CHAPTER – IV

VALUATION OF HUMAN RESOURCE
CHAPTER - 4

VALUATION OF HUMAN RESOURCE

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VALUATION OF HUMAN RESOURCE

4.1 INTRODUCTION

HRA is an art and science of evaluating the worth of HR of a business organization in a systematic manner as a whole to the concern and society and recording them for presenting the information in the financial statements to communicate their worth to the readers of financial statements. Organization structure, strategy, technology and physical assets cannot guarantee sustainable competitive advantage for an organization. Our competitors can clone organization. However, it is not possible to clone human resources who happen to be the creators of intellectual assets. And this can provide enterprise a sustained competitive advantage attained through superior quality of intellectual assets created by our human resources.¹

Intellectual assets are knowledgeable creations of human resources on which the organization can assert ownership.² Such assets comprise of processes, technologies and computer programmes that can be protected through copyrights, patents and semi-conductor mask. These assets often become a basis of mergers and acquisitions because of their capacity to generate superior economic benefits. Intellectual assets are fundamental to the growth and value of an enterprise in the current globally competitive environment.³

The methodology of valuing an intellectual asset can be extended to value the brains behind creation of such an asset. This exercise will help an organization to know the worth of its human resources and to manage the same in an effective
manner. Moreover, the system that attempts to assign cost or value figure to human resource is known as HRA System.

An attempt is made in this chapter to bring together workings of various models available at global level. This working is totally based on secondary data and presented as it is. This will help to understand the working techniques of valuation of HRA models.

4.2 OBJECTIVES OF VALUATION

Though traditionally human resources were never entertained by an accounting system, yet strong arguments have been forwarded against such a practice. A brief historical perspective to the development of HRA will help in better understanding of the concept and the methodology. However, the performance evaluation systems were tied primarily to accounting numbers never considered the impact of management's style on the contribution made by human resources. This is because traditional accounting system is based on a frame work whose structure rests on the concepts of the monitory measurement and objective evidence. And in the traditional sense, human resources defy objective monetary measurement.

The inability of traditional accounting system to monitor and account for human resources invited severe criticism three decades ago when Likert logically questioned the traditional practice. Accounting being a measurement science responded to this problem positively and presented a system called HRA which attempts to assign cost and value figures to human resources.

The process of assigning numeric figures to human resources depends upon the approach adopted for valuation. There are two approaches, viz. cost and value. The cost approach can be operationalized through historical cost model or
replacement cost model or opportunity cost model. The value approach, can be operationalized through a number of models. The models heavily cited in the literature happen to be: Hermanson’s model, the Lev and Schwartz’s model, the Flamholtz’s model and the Jaggi and Lau’s model.

These models have originated under the influence of either the Hermanson School of thought or the Flamholtz school of thought. The Harmanson School of thought focuses on compensation (salary) and treats it as a surrogate of contribution. The Flamholtz school of thought handles the evaluation exercise systematically. It dictates that valuation should be handled as group basis. The variables of the model happen to be: the question of contribution to be made to the organization, the probability of transition from one service state to another (including exist state) and a discount factor to calculate the present value of prospective stream of contribution. The estimation of contribution posed a major problem when the valuation exercise was operationalized. The other variables were found to be comparatively less difficult to trap.

The valuation of a group of human resources engaged in the development of an intellectual asset can be carried out by extending the methodology of intellectual asset valuation as discussed in earlier part. The figure of net cash flow determined under the economic module is reflective of nothing but the contribution potential of the human resources associated with that intellectual asset. This can be taken as the starting point. The figure of net cash flow can be multiplied with the probability of leaving the organization to get adjusted net cash flow. Adjusted net cash flow figure, when discounted to calculate the present value, will provide the value of human resources.

Such an exercise of HRA will help those managing intellectual asset management programs in taking a number of decisions in the area of human
resource management. The value of different teams of human resources engaged in different intellectual asset creation assignments can be calculated and monitored. Further, the variables impacting the value can be tracked and accordingly judgement can be made regarding the achievements of different teams.

4.3 APPRAISAL OF DIFFERENT MODELS

In the previous chapter major models on HR valuation have been discussed in brief. In some aspects they are similar and in some points they differ. The cost, value and behavioural based HRA approaches (including other surrogate measures) are diverse in nature, contributing differently towards accounting of the organizational HR. The contributions and / or the limitations of these approaches / models are presented in Chart 4.1.

Chart 4.1

<table>
<thead>
<tr>
<th>HRA Models &amp; their Proponents</th>
<th>Model in brief</th>
<th>Model appraisal</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Cost based Approach</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Historical cost relev-based approach, Brummet, Flamholtz &amp; Pyle (1968)</td>
<td>Cost of (a) the acquisition, training &amp; development of individuals (b) organizational development</td>
<td>Accumulation of historical cost vant from accounting point of view. Capitalized with subsequent amortization over the years to reflect the value of (a) individuals and (b) the organization Tracing cost to individuals may facilitate control but may not be pragmatic. Capitalization of cost contrary to its expense nature in traditional accounting practices, may not be acceptable in absence of assessment of its</td>
</tr>
</tbody>
</table>
relevant future benefit potentials.

Amortization of cost not appropriate due to,
(a) performance rating of individuals or condition measure of organization
(b) performance rating or the condition measure referred to a totality rather than relevant to accumulated cost.

Accumulated cost of HR acquisition & development (besides inappropriate amortization) may not reflect their value, instead, total performance need to be judged in relation to the total cost associated - with HR to reflect their value.


Assessment of
(a) replacement cost of individuals
(b) rebuilding cost of human organization to reflect HR asset value of
(a) individuals
(b) human organization.

Assessment of replacement cost may be relevant for planning purposes only for those who are likely to leave the organization or for the key individuals, otherwise, such hypothetical cost of replacement/rebuilding may be unwarranted.

Human resource not traded in the market, as such, replacement/current cost may not exist unlike in the case of physical assets.

Replacement alternatives may be many and assessment of cost of such alternatives may be highly subjective.

In absence of real replacements / rebuilding, such make believe cost may not reflect the value of HR either for the individuals or for the organization.

B. Model based on opportunity cost principle

Competitive bidding model. Jones & Hekimian (1967)
It envisages competitive bidding amongst the investment center managers to win the individual employees for used based on the highest bid price to be included as the value of the human

The concept of competitive bidding may facilitate optimal allocation of HR in principal but with increased specialization, more and more individuals may be out of the bidding process and consequently have no value in the organization.
asset along with investment in physical while assessing the return on investment achieved by the investment centres.

To quote the bid price, the first step would be to assess the likely contribution from each individual by the different investment center managers. Assessing contribution of an individual from the present job itself is difficult in a man-machine interactive situation. What to talk of assessment of the contribution from all possible future assignments? In fact, the model has shifted the problem to the investment center managers rather than suggesting any possible method to assess the likely contribution.

Besides the primary task of assessing individual's contribution the model does not specify the frequency of bidding, accordingly, the period may vary for which the relevant contribution needs to be assessed.

In absence of reliable estimates of likely contribution from individuals, the bid price according to the whims and fancies of the managers may not be considered as HR value surrogate and may not be of any use to improve ROI of the investment centres, as envisaged.

C. Economic Models


Extra profits earned by an organization as compared to the industry average rate i.e. goodwill credited to organizational HR for its valuation either party or fully as

1) $HR\ value = \text{goodwill} \times \frac{\text{investments in HR}}{\text{total investments}}$

2) $HR\ value = \text{goodwill} \times \text{estimated contribution rate of HR}$

Short term rate of earning may be influenced by uncomfortable external environment as such goodwill may belong not to HR alone as in (2) or to HR along with other physical assets as in (1)

Goodwill may be attributed to the supernormal rate of earning not only to physical assets along with HR as in (2) but it could even pertain to investments in the suppliers, the customers and
the public image i.e. the external asset bases of an organization. But the credit for supernormal rate of earning on physical assets or for that matter of the suppliers, the customers and the public image perhaps goes to HR, so the goodwill as in \( (2) \)

Good will may be attributed to HR as in \( (2) \) but that may be the returns during the current year. The model does not suggest how to estimate the contribution rate of HR to determine the HR value.

In case the organizational rate of earnings is less than that of the market average, the model is silent on the issue of HR valuation.

| 2. Adjusted discounted Hermanson (1964) | Present value of future wages method next five years discounted At the rate of return considered as the value of the organizational HR. The adjusted rate of return refers to average rate of return on owned assets of all firms in the economy multiplied by the efficiency ratio of the organization specific rate of return on owned assets during the past five years on an weighted average rate basis, with comparatively lower weightings as we move to the previous years. | The credit for the differential adjusted rate of return goes rightly to HR as they only manage all other physical and financial resources of an organization to active such results. Of course rate of return of a specific organization may not be comparable with that of all other firms in the economy perhaps even with the firms belonging to the same sector, the adjusted rate of return may not be fully due to HR Value. But. The assumption that employee wages are based on the Adjusted rate of return achieved by them may not be valid and the present value of future wages may not reflect the HR asset value, perhaps still reflects a liability only. Besides, the model is subjective pertaining to: i) Present value of future wages are restricted to next five years rate of return. |
ii) Efficiency ratio calculation based on last five years rate of return.

iii) Assignment of weightings to the past rate of return for weighted average calculation

3. Model proposed by Lev & Schwartz (1971)

<table>
<thead>
<tr>
<th>Present value of likely future wages payable to the current employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) specific value of HR, when wages payable estimates at specific wage rate of the organization.</td>
</tr>
<tr>
<td>b) general HR value, when wages estimates at market average wage rate, assuming</td>
</tr>
<tr>
<td>i) Estimation of wages and consequently HR value on a group basis</td>
</tr>
<tr>
<td>ii) wages as a function of age alone</td>
</tr>
<tr>
<td>iii) remaining tenure includes the provision for likely death before retirement.</td>
</tr>
</tbody>
</table>

Marginal productivity theory of wages may no be valid in an imperfect labour market as well as within the framework of minimum wages act and the presence of trade Unions etc. Moreover in absence of a suitable measure of employee contribution, wages may not be based on the same. As such present value of estimated future wages may not be appropriate HR value surrogate. Estimate of future wages payable is a measure of Liability, that too may not be reliable due to |

i) wages may not depend on age alone, as such identity transformation to estimate wages from age wise across persons to over time may not be fair.

ii) Possibility not employees leaving the organization before retirement not considered.

