

Human Resources Accounting Practices A Suggested Model For Arithmetic Procedures

Professor Dr. N. P. Agarwal

Professor and Reader
Dept. of Accountancy and Business Statistics,
University of Rajasthan, Jaipur (Raj)
India

Dr. Abdel Naser I. Nour

Associate Professor and Head
Dept. of Accountancy
Al-Isra University, Amman
Jordan

Dr. Munir Shakir

Associate Professor
Dept. of Accountancy
Al-Isra University, Amman
Jordan

ABSTRACT

The last three decades of the twentieth century have witnessed notable attention directed to Human Resources Accounting. Researches and studies in this area have produced many models and methods to facilitate the process of measurement and valuation of human resources working in an organization. However, the numerousness of these models and methods, though they can give an organization a wide choice in practice, they, however, complicated the process of comparison and evaluation. In addition, these models suffer some shortcomings, which limited their benefit in achieving the objective they intended for.

Since the main objective of this study is to encourage Jordanian Companies to apply human resources accounting, this study will apply the available models in three selected foreign companies, analyze the result explain the disadvantages of the existed models, and develop certain model, which hopefully fit the intended objectives of Human Resources Accounting, which can be applied in Jordanian companies without serious difficulties to be associates with models particularly the collection of information about the employees for a long time of period.

The application of the existed models in foreign companies rather than Jordanian ones is due to the difficulty faced the researchers in obtaining information and data from local companies, first because of the confidentiality associated with providing information, and second because of the fact that most, if not all, Jordanian companies have no idea about the application of this sort of accounting. As the suggested model needs less information than the other models do, it concentrates on the main factors affect the valuation of human resources rather than on many factors which some of them are not necessary.

It is assumed that the development of a particular model, which can avoid the shortcomings, the other models suffer, will contribute to encourag the application of human resources accounting in Jordanian companies and

provide more relevant information for different purposes in an organization. This is so particularly in a developing country such as Jordan where some of the information necessary to apply complicated models is difficult to be gathered.

تطبيقات في محاسبة الموارد البشرية

نموذج رياضي مقترح

ملخص

شهدت العقود الثلاث الأخيرة من القرن العشرين اهتماما ملحوظا بمحاسبة الموارد البشرية، وقدمت الدراسات والبحوث نماذج عديدة وطرق هادفة لتسهيل قياس وتقييم الموارد البشرية العاملة في مختلف منظمات الأعمال. ورغم أن العديد من العوامل ساهمت في إعاقة وتأخير استخدام هذا الفرع من فروع المحاسبة في غالبية الشركات وفي الكثير من البلدان. إلا أن تعدد هذه النماذج والتعقيد المصاحب لتطبيقاتها واللاموضوعية المرافقة لبعض قياساتها قد أسهمت أيضا وإلى حد غير قليل في هذا الخل.

ونظرا لصعوبة الحصول على المعلومات لتطبيق النماذج المتوفرة ولتطوير النموذج المقترح من الشركات الأردنية فقد سعى البحث لتطبيق هذه النماذج في ثلاث شركات أجنبية مختارة بهدف بيان الصعوبات والعقبات المرافقة لكل من النماذج المتوفرة بهدف تطوير النموذج المقترح ولجعله صالحا للتطبيق ضمن البيئة المحلية ولذلك فقد اهتم البحث الحالي باستعراض غالبية النماذج والطرق التي وضعتها الدراسات والبحوث السابقة لقياس وتقييم الموارد البشرية موضحا السلبيات والإيجابيات المرافقة لتطبيق كل منها ومتطلبات التطبيق وذلك في المرحلة الأولى. أما في المرحلة الثانية فقد سعى البحث لتطبيق هذه النماذج والطرق في الشركات المختارة بهدف تقييم الموارد البشرية العاملة في كل منها ووفقا للتصنيف الإداري والفئات العمرية الموضوعية من قبل الإدارة في كل منها محللا النتائج التي تم التوصل إليها والمضامين التي تحملها للشركة المعنية. وقد تناولت المرحلة الثالثة من البحث عملية تطوير نموذج لقياس وتقييم الموارد البشرية بالشكل الذي يتلافى السلبيات التي عانت منها النماذج السابقة وبالشكل الذي يركز على العناصر الأهم في عملية القياس والتقييم للموارد البشرية بدلا من التركيز على عناصر متعددة يخلو بعضها من التأثير في عملية التقييم، أو يصعب توفير متطلباتها ضمن الشركات والؤسسات الأردنية. كما تم توضيح عناصر القياس الأساسية التي يستند إليها النموذج المقترح وطبيعة المعلومات التي تحتاجها المنشآت المحلية لاستخدامه، والجوانب التي تميزه عن النماذج السابقة ومنافع تطبيقه.

