

RESEARCH NOTE 2

HUMAN RESOURCE DEVELOPMENT PRACTICES AS PERCEIVED BY SCIENTISTS AND ENGINEERS: A COMPARATIVE STUDY

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The present study is an attempt to assess and compare the perception of research personnel about the practices of human resource development. A questionnaire was used to collect the data from 140 scientists and engineers belonging to three organisations. The results indicate that the R&D group of the private sector had better perception of human resource development practices compared to their counterparts in the public sector undertakings.

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Introduction

Research studies indicate that the management of scientists and engineers needs a different approach, because they tend to identify with their profession rather than with the organisations they belong to (Jauch, Gluick and Osborn, 1978; Arvey and Neel, 1978). Studies have indicated that the cost of the human resource varies from 40 to 90 per cent of the recurring expenditure of R&D (Central Board of Irrigation and Power, 1988). Being professionals, scientists and engineers demand special treatment and cannot be managed like ordinary labourers (Badawy, 1988). Lack of integrating efforts, need for role clarity, failure to develop meaningful tasks, traditional methods of evaluating scientific output are some of the factors demotivating the scientists and engineers in R&D setups. (Dalton and Thompson, 1986; Badawy, 1988; Anand, 1990).

Objectives

The present study is an attempt to assess and compare the perception of scientists and engineers about the practices of human resource development in their organisations. The study involved three phases:

- (1) Defining the variables and developing appropriate measures.
- (2) Conducting unit level investigations.
- (3) Attempting a comparative analysis.

Method

In the absence of standard measures, 36 items were developed to measure the effectiveness of six variables of human resource development practices, namely, manpower planning, recruitment and selection, induction, job design, performance appraisal, and training and development. A Likert type scale was developed by checking the Content validity, and internal consistency (Cronbach alpha).

Sample

To meet the objectives of the present study, R&D units of three engineering industries engaged in technology absorption, indigenisation, and product development were used. All the three units had foreign collaboration for their product technology. Two units were owned by the Government and the other one was under private management. Among the two public sector units, one was a state public sector manufacturing heavy electricals and the other, a central public sector unit manufacturing earth moving equipment. The private sector unit produced two wheelers. The questionnaire was administered to 140 scientists and engineers belonging to these organisations.

Analysis and Findings

Table 1 shows the results of manpower planning practices, as perceived by scientists and engineers belonging to the three organisations.

Table 1
COMPARISON OF MANPOWER PLANNING BETWEEN R&D ORGANISATIONS

	<i>State Public Sector (n = 27)</i>	<i>Central Public Sector (n = 79)</i>	<i>Private Sector (n = 34)</i>	$t_{1,2}$	$t_{2,3}$	$t_{3,1}$
Manpower planning	4.5 (0.70)	4.3 (0.80)	5.0 (0.56)	1.4	" 4.4	*2.6
1. Utilisation	5.1 (0.80)	4.4 (1.18)	5.1 (0.94)	" 2.9	" 3.1	0.0
2. Timely supply	4.4 (1.60)	4.5 (1.90)	5.4 (1.43)	0.0	* 2.2	*2.4
3. Adequacy	4.7 (1.20)	4.5 (1.59)	5.3 (1.18)	0.4	* 2.5	1.9
4. Resilience	3.8 (1.10)	3.5 (1.34)	4.1 (1.28)	0.7	* 2.0	1.0
5. Work load	4.6 (1.10)	3.8 (1.04)	4.4 (0.87)	" 3.4	* 2.5	1.0
6. Flexibility	5.0 (1.20)	5.2 (1.44)	5.5 (1.45)	0.0	0.9	1.4
7. Career planning	4.0 (1.20)	3.8 (1.17)	4.9 (1.18)	0.7	" 4.3	*2.6