The present value of future wages payable may have not be judges in relation to the present value of future contribution receivable to reflect the extent of future benefit potentials as the value of HR asset.

4. Model proposed by Flammoltz (1971)

| HR value considered in tune with the roles they play that is dependent on the services state they |

The estimates of likely future movement of employee on to different service states on an individual basis may be
occupy (i.e. rank and performance rating) subjective and unreliable Likely organizational changes various strategies to be adopted in the area of HR management and even the external environment influences the likely employee movement. In addition the performance rating as one of the service state parameter itself is bases on subjective judgment.

Likely movement of Employees on different Service states (including exit) The present value of services (perhaps net of costs) relevant to each service state to be available from individuals as the HR value may be sound in principal however.

The years on an individual Basis estimates probabilistically

The individual occupies Considered as his/her value

Four possible surrogate Measures of contribution Relevant to each service state Proposed:

i) acquisition cost
ii) replacement cost
iii) wages
iv) Performance measure

i) acquisition cost may be relevant as a part of the cost input but does not Consider the services to be available.

ii) replacement cost may be hypothetical even to reflect Part of the actual cost likely to be incurred without considered the performance side at all.

iii) Wages as a surrogate may be relevant as a part of the cost input but neglects the performance

iv) Performance measure as surrogate does not suggest how to measure the same (besides to be net of costs)

5. Human asset multiplier method (HAM) Giles and Robinson (1972) Supernormal rate of earning reflects the value of the organizational HR as whole Supernormal rate of earning in the short term may be influenced by the uncomfortable external Environment However, in the long run, it may be credited to HR to reflect their value subject to compatible
investments in physical as well as in external assets.

Aggregation of values of individuals or groups may not lead to value of the HR as a whole as assumed due to synergistic component of value.

Employee wages may not be proportional to their values. More importantly the values of the HAM, the relative weightings to wages may be too subjective to reflect their comparative values.

In case, the organizational rate of earning is less that the market average, the model is the issue of HR valuation.

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HR Value considered to be service state dependent i.e. rank and performance rating

Past pattern of employee movement on to different service states may not continue in the future. However, estimates of movement on a group basis, as proposed, may be more reliable than on an individual basis. Of course subjectively associated with performance rating still continues.

Likely movement of Employees (on a group Basis) on to different Service states including Exit due to retirement. And likely death/resignation before retirement, estimated over the years assuming the past trend of employee movement to continue in future.

Present value of likely services (subject to net of costs) associated with different service states as HR value may be sound in principle. But the model does not recommended any method to evaluate the extent of services that may be available from the employee.

Present value likely services from employees relevant to different service states, they
The present value of future wages payable considered as HR value. Future wages have been estimated based on stochastic model of employee movement on to different states (the last state being the absorbing state with zero salary level at the point of employees leaving the organization), each state being characterized by a number of state variables like age, salary level etc.

Employee likely movement analysis as proposed is more flexible with suitable choice of state variables and the number of states depending on the specific organizational context particularly subjectively judged performance rating has not been recommended as one of the state variables.

However, the estimation of transition probability matrix even on a group basis may be subjective in the context of different strategies that are likely to be adopted in the area of human resource management and the likely changes in the internal and external environment.

Employee wages should normally be less than their services but that may not be the logic to justify present value of future wages as HR value taking recourse to conservatism. Perhaps the gap between the services receivable and the wages payable would reflect the value of the asset.

Based on the premises that wage differentials between the firm and industry average as the return on investments in welfare provisions & training and development of HR, the present value of wage differentials has been considered as HR value.

The reliability of employee likely movement analysis on a group basis on to different positions (including exit) using Markov chain technique would depend upon the accuracy of transition probability estimates.

Investments in different compensation and welfare provisions may allow the organizations to pay lower wages but indirect compensation and welfare provision may not mean
always capital expenditure. It may pertain to revenue expenditure as well. But, more importantly investments in training and development may not lead to lower salary but perhaps higher salary based on the improved level of productivity achievements. Otherwise employees might prefer to leave the organization. Again, salary may not be related to investments in training and development, or for that matter may not be in tune with productivity achievement. Higher salary may mean more bargaining power and lower salary, perhaps exploitation of labour in the midst of acute unemployment problem. As such the differential wages may not be the result of HR investments and as such may not be the basis of HR value.

9. model proposed by Myers and Flowers (1974)

Based on the premises that employee attitude is the most important factor that governs the productive behaviour of employees on the job, it has been considered that the employee attitude index multiplied by the wages payable should reflect the likely benefits as against wages payable as the cost and the gap between the benefits and the cost should reflect an individual's value.

Attitude index as proposed may suffer from following limitations:

i) individuals attitude measure may not be reliable when the employee know that reflection of favourable attitude means higher value for them.

ii) individuals attitude when aggregated may not reflect the attitude of the group due to the effect of synergy.

iii) weights based on the job grade level and tenure of service may not be appreciate

Attitude is, no doubt, an important parameter to
<table>
<thead>
<tr>
<th>Model Proposed by</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morse (1975)</td>
<td>Influence employee behavior on the job but it is not the only factor as assumed. In fact, the proponent himself has appreciated the interaction of many parameters but finally considered a single factor. Above, all, employee performance as attitude multiplied by wages may not be acceptable unless its validity is established. In absence of an acceptable measure of benefits against the cost of wages, the gain concept as hypothesized may not reflect HR value.</td>
</tr>
<tr>
<td>Likert (1967)</td>
<td>The accuracy of future wages payable estimates would obviously depend upon the fairness of transition probability matrix assumed in the context of likely future situation. The proponent has appreciated himself that the present value of future wages indicates human capital value rather than the value of HR as an asset in absence of measurement of future benefit potentials.</td>
</tr>
</tbody>
</table>

D. Behavioural Model

Present value of likely future wages payable, based on the possible employee movement on to different service states, age category and wage classifications, has been considered as the value of human capital (rather than of human asset) of the organization. The model aims to establish through psychosocial test results how a set of causal variables reflecting the management system adopted by an organization determine the appreciating or depreciating or condition of the human organization, as intervening variables, which in turn likely to result in the achievement of end result variables over time. How different management strategies affect the organizational health and performance would be great revelation to managers. But, to establish valid relationships between the three sets of variable, it would be really time consuming and difficult in practice.

F. Current Indian practices

Investments in HR as the basis of HR value have been proposed, to be amortized over the years in tune with the condition of human organization.

Different surrogate measures reflect in general:

Evaluation of subordinates attributes and performance through ranking, rating, scoring or scaling.

Suitable information system on HR including certain control ratios on a periodic basis as decision support system to management or for incorporation in annual reports.

Services available from employee considered to be dependent on role played by the employee i.e. the wage scale is directly reflected by the performance rating at the second dimension of service state.

Likely future movement of employees on different wage scales as the service states are reflected by the wage scales directly.

Number of employees likely to move upwards on to different wage scales only.

Basic information on HR in absence of contribution measure, may not be effective aid to the internal management as well as to the external agencies.

Likely future movement of employees on different wage scales as the service states are reflected by the wage scales directly.

Performance measure one-dimensional whereas value measure multidimensional. Relationship between individuals attributes and performance may be difficult to establish.

In absence of a valid relationship between the intervening and the end result variables, the condition of the human organization may not be acceptable as reflector of HR performance and accordingly, as the basis of amortization of HR investments to reflect HR value over time.

Evaluation subjective, left to the best judgment of the superiors.

Relational between individuals attributes and performance may be difficult to establish.

Basic information on HR in absence of contribution measure, may not be effective aid to the internal management as well as to the external agencies.
considered on a group basis within the existing promotion norms and in tune with the retirement schedule.

(excluding performance ratings) to meet the retirement schedule within the existing promotion norms in absence of recognition of specific individuals, may be much more reliable.

Estimates of likely future wages payable made based on:
   i) wages rate relevant each service state, employees would occupy in future.
   ii) provision for likely future wage revision.
   iii) provision for usual increment in wages over time.
   iv) Provision for likely exit due to death or otherwise before retirement.

Based on the more reliable likely movement of employees on to different wage scales and realistic assumptions of likely changes in wages in future, he estimates of likely future wages payable may be more reliable but such a figure may be indicator of future liability rather than asset. Services likely to be available from employees need to be assessed against which wages may be judged to reflect HR value.

Assumption of efficiency multiplier (as in certain cases) to be less that one making the value of HR always less than wages, (i.e. liability rather than asset) may be arbitrary without assessing employee performance.

4.4 VALUATION OF HR AS PER ECONOMIC MODELS

4.4.1 GOODWILL MODEL

AN ILLUSTRATIVE EXAMPLE

Assumed data: [All figures in '000 monetary units (m. u.)]

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profit (after tax)</td>
<td>10,000</td>
</tr>
<tr>
<td>Average investments in total assets</td>
<td>1,200,000</td>
</tr>
<tr>
<td>Average investments in HR</td>
<td>200,000</td>
</tr>
</tbody>
</table>
Industry average rate of return on investments 6%
Rate of return on the organizational HR (estimated) 50%

WORKINGS
Normal profits of the organization during the year at the industry average rate  
= Average investments in total assets * industry average rate of return / 100
= 1,200,000 * 6/100
= 72,000

Value of goodwill of the organization
= Actual Profit - Notional Profit
= 100,000 - 72,000
= 28,000

Organizational HR value (as per first approach)
= Proportionate value of goodwill
= Value of goodwill * (Investments in HR/Investments in total assets)
= 28,000 * (200,000/1,200,000)
= 4,667

Organizational HR value (as per 2nd approach)
= Notional value of HR investments for earning the entire goodwill as the return
= Goodwill value/(Estimated rate of return on organizational HR percent/100)
= 28,000/(50/100)
= 56,000
4.4.2 ADJUSTED DISCOUNTED FUTURE WAGES MODEL

AN ILLUSTRATIVE EXAMPLE

Assumed data: (All figures in '000 mu)

<table>
<thead>
<tr>
<th>Year</th>
<th>For the previous year</th>
<th>current Year</th>
</tr>
</thead>
</table>
| Rate of return on owned assets (%):
  a) average for all firms in the economy | 12    | 11    | 13    | 12    | 13    | 14    |
  b) organization specific | 13    | 13    | 14    | 15    | 16    |
| Weightings assigned to past rate of returns | 2     | 3     | 4     | 5     |
| For the years | 1996  | 1997  | 1998  | 1999  | 2000  |
| Estimated wages & salaries | 300,000 | 330,000 | 360,000 | 400,000 | 440,000 |

payable to all employees during the next five years

WORKING

Weighted average past rate of return for all firms in the economy

= \frac{(12 \times 1 + 11 \times 2 + 13 \times 3 + 12 \times 4 + 13 \times 5)}{(1+2+3+4+5)}