Human Resource Accounting (H.R.A)

Practices

A Suggested Model For Arithmetic Procedures

Introduction:

In any business physical as well as human assets are employed. So far we have been recording only physical assets like land, building, furniture, machinery etc. Human assets have not at all been recorded in the books of accounts.

Nowadays it is being, however, increasingly realized that many problems are encountered not in the world of things but in the world of people. All the activities of a concern are initiated, managed and controlled by the people who make up to concern. Again, except for human assets and efforts, machinery, offices, computers and all other kinds of equipment that a modern firm uses are unproductive.

Human resource accounting is a new concept and hence still in the early stages of development. It was the R.G. Barry Corporation of USA which first recognized human beings as assets and recorded their separate value in its books of accounts. Defining human resource accounting Davidson writes:

It is the process of measuring and reporting the human dynamics of an organization. It is the assessment of the condition of human resources with an organization and the measurement of the change in this condition through time. ⁽¹⁾

Again to quote from the Report of the Committee on Human Resource Accounting, "It is the process of identifying and measuring data. about human resources and communicating this information to interested parties." ⁽²⁾

The above definitions imply the following three objectives of human resources accounting:

- (i) Identifying human resources
- (ii) Measuring the value of human resources

(iii) Communicating information about human resources to the interested parties.

Advocate of HRA. Argue that it is intended to increase the efficiency of human resources management and to facilitate the evaluation of personal policies such as induction procedures, training programs, and so on. Both managers and human resource professionals may be assisted by information which gives them an improved framework for decisions on acquisition, development, allocation, conservation, utilization, evaluation, and rewarding of an organizations human resources. Failure to address this issue may produce sub-optimum management decisions that ignore manpower costs and human resource planning requirement.⁽³⁾

Human Resource Value Theory:

Physical assets are assigned value because they are the source of future economic services. Now just like them, human assets also have an ability to create future economic services. A person is appointed in a concern and gives services during his lifetime, normally up to the retirement age. Therefore, it s necessary to value human resources just as we value other physical assets. Once human resources are accepted as an asset, it becomes necessary to value this asset and record it in the books of accounts⁽⁴⁾. A number of models have been developed to value human assets.

Valuation of Human Assets:

A concern incurs two types of expenditures on human assets (i) capital expenditures, which represent the fixed costs of H.R. and (ii) revenue expenditures, which represent the variable costs of H.R..

Capital expenditure includes hiring costs, development costs and long-term motivation costs. Revenue expenditure includes salaries and wages, perquisites, short-term motivations and efficiency maintenance costs.⁽⁵⁾

On the basis of the above costs, one can arrive at the value of human assets. It can be estimated using the cost of production approach or the capitalized earnings approach.⁽⁶⁾

Cost of Production Approach:

The cost of production approach includes (i) the historical cost method, (ii) the replacement cost method, (iii) the opportunity cost method, (iv) the standard cost method and (v) the current purchasing power method.

(i) Historical Cost Method: This method was developed by William C.Pyle. Under this method revenue cost from which benefit is likely to be derived in the future is capitalized and thereafter amortized over an expected useful life of human assets. However, it is difficult to find out the useful life of human assets and to calculate the rate at which they should be amortized. This approach is familiar to both accountants and managers, creates an awareness of the importance of investment in employees, and provides a basis for evaluating an organization's return on its investment in human resources. However, the real economic value of human resources may be greater or less than their historic cost.⁽⁷⁾

(ii) Replacement Cost Method: This method suggests the use of the replacement cost method to value human assets. Under this method, the cost of recruiting, training, placing and enabling new employees to grow professionally is estimated so that they may reach the level of competence of the existing employees. The value of human assets should, according to this method, be determined on the assumption that a similar organization is to be created from scratch.

This method suggests a replacement or the current value of human asset. It takes into account the current value of the employee inventory. A disadvantage of this method is that it may not be possible to determine the replacement cost of an employee. Also replacement cost cannot reflect the competence and loyalty of employee.⁽⁸⁾

(iii) Bid Price Method; Hekiman and Jones suggest that human resources should be valued on the bidding cost. In this method it is the responsibility of the investment center manager, who bids for scarce Employees, to decide the best bid price. Scarce employees are those employees whose roles are central to a firm. In this method employees not considered scarce are not included while valuing human assets. On the basis of the maximum bid price, the value of human assets is arrived at by capitalizing the total of the bid prices of all the scarce employees. This method, however, does not give a true cost of human assets as it exclude employees who are not scarce.