() Standard Deviations

* Significance at 0.05 level

" Significance at 0.01 level

The overall mean values of the manpower planning practices were 4.5, 4.3 and 5.0 for the state public sector, the central public sector and the private sector organisations respectively. There was no significant difference in perception of manpower planning practices between the research personnel of the two public sectors, but there was a significant difference (0.01 level and 0.05 level) in the perception of manpower planning practices between the scientists and engineers of the private sector and the two public sectors. Scientists and engineers of the private sector perceived they had better manpower planning practices compared to those of the

two public sectors. The mean score of utilisation of the manpower was 4.4 in the case of the central public sector and 5.1 in the case of both the state public sector and the private sector. The scientists and engineers of the state public sector and the private sector perceived better utilisation of their capabilities (0.01 level), compared to the research personnel of the central public sector. The mean scores of timely supply of the manpower were 4.4, 4.5 and 5.4. The scientists and engineers in the state public sector and the central public sector felt that the people were employed with little or no delay. Their counterparts in the private sector perceived (0.05 level) that the people were employed in advance to meet the requirements of projects. The mean scores of adequacy of the manpower varied from 4.5 to 5.3. The research personnel of the private sector felt that their R&D division was adequately staffed when compared to that of the central public sector (0.05 level). The mean scores of ability to cope with the situations due to turnover of key personnel varied from 3.5 to 4.1. This indicates that the existing manpower practices were effective to a certain extent in tackling the situations due to turnover of key personnel. There was a significant difference (0.05 level) between the central public sector and the private sector regarding their rating of resilience. The scientists and engineers of the private sector felt that their division had more resilience compared to the central public sector. The mean values of the dimension work load were 4.6, 3.8 and 4.4. The results indicate that the scientists and engineers often had to work beyond normal working hours to complete the assigned tasks. The mean scores of flexibility in assigning the jobs in case of completion of projects were 5.0, 5.2, 5.5. The scientists and engineers involved in the study perceived that there was a greater flexibility in assigning jobs and the people had to stay idle for a short while, when a project was completed. Career planning practices perceived by the private sector personnel, was better than that of the state public sector and the central public sector.

Table 2 shows the means and standard deviations of recruitment and selection practices among the three R&D organisations.

Table 2
COMPARISON OF RECRUITMENT AND SELECTION BETWEEN R&D ORGANISATIONS

	<i>State Public Sector (n = 27)</i>	<i>Central Public Sector (n = 79)</i>	<i>Private Sector (n = 34)</i>	$t_{1,2}$	$t_{2,3}$	$t_{3,1}$
Recruitment and selection	4.2 (1.00)	3.8 (1.08)	4.8 (0.93)	1.5	**4.1	*2.0
1. Job descriptions	4.5 (1.50)	4.0 (1.59)	4.5 (1.50)	1.4	1.3	0.0
2. Organisational involvement	4.8 (1.30)	4.1 (1.52)	5.2 (1.18)	*2.0	**3.6	1.2
3. Structural support	4.1 (1.40)	3.6 (1.30)	4.6 (1.24)	1.6	**3.6	1.2
4. Capability of attracting the right candidates	3.4 (1.10)	3.6 (1.35)	4.8 (1.13)	0.0	"4.1	**4.5

() Standard Deviations

* Significant at 0.05 level

** Significant at 0.01 level

The overall mean values of recruitment and selection practices were 4.2, 3.8 and 4.8. There was no significant difference in the perception of recruitment practices between the scientists and engineers of the two public sector organisations. However, but the research people of the private sector had high scores (0.01 level).

The results indicate that the organisational involvement and the support extended by the existing policies and procedures for selecting the right candidates was rated as somewhat low in the case of the central public sector as compared to the other two organisations. The scientists and engineers of the private sector had better perception of their organisational polices and capability of attracting right candidates as compared to their other counterparts in the two public sector organisations.

Table 3 presents the means and standard deviations of induction practices among the three R&D organisations.