= \frac{186}{15}

= 12.40\%

Weighted average past rate of return of the organization

= \frac{(13 \times 1 + 13 \times 2 + 14 \times 3 + 15 \times 4 + 16 \times 4)}{(1+2+3+4+5)}

= \frac{221}{15}

= 14.73\%

Efficiency ratio of the organization as applicable for the current year, 1995

= \frac{\text{Weighted average past rate of return of organization}}{\text{weighted average past rate of return for all firms in the economy}}

= \frac{14.73}{12.40}
Adjusted rate of return for the year, 1995
= Average rate of return for all firms in the economy for the year, 1995 * efficiency ratio of the organization
= 14*1.19
= 16.66%

Organizational HR value for the year, 1995
= Net present value of estimated wages and salaries payable to employees during the next five years, discounted at the adjusted rate of return
= \frac{300,000}{1.1666} + \frac{330,000}{1.1666^2} + \frac{360,000}{1.1666^3} + \frac{400,000}{1.1666^4} + \frac{440,000}{1.1666^5}
= 257,160+242,480+226,740+215,960+203,630
= 11,45,970

4.4.3 A MODEL ON THE USE OF ECONOMIC CONCEPT OF HUMAN CAPITAL
AN ILLUSTRATIVE EXAMPLE

HR valuation has been illustrated only for one group of employees, managers in the organization. There are total 43 nos. of managers currently in the organization. The age profile of the current managers, the average rate of their annual salary at different ages and the probability of death at different ages as available from general mortality table are shown in Table 4.1.
Table 4.1
Managers’ profile reflecting their current age, age-wise rate of Salary and probability of death

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Age wise current no. of manager’s</th>
<th>Age wise annual salary per manager (‘000 mu)</th>
<th>Age wise average probability of death of manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>43</td>
<td>2</td>
<td>75</td>
<td>0.0043</td>
</tr>
<tr>
<td>44</td>
<td>4</td>
<td>81</td>
<td>0.0044</td>
</tr>
<tr>
<td>45</td>
<td>0</td>
<td>88</td>
<td>0.0045</td>
</tr>
<tr>
<td>46</td>
<td>2</td>
<td>96</td>
<td>0.0046</td>
</tr>
<tr>
<td>47</td>
<td>1</td>
<td>110</td>
<td>0.0047</td>
</tr>
<tr>
<td>48</td>
<td>2</td>
<td>115</td>
<td>0.0048</td>
</tr>
<tr>
<td>49</td>
<td>2</td>
<td>120</td>
<td>0.0049</td>
</tr>
<tr>
<td>50</td>
<td>3</td>
<td>125</td>
<td>0.0050</td>
</tr>
<tr>
<td>51</td>
<td>1</td>
<td>130</td>
<td>0.0051</td>
</tr>
<tr>
<td>52</td>
<td>2</td>
<td>142</td>
<td>0.0052</td>
</tr>
<tr>
<td>53</td>
<td>4</td>
<td>152</td>
<td>0.0053</td>
</tr>
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<td>160</td>
<td>0.0054</td>
</tr>
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<td>55</td>
<td>3</td>
<td>168</td>
<td>0.0055</td>
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<tr>
<td>56</td>
<td>3</td>
<td>172</td>
<td>0.0056</td>
</tr>
<tr>
<td>57</td>
<td>5</td>
<td>175</td>
<td>0.0057</td>
</tr>
<tr>
<td>58</td>
<td>4</td>
<td>177</td>
<td>0.0058</td>
</tr>
</tbody>
</table>

WORKINGS

There are 2 numbers of managers now at current age 43 years. These 2 numbers of managers would move to different ages (i.e. upto the age of 58) in future, subject to probability of their death earlier and earn annual salary at different rates as relevant to different ages.

The expected total earnings of these two managers at different ages

\[
\text{Total earnings at different ages} \times (1 - \text{probability of death at different ages})
\]
Table 4.2

<table>
<thead>
<tr>
<th>Present age and subsequent ages upto retirement (years)</th>
<th>43</th>
<th>44</th>
<th>45</th>
<th>46</th>
<th>47</th>
<th>48</th>
<th>49</th>
<th>50</th>
<th>51</th>
<th>52</th>
<th>53</th>
<th>54</th>
<th>55</th>
<th>56</th>
<th>57</th>
<th>58</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary per manager at different age ('000mu)</td>
<td>75</td>
<td>81</td>
<td>88</td>
<td>96</td>
<td>110</td>
<td>115</td>
<td>120</td>
<td>125</td>
<td>130</td>
<td>142</td>
<td>152</td>
<td>160</td>
<td>168</td>
<td>172</td>
<td>175</td>
<td>177</td>
</tr>
<tr>
<td>Total earnings of managers (2 nos.) at different ages ('000mu)</td>
<td>150</td>
<td>162</td>
<td>176</td>
<td>192</td>
<td>220</td>
<td>230</td>
<td>240</td>
<td>250</td>
<td>260</td>
<td>284</td>
<td>304</td>
<td>320</td>
<td>336</td>
<td>344</td>
<td>350</td>
<td>354</td>
</tr>
<tr>
<td>Probability of death of managers at different age</td>
<td>0.0043</td>
<td>0.0044</td>
<td>0.0045</td>
<td>0.0046</td>
<td>0.0047</td>
<td>0.0048</td>
<td>0.0049</td>
<td>0.0050</td>
<td>0.0051</td>
<td>0.0052</td>
<td>0.0053</td>
<td>0.0054</td>
<td>0.0055</td>
<td>0.0056</td>
<td>0.0057</td>
<td>0.0058</td>
</tr>
<tr>
<td>Expected total earnings of managers (2 nos.) at different age ('000mu)</td>
<td>149.36</td>
<td>161.29</td>
<td>173.21</td>
<td>191.12</td>
<td>218.97</td>
<td>238.82</td>
<td>248.75</td>
<td>258.57</td>
<td>282.52</td>
<td>302.39</td>
<td>322.17</td>
<td>342.01</td>
<td>351.95</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Present value factor for 14% p.a.</td>
<td>1.000</td>
<td>0.877</td>
<td>0.769</td>
<td>0.675</td>
<td>0.592</td>
<td>0.519</td>
<td>0.456</td>
<td>0.400</td>
<td>0.351</td>
<td>0.308</td>
<td>0.270</td>
<td>0.237</td>
<td>0.208</td>
<td>0.182</td>
<td>0.160</td>
<td>0.140</td>
</tr>
<tr>
<td>Present value of expected total earnings of managers (2 nos.) at different ages ('000mu)</td>
<td>149.36</td>
<td>141.45</td>
<td>134.74</td>
<td>129.55</td>
<td>129.63</td>
<td>118.80</td>
<td>108.90</td>
<td>99.50</td>
<td>90.79</td>
<td>87.92</td>
<td>81.65</td>
<td>75.43</td>
<td>69.50</td>
<td>62.26</td>
<td>55.68</td>
<td>49.27</td>
</tr>
</tbody>
</table>

Say at 43 years, the expected total earnings of these two managers

\[ \text{Expected total earnings} = (\text{Earning rate per employee at age 43 years} \times 2 \text{ nos.}) \times (1 - \text{probability of death at age 43 years}) \]

\[ = (75 \times 2)(1 - 0.0043) \]

\[ = 149.36 ('000 \text{mu}) \]
Similarly, at different ages 44, 45, ..., up to 48 years, the present value of expected total earnings of these two managers is shown in Table 4.2. From the Chart, the total present value of expected total earnings of these two managers during their stay with the organization works out to 1583.53 (‘000 mu).

Following the above manner, the total present value of expected earnings of different nos. of managers at different ages now is calculated and the result is presented in Table 4.3. Adding all the expected earnings for different nos. of manages at different ages, the total present value of expected earnings of the entire group of managers (43 nos.) of the organization works out to 27408.64 (‘000 mu) i.e. the HR value of the group of managers.

Table 4.3

<table>
<thead>
<tr>
<th>Age (Years)</th>
<th>Present value of expected total</th>
</tr>
</thead>
<tbody>
<tr>
<td>43</td>
<td>1583.53</td>
</tr>
<tr>
<td>44</td>
<td>3268.60</td>
</tr>
<tr>
<td>45</td>
<td>0.00</td>
</tr>
<tr>
<td>46</td>
<td>1714.36</td>
</tr>
<tr>
<td>47</td>
<td>868.13</td>
</tr>
<tr>
<td>48</td>
<td>1729.52</td>
</tr>
<tr>
<td>49</td>
<td>1710.56</td>
</tr>
<tr>
<td>50</td>
<td>2516.34</td>
</tr>
<tr>
<td>51</td>
<td>814.32</td>
</tr>
<tr>
<td>52</td>
<td>1561.63</td>
</tr>
<tr>
<td>53</td>
<td>2916.12</td>
</tr>
<tr>
<td>54</td>
<td>3294.12</td>
</tr>
<tr>
<td>55</td>
<td>1709.00</td>
</tr>
<tr>
<td>56</td>
<td>1376.88</td>
</tr>
<tr>
<td>57</td>
<td>1641.63</td>
</tr>
<tr>
<td>58</td>
<td>703.88</td>
</tr>
<tr>
<td>TOTAL</td>
<td>27408.64</td>
</tr>
</tbody>
</table>
The proponents have given definite emphasis on external reporting of proposed human capital values. The reporting of such value has been closely related to the issue of long term leases and other executory contracts. Considering that the labour force of a firm can be constructively regarded as being owned by it and the degree of objectivity to be attained due to use of widely based published statistics, it has been recommended by the proponents that reporting of human capital values may be an integral part of the financial statements with human capital values on the assets side of the balance sheet and the equal amount of the present value of the firm’s liability to pay wages and salaries on the liabilities side with changes in human capital value from period to period not recognized as income but being adjusted with liability.