(iv) Standard Cost Method: Under this method the standard cost of hiring, training and professional growth for each grade of employees is developed and made up-to-date every year. The total cost of all the employees is treated as the value of human assets. For accounting purposes it is shown in the balance sheet on a year-to-year basis.

In the case of new recruitments, the standard cost related to the grade of employees is increased. In case the actual cost is more or less than the standard cost, the difference is transferred to the related account as per the policy of the firm.

(v) Current Purchasing Power Method: In this method the historical cost of investment in human assets is converted into the current purchasing power of money with the help of suitable index numbers. If the index numbers have been doubled, the value of human resources will also be doubled. The value of human resources so calculated is amortized in the rest of the years as per the policy of the management. Nevertheless, as it is difficult to find index numbers to suit the changing requirements of human resources, the value arrived at through this approach may not be representative of the actual value of human resources.

Capitalized Earnings Approach:

Under this approach we will discuss Lev and Schwartz's present value of future earnings model, the net benefits model, Hermanson's adjusted discounted future wages model and unpurchased goodwill model, Brummet, Flamholtz and Pyle's economic value model, Jaggi and Lau's model, and Eric Flamholtz's stochastic rewards valuation model will be discussed.

(1) Lev and Schwartz's Present Value of Future Earnings Model:

Lev and Schwartz suggest that the value of human resources will be equal to the sum of individual employees' future compensation. To quote them, 'The value of human capital embodied in a person of age x is the present value of his remaining earnings from employment.'⁽⁹⁾

The formula for calculating the value of human resources is as given below:

$$V_z = \sum_{t=z}^T \frac{I(t)}{(1+r)^{t-2}}$$

Where

V_z = Expected value of an employee Z years old.

$I(t)$ = Expected annual earnings of the employee in the period (up to his Retirement).

r = Discount rate specific to the employee.

t = Employee's retirement age.

For example, the total number of employees in an organization is 1000 and their average earnings in different age groups are as below:

<i>Age Group</i>	<i>Average Annual Earnings per Employee (In U.S. \$)</i>
24-33	600
34-43	800
44-53	900
54-60	1000

Let us assume a discount rate of 10% let us assume also that all the employees are 24 years old The value of human assets will be calculated in the following manner.

Each person will earn as shown below:

\$ 600 per annum for the first 10 years during his age 24 to 33 years.

\$ 800 per annum for the next 10 years i.e. during his age 34 to 43 years.

\$ 900 per annum for the next 10 years i.e. during his age 44 to 53 years.

\$1000 per annum for the next 6 years i.e. during his age 54 to 60 years.

The present value of this series of 36 years multiplied by 1000 (the number of unskilled employees) is equal to \$ 3326.. 56

Calculation of the present Value;

\$ 600	X	6.145	=	1843.53
\$ 800	X	2.369	=	947.68
\$ 900	X	0.913	=	410.85
\$ 1000	X	0.249	=	<u>124.50</u>

Total Present Value per Employee 3326.56

1. Present value of \$1 received annually for 10 years at the rate of 10% = 6.145 .
2. Present value of \$1 received annually for 20 years minus the present value for 10 years = 8.514 - 6.145 = 2.369 and so on.

The above model is nothing but the sum of the present values of future earnings. Basically one may use the following formula for calculating the present value of \$ 1.

$$\frac{1}{(1+r)^n}$$

r = Rate of interest or rate of discount

n = Number of years

The main limitation of the above model of Lev and Schwartz is the subjectivity associated with the determination of the future earnings of an employee, his length of service and the discount rate.

(2) Net Benefit Model: This model is an improvement on the economic value model. It was suggested by Morse and Ogan. According to this model the value of human resources will be equal to the present value of goods or services produced by the employees in individual as well as collective capacity minus the present value of future payments (wages and salaries) paid to them. Ogan suggests that the value so calculated should be multiplied by the certainty equivalent of an employee. A certainty equivalent shows the probability of an employee or group of employees staying in an organization. In calculating the amount of the present value of goods and services produced by an employee, the value of physical assets consumed by him is deducted.