Table 3
COMPARISON OF INDUCTION BETWEEN R&D ORGANISATIONS

	<i>State Public Sector (n = 27)</i>	<i>Central Public Sector (n = 79)</i>	<i>Private Sector (n = 34)</i>	<i>$h_{,2}$</i>	<i>$h_{,3}$</i>	<i>$t_{3,1}$</i>
Induction practices	4.1 (0.80)	3.8 (1.00)	4.4 (0.85)	1.5	"2.7	0.9
1. Incubation	3.3 (1.00)	3.9 (1.18)	3.9 (1.11)	*2.0	0.00	1.6
2. Role clarity	4.5 (1.30)	3.9 (1.59)	4.7 (1.63)	1.9	*2.3	0.2
3. Satisfaction	4.5 (0.80)	3.6 (1.38)	4.6 (0.84)	"3.1	"3.6	0.2

() Standard Deviations

* Significant at 0.05 level

** Significant at 0.01 level

The private sector R&D group perceived their induction practices to be better (0.01 level) as compared to that of the central public sector. There was no significant difference in the perception of the effectiveness of induction practices between the two public sector organisations and also between the private sector and the state public sector.

The period of incubation was more (0.05 level) in the state public sector compared to the other two organisations. The private sector provided greater role clarity compared to the two public sector organisations. There was no significant difference in the perception of role clarity provided between the two public sector organisations. The research personnel of the private sector and the state public sector were more satisfied (0.01 level) compared to their counterparts in the central public sector.

Table 4 indicates the means and standard deviations of performance appraisal practices.

Table 4
COMPARISON OF PERFORMANCE APPRAISAL BETWEEN DIFFERENT R&D ORGANISATIONS

	<i>State Public Sector (n = 27)</i>	<i>Central Public Sector (n = 79)</i>	<i>Private Sector (n = 34)</i>	$t_{1,2}$	$t_{2,3}$	$t_{3,1}$
Performance	4.0 (0.80)	3.4 (0.95)	4.7 (0.80)	**3.1	"6.5	"2.7
1. Satisfaction	4.4 (0.90)	4.1 (1.37)	4.9 (1.29)	0.8	*2.7	1.6
2. Utilisation for						
(a) Rewarding	3.8 (1.30)	3.6 (1.50)	5.4 (1.09)	0.4	"5.7	"4.7
(b) Capabilities	4.1 (1.00)	3.9 (1.51)	5.0 (1.18)	0.5	"3.5	"2.9
(c) Training and development	3.7 (1.60)	3.4 (1.64)	4.6 (1.45)	0.8	**3.6	*2.2
(d) Corrective measures	3.9 (1.40)	3.0 (1.35)	4.4 (1.46)	**2.9	"4.7	1.2
(e) Routine procedures	5.0 (1.10)	2.0 (1.68)	5.4 (1.21)	"8.6	"10.02	1.3
(f) Victimisation	3.3 (1.80)	3.7 (2.00)	3.20 (1.98)	0.0	1.22	0.0
3. Scope for better understanding	4.1 (1.30)	3.5 (1.41)	4.4 (1.53)	*2.1	"3.0	0.6

() Standard Deviations

* Significant at 0.05 level

** Significant at 0.01 level

The private sector R&D group perceived (0.01 level) better appraisal practices compared to the other two organisations. The R&D group of the private sector were more satisfied (0.05 level) compared to their counterparts in the central public sector and there was no difference between the two public sector organisations. The scientists and engineers of the private sector said that the appraisal feedback was used to a great extent for rewarding the research personnel compared to those in the public sectors. However there was no significant difference between the two public sector organisations. A similar trend was observed with reference to utilisation of appraisal feedbacks for harnessing the capabilities and training and development among the organisations.

The mean scores of utilisation of feedback for corrective measures, for example counselling, for routine procedures like sanctioning of annual increment showed similar trends. In both the cases no difference was observed between private and state public sector, and a significant difference was observed between the central public sector, and the other two organisations. The mean scores of utilisation of appraisal feedback for victimisation showed that there was no significant difference in perception among the research groups and the scores were low in all the cases.

The appraisal process contributed to a moderate extent for better understanding in the private sector and the state public sector, compared to the central public sector.

Table 5 shows the comparison of mean scores of the training and development practices of the R&D organisations.