The proposed disclosure of human capital values has been considered to provide valuable information to the external investors as well as to the management by way to providing:

a) a new set of financial ratios viz. (i) the ratio of human to nonhuman capital reflecting the degree of labour intensiveness in the firm. (ii) the ratio of scientific staff (for example) to the total value of human capital, thus indicating the extent of skill intensity etc.

b) The time series of human capital values of the firm reflecting the changes in the structure of the labour force, like the ageing of the firm.

c) The difference between the general and specific values of human capital that may enable the users to investigate the effects of specific wage and hiring policies of the organization.

4.4.4. **Lev & Schwartz model suggested by ICAI**

From the following information in respect of Exe Ltd. calculate the total value of human capital by following Lev and Schwartz model:
**Distribution of employees of Exe Ltd.**

<table>
<thead>
<tr>
<th>Age</th>
<th>No.</th>
<th>Unskilled</th>
<th>Av. annual earnings (Rs. '000)</th>
<th>Semi - skilled</th>
<th>No.</th>
<th>Av. annual earnings (Rs. '000)</th>
<th>Skilled</th>
<th>No.</th>
<th>Av. annual earnings (Rs. '000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-39</td>
<td>70</td>
<td>3</td>
<td>50</td>
<td>3.5</td>
<td>30</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40-49</td>
<td>20</td>
<td>4</td>
<td>15</td>
<td>5</td>
<td>15</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50-54</td>
<td>10</td>
<td>5</td>
<td>10</td>
<td>6</td>
<td>5</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Apply 15% discount factor.

**Workings**

The present value of earnings of each category of employees is ascertained as below;

**(A) Unskilled employees**

Age group 30-39: Assume that all 70 employees are just 30 years old:

- Rs. 3,000 p.a. for next 10 years: **15,057**
- Rs. 4,000 p.a. for years 11 to 20: **4,960**
- Rs. 5,000 p.a. for years 11 to 15: **1,025**

Total: **21,042**

Age group 40 – 49: Assume that all 20 employees are just 40 years old:

- Rs. 4,000 p.a. for next 10 years: **20,076**
- Rs. 5,000 p.a. for years 11 to 15: **4,140**

Total: **24,216**

Age group 50 – 54: Assume that all 10 employees are just 50 years old:

- Rs. 5,000 p.a. for next 5 years: **16,760**

Total: **16,760**
Similarly, present value of each employee under categories will be calculated.

(B) Semi-skilled employees

<table>
<thead>
<tr>
<th>Age group 30 - 39:</th>
<th>Present value (Rs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rs. 3,500 p.a. for next 10 years</td>
<td>17,567</td>
</tr>
<tr>
<td>Rs. 5,000 p.a. for years 11 to 20</td>
<td>6,200</td>
</tr>
<tr>
<td>Rs. 6,000 p.a. for years 21 to 25</td>
<td>1,230</td>
</tr>
<tr>
<td></td>
<td>24,997</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age group 40-49:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rs. 5,000 p.a. for next 10 years</td>
<td>25,095</td>
</tr>
<tr>
<td>Rs. 6,000 p.a. for years 11 to 15</td>
<td>4,968</td>
</tr>
<tr>
<td></td>
<td>30,063</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age group 50-54:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rs. 6,000 p.a. for next 5 years</td>
<td>20,112</td>
</tr>
<tr>
<td></td>
<td>20,112</td>
</tr>
</tbody>
</table>

(C) Skilled employees

<table>
<thead>
<tr>
<th>Age group 30-39:</th>
<th>Present value (Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rs. 5,000 p.a. for next 10 years</td>
<td>25,095</td>
</tr>
<tr>
<td>Rs. 6,000 p.a. for years 11 to 20</td>
<td>7,440</td>
</tr>
<tr>
<td>Rs. 7,000 p.a. for years 21 to 25</td>
<td>1,435</td>
</tr>
<tr>
<td></td>
<td>33,970</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age group 40-49:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rs. 6,000 p.a. for next 10 years</td>
<td>30,114</td>
</tr>
<tr>
<td>Rs. 7,000 p.a. for year 11 to 15</td>
<td>5,796</td>
</tr>
<tr>
<td></td>
<td>35,910</td>
</tr>
</tbody>
</table>
Age group 50-54:
Rs. 7,000 p.a. for next 5 years 23,464

The value of Human Capital

<table>
<thead>
<tr>
<th>Age</th>
<th>Unskilled No.</th>
<th>Unskilled Av. earnings (Rs.)</th>
<th>Semi-skilled No.</th>
<th>Semi-skilled Av. earnings (Rs.)</th>
<th>Skilled No.</th>
<th>Skilled Av. earnings (Rs.)</th>
<th>Total No.</th>
<th>Av. annual earning (Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-39</td>
<td>70</td>
<td>14,72,940</td>
<td>50</td>
<td>12,49,850</td>
<td>30</td>
<td>10,19,100</td>
<td>150</td>
<td>37,41,890</td>
</tr>
<tr>
<td>40-49</td>
<td>20</td>
<td>4,84,320</td>
<td>15</td>
<td>4,50,945</td>
<td>15</td>
<td>5,38,650</td>
<td>50</td>
<td>14,73,915</td>
</tr>
<tr>
<td>50-54</td>
<td>10</td>
<td>1,67,600</td>
<td>10</td>
<td>2,01,120</td>
<td>5</td>
<td>1,17,320</td>
<td>25</td>
<td>4,86,040</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>21,24,860</td>
<td>75</td>
<td>19,01,915</td>
<td>50</td>
<td>16,75,070</td>
<td>225</td>
<td>57,01,845</td>
</tr>
</tbody>
</table>

4.4.4.1 NORMATIVE ECONOMIC MODEL

AN ILLUSTRATIVE EXAMPLE

Assumed Data:

Value of one specific employee in the organization has been considered for illustration. The current service State of the employee:

Service level: Assistant manager
Service group: Above average (in the possible 3 groupings as it exists viz. below average, average, and above average)

Compensation has been assumed as the surrogate measure of available services from the employee. The employee has three more years before retirement, besides the current year (0).

The likely movement of the employee from the current year (0), year (1), and year (2) along with respective probability figures and annual compensation in brackets is shown in Chart 4.2.
1. Figure in brackets indicate the number of employees.

2. Figures along the arrowheads indicate the probability of transition.

Chart shows likely employee movement between different service states.
Discounting rate for present value assessment at the firm’s average cost of capital of 14% p.a.

**WORKINGS** (Figures in ‘000mu)

1. Present value of expected services from the employees for the current year (0)
   = 120.00

2. Present value of expected services from the employee for the year (1)
   = 125 * 0.25/1.14
   = 27.41
   As Manager (average), the present value
   = 140 * 0.70/1.14
   = 85.96
   For possible exit, the present value
   = 0

   Thus, the total present value of expected services from the employee for the year (1)
   = 27.41 + 85.96
   = 113.37

3. Present value of expected services from the employee for the year (2)
   As assistant manager (above average), the present value
   = 130 * (0.25 * 0.10)/1.14^2
   = 2.50
   As Manager (average), the present value
   = [146 * (0.70 * 0.80) + 140 * (0.25 * 0.80)]/ 1.14^2
   = 84.46
   As Manager (above average), the present value
   = 155 * (0.70 * 0.20)/1.14^2
   = 16.70
For possible exist, the present value
= 0

Thus, the total present value of expected services from the employee for the year (2)
= 2.50 + 84.46 + 16.70
= 103.66

4. Present value of expected services from the employee for the year (3)

As Assistant Manager (above average), the present value
= 135 * (0.25 * 0.10 * 0.05)/1.14^3
= 0.11

As Assistant Manager (average), the present value
= [152 * (0.70 * 0.80 * 0.70)+ 146 * (0.25 * 0.80 * 0.90) +
140 * (0.25 * 0.10 * 0.90)]/1.14^3
= 60.08

As Assistant Manager (above average), the present value
= [162 * (0.70 * 0.20 * 0.95) + 155 * (0.70 * 0.80 * 0.30) +
155 * (0.25 * 0.80 * 0.10)]/1.14^3
= 34.21

As Senior Manager, the present value
= 165 * (0.70 * 0.20 * 0.05)/1.14^3
= 0.78

For possible exit, the present value
= 0

Thus, the total present value of expected services from the employee for the year (3)
= 0.11 + 60.08 + 34.21 + 0.78
= 95.18

Thus, the HR value of the specific employee
= Total present value of expected services in the remaining service with the firm
= Present value of services during the current year (0), year (1), year
(2) and year (3) before retirement
= 120.00 + 113.37 + 103.66 + 95.18
= 432.21

4.4.5 HUMAN ASSET MULTIPLIER MODEL

An illustrative example 13

Assumed data

1. Profit (after tax) during the current year (‘000 mu) 100.00
2. Price earning ratio during the current year
   Organization specific 0.60
   Industry average 0.30

3. The organization employees are divided into six groups, average number
   of employees in the current year and average rate of current annual salary for
   these six group is assumed as follows:

<table>
<thead>
<tr>
<th></th>
<th>Un – skilled &amp; Semi-Skilled</th>
<th>Skilled Workers</th>
<th>Clerical Staff</th>
<th>Supervisory Level</th>
<th>Middle Mgt.</th>
<th>Senior Mgt.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. no. of employees</td>
<td>500</td>
<td>1650</td>
<td>1500</td>
<td>600</td>
<td>25</td>
<td>18</td>
<td>4293</td>
</tr>
<tr>
<td>during the current year</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avg. current rate of annual salary (‘000 mu)</td>
<td>52</td>
<td>72</td>
<td>60</td>
<td>100</td>
<td>132</td>
<td>150</td>
<td>—</td>
</tr>
</tbody>
</table>

4. The human asset multiplier (HAM) values on an average for each group
   of employees as assessed from individual employee HAM ratings within
   each employee group (factor wise) are as follows.

<table>
<thead>
<tr>
<th></th>
<th>Un – skilled &amp; Semi-Skilled</th>
<th>Skilled Workers</th>
<th>Clerical Staff</th>
<th>Supervisory Level</th>
<th>Middle Mgt.</th>
<th>Senior Mgt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1 Qualification &amp;</td>
<td>30</td>
<td>120</td>
<td>70</td>
<td>130</td>
<td>140</td>
<td>150</td>
</tr>
<tr>
<td>technical experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.2 Experience required</td>
<td>20</td>
<td>100</td>
<td>90</td>
<td>85</td>
<td>110</td>
<td>125</td>
</tr>
<tr>
<td>on job</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.3 Personal qualities & attitudes

4.4 Promotion capability

4.5 Replacement Scarcity

4.6 Loyalty & expectation of future services

<table>
<thead>
<tr>
<th></th>
<th>100</th>
<th>100</th>
<th>100</th>
<th>110</th>
<th>115</th>
<th>120</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>100</td>
<td>30</td>
<td>80</td>
<td>70</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>100</td>
<td>20</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>80</td>
<td>75</td>
<td>90</td>
<td>80</td>
<td>60</td>
<td></td>
</tr>
</tbody>
</table>

| 360 | 550 | 385 | 525 | 555 | 545 |

**Workings**

Rate of organizational goodwill (‘000 mu)

= Super normal earnings of the organization

= Profit (after tax) of the organization x (Price earning ratio of the organization - industry average price earning ratio)

= 100,000 (0.60 - 0.30)

= 30,000.

