

Development of a Point Rating Model for Job-Manpower Evaluation in an Organization

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Abstract

The basic reason for industrial dispute in developing countries is the inability to determine appropriate wages for the jobs carried out based on prevailing conditions of service. Stability in the workforce of an organization is being hampered by higher wages offered by competing organizations engaging in similar jobs. There is need to evaluate job contents and performance of workforce so that equitable and appropriate wages is arrived at, without causing any loss or instability in the organization. The study adopted workforce-job evaluation factor-point ranking system. Among the evaluation factors considered include education, experience, knowledge, computer literacy, communication, complexity duty/innovation, adaptability, mental and physical demand, reliability, responsibility, confidentiality, safety and scope of supervision. A point rating mathematical model was developed utilizing aforementioned evaluation

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parameters. The model was used to determine the appropriate wages for the workforce of an organization based on performance. The result obtained from an organization, using the model, showed a significant difference of about 30 % between the expected, and actual performance. Therefore, to avoid loss or instability in the system, adjustment of wages in consonant with the level of performance is inevitable.

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1 Introduction

The basic reason today for industrial dispute is the inability to determine appropriate wages/salaries and conditions of service for labor input. It is the tendency of the employees to compare their wage and conditions of service with others in similar organization. He is an accountant just sitting inside the air-conditioner, or he is an engineer engaging on the heavy work, one conditions of service may be better than the other. This age-old arguments and puzzle, about which jobs are most rewarding, will continue and become tougher if wage rates are assigned without regard to job contents. Difference in wages of workers performing similar job sometimes creates dissatisfaction among them. Telsang [17] stated that both medium- and large-scale industries and businesses are being faced with the problem of basic wage payment. There is need to have a standard method of evaluating job so that jobs having the same amount of work content and level of difficulty is remunerated equally. This is possible only, if wages structure is based on appropriate classification and commensurate with the efforts expended on jobs.

Many research efforts were identified in the areas of value analysis of products [1]-[5], value engineering [2], [3], [1], [6]-[8], value of job/labour [6], [9]. Also basic methods of job evaluation are also available in literature [8], [10]-[14], and

merit rating methods for the job performer, as well [15], [16]. The demerit of these efforts is they are mostly theoretical based and no provision was made for practical implementation of them in industries. This research work looked into the different methods of job/labour evaluation, transformation it into mathematical model and made it practicable through implementation in an organization. Therefore, the specific objectives of this study are to: determine an equitable basis of evaluating job/labour; and formulate an equitable job/labour evaluation model; and test the model with a case study.

2 Mathematical Model Formulation

In formulating the model for the productivity/performance for the workforce, the factor weight relations, which represent the minimum degree weight of each factor is first determined. Second, interrelationship between the evaluation factors was developed. It was discovered that performance, P of a workforce depends on skill acquired, S, effort applied, E, initiative, I, responsibility, R and job condition, J. This could be mathematically represented as

$$P = f(S, E, I, R, J) \quad (1)$$

It was discovered that each evaluation factor was also related with its own sub-factors. Amount of skills, S acquired depends on level of education/training, T, experience, X, knowledge, K and was expressed as

$$S = f(T, X, K) \quad (2)$$

Also, amount of effort, E required from manpower largely depends on physical, H and mental demand, M of the job.

Hence,

$$E = f(H, M) \quad (3)$$

Moreover, it was also established that initiative, I required for any particular work depends on the complexity of duties, C and adaptability, A.

Therefore,

$$I = f(C, A) \quad (4)$$

Responsibility, R of an employee depends on the level of accountability for materials/products, L, equipment/process, Q, safety, F and work of others, W. This was expressed as

$$R = f(L, Q, F, W) \quad (5)$$

And, job condition, J depends also on working conditions, K and the hazard, Z being exposed to.

Then,

$$J = f(K, Z). \quad (6)$$

The model for actual performance was formulated by comparing the ratings obtained from each factor with the overall sum of all the factors. That is,

$$\beta = \frac{Fi}{\sum_i^m Fi} \quad (7)$$

where,

β = relative ratio of weight rating to overall sum of factor-point weight for a particular degree.