Table 5
COMPARISON OF TRAINING AND DEVELOPMENT BETWEEN DIFFERENT R&D ORGANISATIONS

	<i>State Public Sector (n = 27)</i>	<i>Central Public Sector (n = 79)</i>	<i>Private Sector (n = 34)</i>	$t_{1,2}$	$t_{2,3}$	$t_{3,1}$
Training and development practices	4.0 (0.70)	4.1 (0.79)	4.8 (0.77)	0.0	"3.7	"3.4
1. Opportunity for attending training programme	3.6 (1.30)	4.1 (1.31)	5.1 (1.02)	1.0	"3.5	"4.7
2. Scarcity of skills	4.4 (1.20)	3.9 (1.38)	4.3 (1.62)	*1.5	1.3	0.0
3. Encouragement for attending seminars and conferences	3.3 (1.20)	3.6 (1.59)	4.0 (1.40)	0.0	**1.0	1.7
4. Encouragement to publish papers	3.5 (1.30)	3.8 (1.89)	4.3 (1.62)	0.0	1.1	1.9
5. Professional growth	4.3 (1.00)	4.3 (1.10)	5.3 (1.06)	0.0	**4.2	"3.4
6. Need to develop skills	5.2 (1.30)	5.0 (1.36)	5.6 (1.32)	0.8	*2.2	1.0

() Standard Deviations

* Significant at 0.05 level

** Significant at 0.01 level

The overall mean scores of the training and development practices varied from 4.0 to 4.8. The training and development practices seem to be better in the private sector compared to the public sector organisations. The opportunities for attending training programmes (item 1) and professional growth (item 5) were more in the private sector as compared to the same in the central public sector or the state public sector. The mean scores of scarcity of skills showed some difference (at 0.05 level) between the two public sector organisations. The mean scores of encouragement for attending seminars and conferences and paper publication indicate that to a moderate extent, the scientists and engineers were encouraged in all the three organisations. There was no significant difference in the perception among R&D groups. The scientists and engineers involved in the study showed a great need to develop their capabilities. This need was more (0.05 level) in the case of scientists and engineers of the private sector compared to the two public sector organisations.

Discussion

The above analysis and findings indicate that the scientists and engineers of the private sector R&D perceived better manpower planning practices compared to the

scientists and engineers in the public sector. The flexibility in assigning suitable job assignments was above moderate level in all the three R&D organisations. The mean values for the dimension resilience to withstand situations due to turnover of key personnel was the least among other dimensions, for all the three R&D organisations. This shows that preparing the second line of people, one of the responsibilities of manpower planning practices, needs the attention of human resources development practices.

The recruitment and selection practices of the private sector were comparatively better than those of the public sector organisations. The organisational involvement in recruitment and selection practices has emerged as a predominant dimension in all the three organisations. The private sector had been comparatively successful in attracting the right candidates for R&D.

The private sector was providing better socialisation (induction practices) to the new recruits compared to the public sector organisations. The private sector and the state public sector provided better role-clarity. The scientists and engineers of the central public sector were less satisfied with the induction process compared to the others.

The effectiveness of the performance appraisal of the private sector was superior to that of the state public sector. However, the effectiveness of the state public sector was superior to that of the central public sector. The 't' values were significant for all the dimensions except for victimisation, between the private sector and the central public sector. The appraisal feedback was mostly used for salary administration in the state public sector and in the private sector.

The effectiveness of the training and development practices was rated as average to above average. The training and development practices of the private sector were superior to those of the public sectors. All the scientists and engineers expressed greater need to develop skills. The scientists and engineers of the private sectors considered their professional growth as above average.

The results indicate that the human resources development practices were perceived to be better by the scientists and engineers in the private sector compared to those of the public sector organisations. However, there was sufficient scope for improvement in the public sector organisations. Induction being the gateway to career, organisations have to recognise the importance of induction practices and work out to improve the current practices. The feedback on the performance of work is a vital aspect for introspection and improvement, which needs considerable attention in all the three organisations. Performance appraisal practices were satisfactory in the private sector compared to the public sector organisations. The training and development efforts in the private sector were satisfactory. The study suggests that there is scope to improve upon the existing training and development practices in the public sector organisations.

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