Human resource value of a particular group of employees

= Total annual salary of all employees in the group x Total HAM factor for the group.

Say, for unskilled and semiskilled workers group, the HR value (as shown in the Table 4.4)

= Total annual salary of the unskilled & semiskilled workers x Total HAM for the unskilled & semiskilled workers

= (26000 x 10^3) x 360

= 9360 (in millions of mu)

Similarly, for all other groups of employees, the HR value has been assessed as in the Table 4.4. The total HR value of all the groups taken together works out to,

= 144154 (in millions of mu)

To make the total HR value equal to the value of goodwill of the organization, the adjustment factor works out to

= 3000 x 10^3 / 144154 x 10^6
With such an adjustment factor, the HAM for different groups (factor wise and total) have been duly adjusted as shown in Table 4.4. Say, for the qualification and technical experience factor for the unskilled and semiskilled group of employees, the HAM duly adjusted

$$= \text{HAM (before adjustment)} \times \text{Adjustment factor}$$

$$= 30 \times (0.2081 \times 10^{-3})$$

$$= 6.24 \times 10^{-3}$$

With adjusted HAM figures, the HR value of different group of employees has been assessed as earlier i.e. HR value of a particular group

$$= \text{Total annual salary of all employees in the group} \times \text{Total HAM (adjusted)}$$

$$= (26000 \times 10^{3}) \times (74.91 \times 10^{-3})$$

$$= 1947.66 \text{ ('000 mu)}$$

On adding HR value of all the six groups of employees, the HR value of all employees together works out to

$$= 30,000 \text{ ('000 mu)}$$

$$= \text{Value of goodwill of the organization.}$$

Table 4.4

<table>
<thead>
<tr>
<th>HR Value assessment with adjusted HAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Un - skilled &amp; Semi-Skilled</td>
</tr>
<tr>
<td>Skilled Workers</td>
</tr>
<tr>
<td>Clerical Staff</td>
</tr>
<tr>
<td>Supervisory Level</td>
</tr>
<tr>
<td>Middle Mgt.</td>
</tr>
<tr>
<td>Senior Mgt.</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>-------------------------------------</td>
</tr>
<tr>
<td>Avg. number of employees (no.)</td>
</tr>
<tr>
<td>Avg. current annual salary per employee ('000 mu)</td>
</tr>
<tr>
<td>Total current annual salary of employees in the group ('000 mu)</td>
</tr>
<tr>
<td>Total HAM factor for different groups</td>
</tr>
<tr>
<td>Human Resource value (in million of mu)</td>
</tr>
</tbody>
</table>

| Avg. number of employees (no.) | 500 | 1650 | 1500 | 600 | 25 | 18 | 4293 |
| Avg. current annual salary per employee ('000 mu) | 52 | 72 | 60 | 100 | 132 | 150 | -- |
| Total current annual salary of employees in the group ('000 mu) | 26,000 | 1,18,800 | 90,000 | 60,000 | 3,300 | 2,700 | 300,800 |
| Total HAM factor for different groups | 360 | 550 | 385 | 525 | 555 | 545 | -- |
| Human Resource value (in million of mu) | 9,360 | 65,340 | 34,650 | 31,500 | 1,832 | 1,472 | 144,154 |
HAM for different groups after adjustment \( (x \times 10^3) \)

<table>
<thead>
<tr>
<th>Qualification &amp; technical experience</th>
<th>Un-skilled &amp; Semi-Skilled (x 10^3)</th>
<th>Skilled Workers</th>
<th>Clerical Staff</th>
<th>Supervisory Level</th>
<th>Middle Mgt.</th>
<th>Senior Mgt.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.24</td>
<td>24.97</td>
<td>14.57</td>
<td>27.05</td>
<td>29.14</td>
<td>31.22</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Experience required on job</td>
<td>4.16</td>
<td>20.81</td>
<td>18.73</td>
<td>17.69</td>
<td>22.89</td>
<td>26.01</td>
<td>--</td>
</tr>
<tr>
<td>Personal qualities &amp; attitude</td>
<td>20.81</td>
<td>20.81</td>
<td>20.81</td>
<td>22.89</td>
<td>23.93</td>
<td>24.97</td>
<td>--</td>
</tr>
<tr>
<td>Promotion capability</td>
<td>20.81</td>
<td>10.41</td>
<td>6.24</td>
<td>16.65</td>
<td>14.57</td>
<td>8.32</td>
<td>--</td>
</tr>
<tr>
<td>Replacement scarcity</td>
<td>2.08</td>
<td>20.81</td>
<td>4.16</td>
<td>6.24</td>
<td>8.32</td>
<td>10.41</td>
<td>--</td>
</tr>
<tr>
<td>Loyalty &amp; expectation of future services</td>
<td>20.81</td>
<td>16.65</td>
<td>15.61</td>
<td>18.73</td>
<td>16.65</td>
<td>12.49</td>
<td>--</td>
</tr>
<tr>
<td>Total for all factors</td>
<td>74.91</td>
<td>114.46</td>
<td>80.12</td>
<td>109.25</td>
<td>115.50</td>
<td>113.42</td>
<td>--</td>
</tr>
<tr>
<td>Human Resource value after adjustment ( (\text{',000 mu}) )</td>
<td>1947.66</td>
<td>13597.85</td>
<td>7210.80</td>
<td>6555.00</td>
<td>381.15</td>
<td>306.23</td>
<td>30,000</td>
</tr>
</tbody>
</table>

### 4.4.6 A MODEL ON VALUATION OF HUMAN RESOURCE

**An illustrative example**

**Assumed Data**

1. The employees of the organization are divided into six service states depending upon their rank and performance rating. The current number of employees in these six service states is as under:

<table>
<thead>
<tr>
<th>Service states</th>
<th>No. of employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Un-skilled Semi-Skilled Workers</td>
<td>500</td>
</tr>
<tr>
<td>2 Skilled Workers</td>
<td>1650</td>
</tr>
<tr>
<td>3 Clerical Staff</td>
<td>1500</td>
</tr>
<tr>
<td>4 Supervisory Level</td>
<td>600</td>
</tr>
<tr>
<td>5 Middle Mgt.</td>
<td>25</td>
</tr>
<tr>
<td>6 Senior Mgt.</td>
<td>18</td>
</tr>
</tbody>
</table>

Total | 4293 |
2. Employees may move from one service state to another and also to the exist state (i.e. moving out of the organization due to resignation, retirement and death) during any period, say year. The probability of such movement is assumed as follows:

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7 (exit state)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.85</td>
<td>0.10</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.05</td>
</tr>
<tr>
<td>2</td>
<td>0.00</td>
<td>0.85</td>
<td>0.00</td>
<td>0.05</td>
<td>0.00</td>
<td>0.00</td>
<td>0.10</td>
</tr>
<tr>
<td>3</td>
<td>0.00</td>
<td>0.00</td>
<td>0.90</td>
<td>0.05</td>
<td>0.00</td>
<td>0.00</td>
<td>0.05</td>
</tr>
<tr>
<td>4</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.80</td>
<td>0.15</td>
<td>0.00</td>
<td>0.05</td>
</tr>
<tr>
<td>5</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.80</td>
<td>0.15</td>
<td>0.05</td>
</tr>
<tr>
<td>6</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.90</td>
<td>0.10</td>
</tr>
<tr>
<td>7</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

3. The value of expected services from employees is assumed to be equivalent to their salaries for the purpose of illustration. The average annual salary per employee for different service states during the current and subsequent two years are as follows.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current year (0)</td>
<td>52</td>
<td>72</td>
<td>60</td>
<td>100</td>
<td>132</td>
<td>150</td>
</tr>
<tr>
<td>Year (1)</td>
<td>53</td>
<td>74</td>
<td>61</td>
<td>102</td>
<td>135</td>
<td>154</td>
</tr>
<tr>
<td>Year (2)</td>
<td>54</td>
<td>76</td>
<td>62</td>
<td>104</td>
<td>138</td>
<td>158</td>
</tr>
</tbody>
</table>
Workings

1. Transition probability after 2-periods [i.e. at the end of year (2)] would be

\[ = [\text{Service state transition matrix}]^2, \text{assuming the employee movement pattern to remain the same.} \]

\[ = [T]^2, \text{i.e. multiplying [T] by [T], we obtain [T]^2 as follows:} \]

\[
\begin{array}{cccccccc}
1 & 2 & 3 & 4 & 5 & 6 & 7 \\
1 & 0.7225 & 0.17 & 0.00 & 0.005 & 0.00 & 0.00 & 0.1025 \\
2 & 0.00 & 0.7225 & 0.00 & 0.0825 & 0.0075 & 0.00 & 0.1875 \\
3 & 0.00 & 0.00 & 0.81 & 0.085 & 0.0075 & 0.00 & 0.0975 \\
4 & 0.00 & 0.00 & 0.00 & 0.64 & 0.24 & 0.0225 & 0.0975 \\
5 & 0.00 & 0.00 & 0.00 & 0.00 & 0.64 & 0.255 & 0.105 \\
6 & 0.00 & 0.00 & 0.00 & 0.00 & 0.00 & 0.81 & 0.19 \\
7 & 0.00 & 0.00 & 0.00 & 0.00 & 0.00 & 0.00 & 1.00 \\
\end{array}
\]

2. The number of employees in different service states after different periods of time may be assessed as follows:

\[ = \begin{bmatrix} 500 & 1650 & 1500 & 600 & 25 & 18 & 0 \end{bmatrix} \times [T] \]

\[ = \begin{bmatrix} 425 & 1453 & 1350 & 637 & 110 & 20 & 298 \end{bmatrix} \]
Similarly, [employees in different service states after 2 periods i.e. at the end of year (2)]

= [Employees in different service states at the end of year (0)] [T]^2

= [361 1277 1215 650 184 35 571]

Following the above procedure, the likely number of employees in different services states after different periods of time may be assessed.