Fi = weight of each factor

$\sum Fi = Q^* =$ Actual Performance or total performance rating of the employee which is the sum of weight of each factor at particular degree.

Since performance of an individual is based on comparing the actual to the expected. Then, the effectiveness of an employee was represented by:

$$Pe = \frac{Q^*}{N^*} \quad (8)$$

where,

$Q^* =$ Actual performance

$\sum G = N^* =$ Expected performance of an employee

Hence, effectiveness of an employee is measured as the ratio of actual performance to the expected performance. This was formulated as Equation (9)

$$Pe = \frac{\sum_{i=1}^m \left| \frac{Fi}{Gi} \right|}{N} = \frac{\sum_{i=1}^m Fi}{\sum_{i=1}^m Gi} \quad (9)$$

The corresponding performance, Pe is established using Equation (10)

$$Pe = \frac{\sum_{i=1}^m Fi}{\sum_{i=1}^m Gi} \times 100\% \quad (10)$$

$$Pe \approx 100\%$$

The relative weight (equitable wage) of performance was determined by comparing the actual performance, Q^* to the required performance, Pe .

This was represented by the relationship given in Equation (11).

$$\alpha = \frac{Fi}{Gi} \quad (11)$$

Performance rating in monetary value, Cp , was determined from Equation (12):

$$Cp = \frac{\sum_{i=1}^m \frac{Fi}{Gi}}{N} \left[\sum_{j=1}^k C_{wj} \right], \quad or$$

$$Cp = Pe \left[\sum_{j=1}^k C_{wj} \right], \quad or$$

$$Cp = \frac{\sum_{i=1}^m \alpha_i}{N} \left[\sum_{j=1}^k C_{wj} \right] \quad (12)$$

where,

N = the number of compensable factors

C_w = standard wages cost (basic salaries and others related to it).

Cp = Performance wage

The total pay package, Tp of an employee based on performance was determined using expression (13):

$$Tp = Cp + Gp \quad (13)$$

where,

Gp = General payment (Allowance not affected by basic salary). This is

applicable to public and private organizations.

3 Testing/Validation of the Model

The model was tested/ validated with data from educational and industrial organizations (Table 1). Equations (8) - (11), which were formulated from the relationships presented in Equations (1)- (7), were used to analyse the relationship between the expected and actual performance, while equitable wages for workforce were determined using Equations (12) and (13).

4 Results and Discussion

The following were the results obtained when the model was tested with data collected from an educational organisation. Tables (1) - (4) represent the results obtained from Equation (4) which was the relative weight of expected performance. Tables (2) and (3) represented the results of the analysed data, which revealed the actual and expected performances for academic and industrial jobs. Table (4) shows the result obtained when performance was translated into wages. Table (4) also represents result for comparison of performances and wages for both academics and industrial staff. From Table (1), it was observed that, for academic job, educational factor was allocated the highest points. This is an indication of high importance attached to education in the academic work. This was followed by knowledge and complexity of duties; while for administrative job, education and confidential matter were regarded as most important before experience on duty. In other level of administration, experience was considered first, followed by mental demand and safety of others before education. The result obtained when performance was translated into wages revealed that employers were paying more to their employees than expected as shown by their performances (Tables 2-4). The excess wages above normal paid to workers by the organisation was a loss because input of the employees was not commensurate with the wages received. Though, it is unrealistic to achieve 100 % performance

of workforce, but the management can draw a reference point for the payment of wages such that the expected profit margin of the organisation is not affected. For the case studied, performance shortage of about 30 % was realised (Table 4). Therefore, for the organisation to break even there is need to reassess the wage scheme utilised for the remuneration of its workforce.

