decrease as a increases for both the Models while the other parameters are fixed.

iii) Mean and Variance of the time for recruitment increase with b for both the models while the other parameters are fixed.

iv) From the organization's point of view, Model-I is preferable to Model – II in all the three cases regarding average time for recruitment.

v) This agrees with reality since in Model I, the time for recruitment is elongated, compared to Model II, as can be seen from the recruitment policies for these two models.