3. Human resource values for different employee groups and for the organization as whole may be assessed assuming their annual salary as a measure of services as follows:

HR value for any employee group i.e. service state

\[ a = \sum \{ \text{Employee matrix in the specific service state during current period (0)} \} \times \left( \text{Avg. annual salary per employee in the specific service state during the same period} \right) / \text{present value factor for the same period}. \]

Say, for the unskilled and semiskilled workers, the HR value may be assessed as:

HR value of unskilled and semiskilled service state

\[ = 500 \times 52/1.00 \ (i.e. \ for \ current \ or \ period - 0) + 425 \times 53/1.14 \ (i.e. \ for \ period - 1) + 361 \times 54 / 1.14^2 \ (i.e. \ for \ period -3) + \ldots \ \text{Infinity (upto 40 periods as suggested for fairly accurate result)} \]

Similarly, HR value for all employee groups can be found out and on adding them together would result the HR Value of all the current employees in the organization now.
4.4.7 A STOCHASTIC MODEL ON HUMAN RESOURCE VALUATION

An illustrative example

Assumed Data

1. All employees of the organization are divided into the six possible states as before, the current employee distribution vector is assumed the same as before:

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of employees</td>
<td>500</td>
<td>1650</td>
<td>1500</td>
<td>600</td>
<td>25</td>
<td>18</td>
<td></td>
</tr>
</tbody>
</table>

2. Employees may move from one state to another and also to the exit state (No.7) i.e. moving out of the organization during different periods of time, say in different years in future. The transition probability matrices for such employee movement during different periods are estimated up to the period till the current employees of different service states reach the exit state.

Let the estimated transition probability matrices for the next two periods (i.e. for year 1 and year 2) are as follows:

Transition probability matrix for the year 1

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.85</td>
<td>0.10</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.05</td>
</tr>
<tr>
<td>2</td>
<td>0.00</td>
<td>0.85</td>
<td>0.00</td>
<td>0.05</td>
<td>0.00</td>
<td>0.00</td>
<td>0.10</td>
</tr>
<tr>
<td>3</td>
<td>0.00</td>
<td>0.00</td>
<td>0.90</td>
<td>0.05</td>
<td>0.00</td>
<td>0.00</td>
<td>0.05</td>
</tr>
<tr>
<td>4</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.80</td>
<td>0.15</td>
<td>0.00</td>
<td>0.05</td>
</tr>
<tr>
<td>5</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.80</td>
<td>0.15</td>
<td>0.05</td>
</tr>
<tr>
<td>6</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.90</td>
<td>0.10</td>
</tr>
<tr>
<td>7</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>
Transition probability matrix for year 2

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.84</td>
<td>0.11</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.05</td>
</tr>
<tr>
<td>2</td>
<td>0.00</td>
<td>0.83</td>
<td>0.00</td>
<td>0.07</td>
<td>0.00</td>
<td>0.00</td>
<td>0.10</td>
</tr>
<tr>
<td>3</td>
<td>0.00</td>
<td>0.00</td>
<td>0.90</td>
<td>0.05</td>
<td>0.00</td>
<td>0.00</td>
<td>0.05</td>
</tr>
<tr>
<td>4</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.77</td>
<td>0.15</td>
<td>0.00</td>
<td>0.08</td>
</tr>
<tr>
<td>5</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.75</td>
<td>0.15</td>
<td>0.10</td>
</tr>
<tr>
<td>6</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.90</td>
<td>0.10</td>
</tr>
<tr>
<td>7</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

3. The mean annual salary per employee for different service states in different future periods may be estimated in the same manner as before. Let the same for the current year (0) and two future periods i.e. year (1) and year 2 are as follows (‘000 mu)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Un - skilled &amp; Semi-Skilled</td>
<td>Skilled Workers</td>
<td>Clerical Staff</td>
<td>Supervisory Level</td>
<td>Middle Mgt.</td>
<td>Senior Mgt.</td>
<td></td>
</tr>
<tr>
<td>Current year (0)</td>
<td>52</td>
<td>72</td>
<td>60</td>
<td>100</td>
<td>132</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>Year (1)</td>
<td>53</td>
<td>74</td>
<td>61</td>
<td>102</td>
<td>135</td>
<td>154</td>
<td></td>
</tr>
<tr>
<td>Year (2)</td>
<td>54</td>
<td>76</td>
<td>62</td>
<td>104</td>
<td>138</td>
<td>158</td>
<td></td>
</tr>
</tbody>
</table>

4. Cost of capital of the organization as 14% p.a..

Workings

1. Estimated number of employees in different service states in different future periods of time (till all the current employees reach the exit state):

   employee distribution vector in year (1) = [Employee distribution vector in year (0)] x Transition probability matrix for year (1)
= [425 1453 1350 637 110 20 298]
Employee distribution vector in year (2)
= [Employee distribution vector in year (1)] \times \text{Transition probability matrix for year(2)}
= [357 1253 1215 660 178 34 596]
Following the above, the employee distribution for all relevant future periods may be assessed.

2. The likely total manpower cost for different periods (till all current employees reach the exit state) may be worked out by multiplying the employee distribution vector for the period with the mean annual salary per employee vector for the concerned period.
The likely total manpower cost for first three periods, for example, works out to ('000 mu):
= 300800 for year (0)
= 295301 for year (1)
= 288412 for year (2)

3. The present value of likely total manpower cost for all relevant future periods would reflect the HR value of all the current employees of the organization during the current period, i.e.
HR value ('000 mu)
= 300800/1.00 \{\text{for period (0)}\} + 295301/1.14 \{\text{for period (1)}\} + 2884412/1.14^2 \{\text{for period (3)}\} + \ldots \ldots \ldots \text{(upto the period till all the current employees reach the exit state)}
4.4.8 A SURROGATE MODEL FOR THE FIRM'S INVESTMENT IN HUMAN RESOURCES

An illustrative example

Assumed Data

1. Employees of the organization are divided into six service states as before, the current number of employees is assumed as under:

<table>
<thead>
<tr>
<th>Service States</th>
<th>No. of employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Un-skilled &amp; Semi-Skilled</td>
<td>500</td>
</tr>
<tr>
<td>Skilled Workers</td>
<td>1650</td>
</tr>
<tr>
<td>Clerical Staff</td>
<td>1500</td>
</tr>
<tr>
<td>Supervisory Level</td>
<td>600</td>
</tr>
<tr>
<td>Middle Mgt.</td>
<td>25</td>
</tr>
<tr>
<td>Senior Mgt.</td>
<td>18</td>
</tr>
</tbody>
</table>

2. Representative employee transition probability matrix based on past employee records is assumed as under:

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7 (exit state)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.85</td>
<td>0.10</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>2</td>
<td>0.00</td>
<td>0.85</td>
<td>0.00</td>
<td>0.05</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>3</td>
<td>0.00</td>
<td>0.00</td>
<td>0.90</td>
<td>0.05</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>4</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.80</td>
<td>0.15</td>
<td>0.00</td>
</tr>
<tr>
<td>5</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.80</td>
<td>0.15</td>
</tr>
<tr>
<td>6</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.90</td>
</tr>
<tr>
<td>7</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

3. Mean annual rate of salary vectors for different periods as in the general market and to be assessed, the same for the current and future two periods are assumed, for example, as under ('000 mu):


4. Mean annual rate of salary vectors for different periods as in the general market and to be assessed, the same for the current and future two periods are assessed, for example, as under ('000 mu):

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Year (0)</td>
<td>52</td>
<td>72</td>
<td>60</td>
<td>100</td>
<td>132</td>
<td>150</td>
</tr>
<tr>
<td>Year (1)</td>
<td>53</td>
<td>74</td>
<td>61</td>
<td>102</td>
<td>135</td>
<td>154</td>
</tr>
<tr>
<td>Year (2)</td>
<td>54</td>
<td>76</td>
<td>62</td>
<td>104</td>
<td>138</td>
<td>158</td>
</tr>
</tbody>
</table>

5. Cost of capital of the organization is assumed to be 14% p.a.

**Working**

1. Calculation of employees distribution in different service states in future periods up to the period 'n' at the end of which all current employees would move to exist state):

Employee distribution vector in period (1).

= [Employee distribution vector in period (0) (i.e. as at present) x (Transition probability matrix)]

= [425 1453 1350 637 110 20 298] (exit)

Employee distribution vector in period (2).

= [Employee distribution vector in period (0) (i.e. as at present) x [Transition probability matrix]^2]

= [361 1277 1215 650 184 35 571]
Similarly, the employee distribution vector for all subsequent ‘n’ periods can be found out.

2. The likely total manpower cost for different future periods (up to period ‘n’) may be worked out by multiplying the employee distribution vector for the period with the mean salary per employee vector for the period, using both organization specific and market average rate.

For example, in the current year (0) and subsequent two years, the likely total manpower cost works out as follows:

<table>
<thead>
<tr>
<th></th>
<th>Likely total manpower cost ('000 mu)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Organization specific</td>
</tr>
<tr>
<td>Current ear (0)</td>
<td>300800</td>
</tr>
<tr>
<td>Year (1)</td>
<td>295301</td>
</tr>
<tr>
<td>Year (2)</td>
<td>290398</td>
</tr>
</tbody>
</table>

3. The present value of likely total manpower cost for all future periods (n) at organizational specific rate and at market average rate would reflect the internal and external value of HR respectively, i.e.

- Present value of likely total manpower cost at organization specific rate.
  \[
  = \frac{300800}{1.00} + \frac{295301}{1.14^2} + \frac{290398}{1.14^3} + \ldots \text{ up to 'n' periods.}
  \]

- Present value of likely total manpower cost at market average rate.
  \[
  = \frac{289156}{1.00} = \frac{284024}{1.14^2} + \frac{279431}{1.14^3} + \ldots \text{ upto 'n' periods.}
  \]

For proper accounting of HR, the model has suggested the plan of accounting as follows:

A. At the time when HRA is introduced in the firm
   (i) If external HR value > internal HR value, then debit HR investment A/c and credit retained earnings A/c (Investments in HR caused understatement of previous year's earnings due to 100% depreciation of the investments in HR, now corrected).
(ii) If external HR value < Internal HR value, then debit retained earnings A/c and credit HR investment A/c (negative intangible asset) [Negative investments in HR caused overstatement of past earnings, now corrected].