Table 1: Point ratings for academic and industrial staff

Factors	Point Ratings	
	Academic	Industrial
Skill		
1. Education	14	10
2. Experience	8	9
3. Knowledge	12	5
4. Computer Literacy	5	5
5. Communication	10	8
Initiative		
6. Complexity of Duties/New ideas	12	8
7. Ability to cope with scope of work	8	6
Responsibility		
8. Errors/Reliability	5	7
9. Personal Contact	5	6
10. Confidential Matters	4	10
Job Conditions		
11. Working conditions	5	8
12. Mental Demand	10	8
Supervision		
13. Character of Supervision	6	8
14. Scope of Supervision	10	6
Total	110	104

Table 2: Performance ratings for industrial staff I

Factors	Performance		
	Expected (G_i)	Actual (F_i)	Ratio $\alpha = \frac{F_i}{G_i}$
Skill			
1. Education	10	6	0.600
2. Experience	9	5	0.556
3. Knowledge	5	4	0.800
4. Computer Literacy	5	3	0.600
5. Communication	8	6	0.750
Initiative			
6. Complexity of Duties/New ideas	8	6	0.750
7. Ability to cope with scope of work	6	5	0.833
Responsibility			
8. Errors/Reliability	7	6	0.857
9. Personal Contact	6	5	0.833
10. Confidential Matters	10	8	0.800
Job Conditions			
11. Working conditions (Ability to work under difficult condition/when things get going tougher)	8	6	0.750
12. Mental Demand (Comprehension and dissemination of ideas, Reasoning/Judgment level)	8	6	0.750
Supervision			
13. Character of Supervision	8	6	0.750
14. Scope of Supervision	6	5	0.833
Total	104	77	

Table 3: Performance ratings for industrial staff II

Factors	Performance		
	Expected (G_i)	Actual (F_i)	Ratio $\alpha = \frac{F_i}{G_i}$
Skill			
1. Education	10	8	0.800
2. Experience	12	8	0.667
3. Knowledge	8	5	0.625
4. Computer Literacy	4	3	0.750
Effort			
5. Physical Demand (Measure of Strain required and ability to cope with it)	7	5.6	0.800
6. Mental Demand (Perception, Judgment, Numerical ability and Spatial ability)	10.5	7.0	0.667
Responsibility			
7. For Equipment/Process	8	5	0.625
8. For Materials/Product.	8	6	0.750
9. For Safety of others & himself	10.5	8	0.762
10. For work of others (ability to supervise the work of others and be able to bring best out of them)	8	5	0.625
Job Conditions			
11. Working conditions (Difficulty of complexity of work). How does he perform under difficult situation? Reliability	8	6	0.750
12. Hazards. Ability to prevent unnecessary hazards following Safety rules and Regulations.	8	6	0.750
Total	102	72	

Table 4: Performance point ratings for academic and industrial staff

<i>Nature of Job</i>	<i>Academic</i>	<i>Industrial I</i>	<i>Industrial II</i>
Expected point rating	110	104	102
Actual point rating	82	77	72
Performance (%)	74.55	72	70.59%
Actual wage	88,305.00	56,476.70	92,802.25
Expected wage	61,406.85	43,534.36	69,659.60
Over paid	26,898.15	12,942.34	23,142.66
Over paid (%)	30.40	22.92	24.94

4 Conclusion

The study focused on the development of mathematical model for evaluating job-manpower performance in the educational industry. A mathematical model was developed base on the factors points derived from the data collected from the questionnaires administered. The job evaluation system developed was used to assess performance of some chosen employees. The results gotten from there were used to test the mathematical model. The developed model revealed the performance of the employees. It was shown that effectiveness of an employee depends on some factors such as skill acquired, effort applied, initiative, and responsibility and job conditions. The general conclusion to be drawn from the results is that there is a substantial shortfall in performance of the workforce; and this needs to be quickly addressed for the sustainability of the organisation. Based on this research finding the following recommendations are necessary: an employee who is hard working should be motivated through increased wages, as blanket wages could kill its morale; there is need for constant assessment of salary/wages and adjustment made in accordance with performance of employees; and there is need for manpower development in order to improve performance.

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