B. During subsequent periodic intervals

The year end value of the firms investments in HR should be periodically computed and the investment account adjusted to the new value, the opposite entry should be made to the income statement correcting the wage expense figure. This procedure will adjust current period earnings for the under or overstatement due to 100% depreciation of the investment in HR.

4.4.9 A MODEL ON THE MEASUREMENT OF HUMAN ASSET

An illustrative example

Assumed data

Let the annual salary of an employee belonging to the middle management group of the organization is 132000 m.u. and the specific employee’s attitude index is 1.12. Then, the monetary value of the employee’s attitude works out to

\[ \text{Monetary value of attitude} = 132000 \times 1.12 \]

\[ = 147840 \text{ mu} \]

Therefore, the gain from the employee’s favourable attitude during the year works out to

\[ \text{Gain} = \text{Monetary value of attitude} - \text{Annual salary} \]

\[ = 147840 - 132000 \]

\[ = 15840 \text{ mu} \]

Accordingly, it has been proposed to assess the gain per individual employee (or group of employees or of a department or the entire work force as a
whole) related to the investments in the HR guiding the management to formulate various strategies pertaining to direct and indirect HR investments in the presence of external factors to reinforce the work and non–work related factors, thereby optimizing the value of the organizational HR.

4.4.10 A MODEL ON ESTIMATION OF HUMAN CAPITAL ASSOCIATED WITH AN ORGANIZATION

An illustrative example

Assumed data

1. To illustrate the method of human capital value assessment, only two groups of employees of the firm are considered here i.e. middle management and senior management.

2. The employee transition probability between the above two and the exit state has been assumed based on past employee records as under.

<table>
<thead>
<tr>
<th>Service state</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Middle Management</td>
<td>0.80</td>
<td>0.15</td>
<td>0.05</td>
</tr>
<tr>
<td>Senior Management</td>
<td>0.00</td>
<td>0.90</td>
<td>0.10</td>
</tr>
</tbody>
</table>

3. The current number of employees in the above two selected service states is as follows. (Row Vector):

Middle Management
Senior Management
25
28

4. The average annual rate of compensation paid to employees in each group is assumed as follows (column vector);
5. Discounting rate is assumed at 14% p.a. for present value calculations.

**Workings**

1. The relevant sub matrix reflecting the transition probability for each possible non-absorbing state is

\[
\begin{pmatrix}
1 & 2 \\
1 & 0.80 & 0.15 \\
2 & 0.00 & 0.90
\end{pmatrix}
\]

2. To take into account the time value of money, the relevant sub matrix as in (1) above is multiplied by the scalar of (0.8772 i.e. 1/1.14), the adjusted sub matrix is as follows:

\[
\begin{pmatrix}
1 & 2 \\
1 & 0.70 & 0.13 \\
2 & 0.00 & 0.79
\end{pmatrix}
\]

3. The mean number of years (duly adjusted for time value consideration) an employee will be in each possible non-absorbing state is calculated as follows:

The mean number of years (adjusted) to be spent

\[
= [\text{Identity matrix} - \text{Revised sub matrix}]^{-1}
\]

\[
= \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} 0.70 & 0.13 \\ 0.00 & 0.79 \end{pmatrix}
\]
\[
\begin{pmatrix}
0.30 & -0.13 \\
0.00 & 0.21
\end{pmatrix}^{-1} = 1 \left( 0.30 \times 0.21 - 0.00 \times (-0.13) \right)
\begin{pmatrix}
0.21 & 0.13 \\
0.00 & 0.30
\end{pmatrix}
\]
using 2 x 2 matrix inversion
\[
= \left( 1 / 0.063 \right) \begin{pmatrix} 0.21 & 0.13 \\ 0.00 & 0.30 \end{pmatrix}
\]
\[
= \begin{pmatrix} 3.33 & 2.06 \\ 0.00 & 4.76 \end{pmatrix}
\]

4. The average number of man years all the current employees are likely to spend in various service states is calculated as follows:

Average number of man years all current employees are likely to spend in various service states
\[
= \left[ \text{Number of all current employees in different service states now} \right] \times \left[ \text{Mean number of years (duly adjusted) each employee is likely to spend in each non-absorbing state} \right]
\]
\[
= \begin{pmatrix} 25 & 18 \end{pmatrix} \begin{pmatrix} 0.33 & 2.06 \\ 0.00 & 4.76 \end{pmatrix}
\]
\[
= \begin{pmatrix} 83.25 & 137.18 \end{pmatrix}
\]

5. The value of human capital i.e. the present value of total compensation payable to all current employees during their likely stay with the organization may be assessed as follows:

Human capital value for the two groups of employees
\[
= \left[ \text{Average number of man years (adjusted) all the current two groups of employees are likely to spend in different service states} \right] \times \left[ \text{Rate of annual compensation to employees in each service state} \right]
\]
\[
= \begin{pmatrix} 83.25 & 137.18 \end{pmatrix} \begin{pmatrix} 132 \\ 150 \end{pmatrix}
\]
\[
= 31566 \text{ (in '000 m.u.)}
\]
4.5 HUMAN RESOURCE DEPRECIATION SYSTEM

An illustrative example

Assumed Data

Consider that Mr. X, a skilled labour, working in the production department of a medium sized company at Kolhapur has acquired the following scores in the annual questionnaire administered to the employees of the company to identify the causes of absenteeism.

Table 4.5
Causes of Absenteeism

<table>
<thead>
<tr>
<th>Organizational Factors</th>
<th>Scores (A)</th>
<th>Co-efficient of correlation (B/A)</th>
<th>Weighted Scores (B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Job Scope</td>
<td>3</td>
<td>0.5</td>
<td>1.5</td>
</tr>
<tr>
<td>2. Leadership Style</td>
<td>2</td>
<td>0.4</td>
<td>0.8</td>
</tr>
<tr>
<td>3. Work group norms</td>
<td>2</td>
<td>0.7</td>
<td>1.4</td>
</tr>
<tr>
<td>4. Wages and Incentives</td>
<td>4</td>
<td>0.7</td>
<td>2.8</td>
</tr>
</tbody>
</table>

External Factors

1. Labour market condition    | 4          | 0.6                               | 2.4                 |
2. Organizational Commitment  | 4          | 0.5                               | 2.0                 |

Consider further that Mr. X’s attendance record for the year as well as his human resource account show the following data.

1. Attendance Record

1. Schedule work time         | 300 Days   |
2. Attendance time exclusive of:
   (a) Sick Leave taken         | 10 Days    |
   (b) Absence due to village visits | 8 Days    |
   (c) Absence due to transportation & weather problems | 6 Days    |
   (d) Absence due to family responsibilities    | 8 Days    |
II. Human Resource Accounting Data

1. (a) Owners human investment  
   Rs. 35,000.  
   (b) Depreciation rate p.a.  
   20%

2. Employees human investment  
   (a) Value at the beginning of the year  
      Rs. 88,000  
   (b) Value at the end of the year  
      Rs. 73,000

Workings

Given the above data, the computation of Mr. X's human depreciation associated with various causes of absenteeism will essentially involve two basic steps:

1. The first step entails the calculation of human depreciation attributable to causative factors of absenteeism whose number of absence days can be measured directly such as for instance employees' absence due to sick or village visits.

2. The second step entails the calculation of human depreciation attributable to causative factors of absenteeism whose number of absence days cannot be measured directly but can be inferred from scores assigned to these factors through the questionnaire administered to the employees of the organization prior to or at the time of the evaluation. Mr. X's human depreciation will accordingly be calculated as follows:-

Preliminary Calculations

(a) Computation of absence rate

1. Overall absence rate  
   = 75/300 x 100 = 25%

2. Sick leave absence rate  
   = 10/300 x 100 = 3.33%

3. Village visits absence rate  
   = 8 / 300 x 100 = 2.67%

4. Transportation problem absence rate  
   = 6 / 300 x 100 = 2.00%

5. Family problem absence rate  
   = 8 / 300 x 100 = 2.67%
(b) **Computation of annual charges of human depreciation**

1. Owners share of human depreciation = \(35000 \times 20\% = \text{Rs. 7000}\)

2. Employees share of human depreciation = \(88000 - 73000 = \text{Rs. 15000}\)

Total human depreciation caused by absenteeism \(= \text{Rs. 22,000}\)*

(c) **Computation of human depreciation caused by absenteeism**

1. Owner’s share of human depreciation caused by absenteeism,
   \[= \text{Rs. 7000} \times 25\% = \text{Rs. 1750}\]

2. Employee’s share of human depreciation caused by absenteeism,
   \[= \text{Rs. 15000} \times 25\% = \text{Rs. 3750}\]

Total human depreciation caused by absenteeism \(= \text{Rs. 5,500}\)

**First Step Calculations**

Computation of human depreciation attributable to factors of absenteeism directly measurable:

(a) Depreciation due to sick leave = \(\text{Rs. 22,000} \times 3.33\% = \text{Rs. 732.60}\)

(b) Depreciation due to village visits = \(\text{Rs. 22,000} \times 2.67\% = \text{Rs. 587.40}\)

(c) Depreciation due to transport problems = \(\text{Rs. 22,000} \times 2.00\% = \text{Rs. 440.00}\)

(d) Depreciation due to family problems = \(\text{Rs. 22,000} \times 2.67\% = \text{Rs. 587.40}\)

Total depreciation charge due to measurable factors = \(\text{Rs. 2347.40}\)

**Second Step Calculations**

Computation of human depreciation attributable to factors of absenteeism indirectly measurable: This consists of two components:-

(a) Computation of total depreciation cost associated with non-directly measurable factors; and
(b) allocation of the total depreciation cost among the various non-directly measurable factors.

(c) allocation of the total depreciation cost among the various non-directly measurable factors.

  (i) Total depreciation cost associated with non-directly measurable factors depreciation due to absenteeism less depreciation associated with directly measurable factors = Rs. 5,500 - 2,347.4 = Rs. 3,152.6

  (ii) Allocation of the total depreciation cost among the various non-directly measurable factors. This is done on the basis of the percentage weighted scores each factor holds to the total weighted scores of all the factors:

<table>
<thead>
<tr>
<th>Factors</th>
<th>Weighted Scores</th>
<th>% weighted Scores</th>
<th>Depreciation allocated to non directly measurable factors, Total = Rs. 3,152.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Job Scope</td>
<td>1.5</td>
<td>13.76</td>
<td>433.80</td>
</tr>
<tr>
<td>2. Leadership Styles</td>
<td>0.8</td>
<td>07.34</td>
<td>231.40</td>
</tr>
<tr>
<td>3. Work Group Norms</td>
<td>1.4</td>
<td>12.84</td>
<td>404.80</td>
</tr>
<tr>
<td>4. Wages and Incentives</td>
<td>2.8</td>
<td>25.69</td>
<td>809.90</td>
</tr>
<tr>
<td>5. Labour Market Condition</td>
<td>2.4</td>
<td>22.02</td>
<td>694.20</td>
</tr>
<tr>
<td>6. Organizational Commitment</td>
<td>2.0</td>
<td>18.35</td>
<td>578.50</td>
</tr>
<tr>
<td>Total</td>
<td>10.9</td>
<td>100.00</td>
<td>3,152.60</td>
</tr>
</tbody>
</table>

**Final Conclusions:** Apportionment of human depreciation cost associated with absenteeism between the owner's and the employees' human investments in accordance with the ratio which the human depreciation cost of each of these types of human investment bears to their combined human depreciation costs (i.e. Rs. 7,000 : Rs. 15,000).
Factors | Depreciation charge due to absenteeism | Owners' Share of human depreciation associated with absenteeism. (7/22) | Employees' share of human depreciation associated with absenteeism. (15/22)
---|---|---|---
1. Sick Leave | 732.60 | 233.10 | 499.50
2. Village Visits | 587.40 | 186.90 | 400.50
3. Transport Problem | 440.00 | 140.00 | 300.00
4. Family Responsibilities | 587.40 | 186.90 | 400.50
5. Job Scope | 433.80 | 138.03 | 295.77
6. Leadership Style | 231.40 | 73.63 | 157.77
7. Work Group Norms | 404.80 | 128.80 | 276.00
8. Wages and Incentives | 809.90 | 257.69 | 552.21
9. Labour Market Condition | 694.20 | 220.88 | 473.32
10. Organizational Commitment | 578.50 | 184.07 | 394.43
--- | --- | --- | ---
5500.00 | 1750.00 | 3750.00

It should be noted that the employees' share of human depreciation associated with absenteeism (as calculated above) represents notional rather than actual depreciation cost born by the organization. This is, of course, obvious, as no organization will be prepared to pay emoluments to its employees during their absence period except for reasons authorised by its regulations or any other contractual agreement such as conditions of employment.

Among the absence period generally unauthorized by the organization is time taken off by the employee to visit his village or to accommodate some family or attitudinal problems.

Accordingly, therefore, there will be two sets of calculation for the employees' human investment depreciation charge that is attributable to absenteeism, one based on the notional charge of human depreciation and the other based on the actual amount of human depreciation borne by the organization. We have already seen in the previous example how to calculate the notional charge of human depreciation associated with absenteeism.
Actual amount of depreciation borne by the organization will be calculated as under.

Consider, for instance, that the collective agreement signed by the union and management of an organization entitles the employees for 12 days sick leave in a year as well as 7 days casual leave to accommodate the family responsibilities and transport problem. Consider also that Mr. X has taken 10 days sick leave during the year and a further 7 days casual leave to attend to his family problems.

Given that Mr. X has actually received Rs. 16,500 as personal emoluments during the year, what will then be the real annual depreciation charge of his investment in himself that is being associated with his absence from work. This will be calculated as follows.

(a) Paid leave utilized by Mr. X during the year = sick leave + casual leave = 10 + 7 = 17 days.

(b) Actual amount of salary received by him during the year = Rs. 16,500.

Hence, the actual amount of depreciation of Mr. X's investment in himself that is born by the organization as a result of his absenteeism will be equal to:

\[
\frac{17}{300} \times 16,500 = \text{Rs. 935.}
\]

The journal entries relating to Mr. X's annual human depreciation charge will be recorded in the books of the organization as follows:

<table>
<thead>
<tr>
<th>Date/ Sr. No.</th>
<th>Particulars</th>
<th>Debit (Rs.)</th>
<th>Credit (Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Owners human investment depreciation charge.</td>
<td>Human depreciation due to other factors</td>
<td>Dr. 5,250</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Human depreciation due to absence</td>
<td>Dr.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(a). Sick Leave</td>
<td>Rs. 233.10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(b). Village Visits</td>
<td>Rs. 186.90</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(c). Transport Problems</td>
<td>Rs. 140.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(d). Family Responsibilities</td>
<td>Rs. 186.90</td>
<td></td>
</tr>
</tbody>
</table>
(e) Job Scope Rs. 138.03
(f) Leadership Style Rs. 73.63
(g) Work group norm Rs. 128.80
(h) Wages and incentives Rs. 257.69
(i) Labour market condition Rs. 220.88
(j) Organizational commitment Rs. 184.07

1,750

To Provision for Owners' Human Investment
[Being the owner's share of annual human depreciation charge]

7,000 7,000

2. Employees Human Investment Depreciation Charge

(a) Notional Depreciation
   (i) First Entry
Human Depreciation due to other factors Dr. 11,250

Human Depreciation due to absence. Dr.
   (a). Sick Leave Rs. 499.50
   (b). Village Visits Rs. 400.50
   (c). Transport Problems Rs. 300.00
   (d). Family Responsibilities Rs. 400.50
   (e). Job Scope Rs. 295.77
   (f). Leadership Style Rs. 157.77
   (g). Work group norm Rs. 276.00
   (h). Wages and incentives Rs. 552.21
   (i). Labour market condition Rs. 473.32
   (j). Organizational commitment Rs. 394.43

3,750

To Human Asset Account
[Being the employees share of annual human depreciation]

15,000

(ii) Second Entry
Employees Human Capital Account Dr. 15,000

To Human Depreciation due to other factors 11,250
To Human Depreciation due to absence

(a) Sick Leave Rs. 499.50
(b) Village Visits Rs. 400.50
(c) Transport Problems Rs. 300.00
(d) Family Responsibilities Rs. 400.50
(e) Job Scope Rs. 295.77
(f) Leadership Style Rs. 157.77
(g) Work group norm Rs. 276.00
(h) Wages and incentives Rs. 552.21
(i) Labour market condition Rs. 473.32
(j) Organizational commitment Rs. 394.43

[Being adjustment to the employees Human Capital account] 15,000

(b) Real Depreciation

Human Depreciation due to absence Dr.
1. Sick Leave Rs. 550
2. Family Responsibilities Rs. 385 935

To Wages and Salaries A/c 935

[Being the amount of actual salary paid to the employee in lieu of absenteeism]

3. Profit & Loss Accounts

Profit & Loss A/c Dr. 7,935

To Human Depreciation due to other factors 5,250

To Human Depreciation due to absenteeism

(a) Sick Leave Rs. 783.10
(b) Village Visits Rs. 186.90
(c) Transport Problems Rs. 140.00
(d) Family Responsibilities Rs. 571.90
(e) Job Scope Rs. 138.03
(f) Leadership Style Rs. 73.63
(g). Work group norm Rs. 128.80
(h). Wages and incentives Rs. 257.69
(i). Labour market condition Rs. 220.88
(j). Organizational commitment Rs. 184.07

[Being the transfer of the balance of the human depreciation accounts to profit & loss account]

7,935  7,935

Mr. X's Human Capital as well as its depreciation will be reflected on the balance sheet of the organization as follows:

<table>
<thead>
<tr>
<th>Liabilities</th>
<th>Rs.</th>
<th>Assets</th>
<th>Rs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owner's Human Capital</td>
<td>35,000</td>
<td>Human Assets</td>
<td>1,23,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[35,000 + 88,000]</td>
<td></td>
</tr>
<tr>
<td>Employees Human Capital</td>
<td>88,000</td>
<td>(-) Accumulated &amp;</td>
<td></td>
</tr>
<tr>
<td>(-) Adjustment</td>
<td>15,000</td>
<td>(-) Depreciation</td>
<td>22,000*</td>
</tr>
<tr>
<td></td>
<td>73,000</td>
<td>[7,000 + 15,000]</td>
<td>1,01,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Profit &amp; Loss A/c</td>
<td>7,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1,08,000</td>
<td></td>
<td>1,08,000</td>
</tr>
</tbody>
</table>

4.6 INDIAN VIEW OVER HR BALANCE SHEET

4.6.1 S. P. Jain & K. L. Narang's View


Assumed illustration

A firm has started its business with a capital of Rs. 5,00,000. It has purchased fixed assets worth Rs. 2,50,000 in cash. It has kept Rs. 1,30,000 as working capital and incurred Rs. 1,20,000 on recruitment, training and
developing the engineers and a few workers. The value of engineers and workers is assessed as Rs. 4,00,000. Show these items in the balance sheet.

In the books of firms

Balance sheet (Including Human Resource) as at .......

<table>
<thead>
<tr>
<th>Liabilities</th>
<th>Rs.</th>
<th>Assets</th>
<th>Rs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital</td>
<td>5,00,000</td>
<td>Fixed Assets</td>
<td>2,50,000</td>
</tr>
<tr>
<td>Human Capital / Assets</td>
<td>4,00,000</td>
<td>Human Assets:</td>
<td></td>
</tr>
<tr>
<td>(i) Individual value</td>
<td>4,00,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii) Value of firms investment</td>
<td>1,20,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current Assets – Current Liab.</td>
<td>1,30,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9,00,000</td>
<td>9,00,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

But they fail to mention the working of human resource monetary value of Rs. 4,00,000.

4.7 SUMMARY

The model suggested under cost based approach were very subjective and it lack from practical application, where as model under value based future earnings are better than the cost based model. Nevertheless, value based model also suffers from following limitations.

(i) Salary & wages alone does not measure the correct potentiality of labour force. There may be case of underpayment of salary & wages due to cut throat competition in labour market.

(ii) These value base model ignores unexpected changes in salary structure which may upset the present value calculation based on the present salary.

(iii) These model fails to take into account the mobility of labour from one position to another and the employees leaving the organization and new recruits coming in.
(iv) There is lots of subjectivity in determining the probable period of the employee occupying each service state.

Though value-based model are ideal but suffers from many complicated calculations such as application of matrix, vector, probability, matrix inversion, probability matrix, revised sub-matrix, transition probability matrix, correlation, sampling error, knowledge of eco-trigonometric and so on.
REFERENCES