(3) Hermanson's Adjusted Future Wages Model: Hermanson suggests the use of adjusted compensation value as a proxy of the value of an employee to a firm. In this approach compensation means the present value of the future stream of earnings (wages and salaries) to an employee of the firm. The discount future earnings are adjusted by an efficiency ratio intended to measure the relative effectiveness of the human asset of a given concern. The efficiency ratio is the weighted average of the ratio of return on investment of the capital employed by the firm under study to all other firms of the same nature in the economy for a given period. For calculation the weighted average, the weights are assigned in the reverse order i.e. highest to the current year and so on in the descending order of years. The following formula is used to calculate the efficiency ratio:

$$\text{Efficiency ratio}^* = \frac{5 \text{ RF}_0}{\text{RE}_0} + \frac{4 \text{ RF}_1}{\text{RE}_1} + \frac{3 \text{ RF}_2}{\text{RE}_2} + \frac{2 \text{ RF}_3}{\text{RE}_3} + \frac{\text{RF}_4}{\text{RE}_4}$$

Where:

RF_i = The accounting rate of return on owned assets for the firm under review for the year i

i = Years from 0 to 4

RE_i = The accounting average rate of return on owned assets for the same group of firms for the year i .

Therefore in the above formula RF_0 will explain the accounting income on owned assets for the firm under review for the current year while RF_4 will explain the accounting rate of return on owned assets for the firm under review for the fourth preceding year.

If the calculated ratio is less than one it indicates a reverse situation.

The steps for calculating the value of human resources are as follows:

- (i) The annual earnings (wages and salaries) of the employees for the years from 0 to 4 are estimated.
- (ii) The present value of earnings, which will be equal to the normal rate of return for all the firms taken together, is calculated by applying the discount factor.
- (iii) The efficiency ratio is calculated by using the formula explained above.
- (iv) The present value of earnings is multiplied by the efficiency ratio.

In this model, however, the calculation of efficiency is quite subjective. The weighing scheme used in the ratio has no theoretical justi-

* The above ratio measures the effectiveness of human assets employed in a firm over a period of five years. A ratio more than one will indicate that the average accounting rate of return for the firm under study is above the average accounting rate of return for all the firms taken together.

fication. Again the valuation period of five years is without any justification. It has been assumed in the model that the difference between the accounting rate of return of the firm under review and the normal accounting rate of return is due to the difference in human assets performance.

(4) Hermanson's Unpurchased Goodwill Model: Hermanson suggests that the value of human assets should be calculated by capitalizing earnings in excess of normal earnings for the industry or the group of companies of which the firm is a part. For example, the investment in the firm is \$250000. The normal earnings are 10 per cent. The particular firm under consideration is earning at the rate of 15 per cent. The firm earnings will be \$ 37500 (250000×0.15) while the normal earnings are \$25000 (250000×0.10). The difference between the earnings is of \$12500 ($37500 - 25000$), which is considered as unpurchased goodwill. The capitalized value of this unpurchased goodwill will be \$104167 ($12500 \times 100/12$), assuming that the discount rate used by the company is 12%. It has been assumed by Hermanson that the excess profit earned by the concern is due to the extra ability of human resources.

(5) Brummet, Flamholtz and Pyle's Economic Value Model: Brummet, Flamholtz and Pyle suggest that a group of employees should be valued by estimating their contribution to the economic value of the concern without deducting therefrom the salaries and wages paid to them. In this approach the total of future services or future goods the employees are expected to produce during the tenure of their service is calculated. By multiplying the units of service or goods by the selling price, the amount of value generated is discounted at an appropriate rate and the total present value is calculated. From this total present value the physical resources consumed by the employees are deducted and the remaining amount is treated as the value of human resources.

For example, X has been appointed in a concern and is given physical resources worth \$15000 to produce goods. It is anticipated that X will remain in the concern for about 7 years and will produce at the end of the period 150000 articles, each valuing \$2 . Let us assume a discount rate 10% .

The total amount of goods produced by him at the end of 7 years is 150000. Units X \$ 2= 300000. The present value of \$300000 is discounted at 10% .

The factor being $0.51 = \$1.153000$

Less: Value of physical assets (present value) = \$150000

Value of the employee = \$3000

(6) Jaggi and Lau Model: This model suggests valuation of human resources on a group basis rather than on an individual basis. The term "group of employees" refers to a homogeneous type of employees working in an organization. This homogeneous group of employees may not necessarily be working in the same department; it is the same type of employees from all the departments taken together who form the group.

It is difficult to estimate the future period of stay and chances of promotion on the individual basis. On the group basis it is easier to ascertain the future period of service, chances of promotion and those of living. In this approach it has been assumed that the pattern of movement from one cadre to another remains constant

(7) Eric Flamholtz's Stochastic Rewards Valuation Model: This model is based on the expected future service of an employee. This model takes into account the movement of an employee through different positions or roles in the organization as a stochastic process depending on the prior position or "Service State" held by him in the system. Kohler defines "stochastic" "as applied to a system or process; developed by chance; functioning on the basis of probabilities, usually

with an emphasis on chains of conditional probabilities"⁽¹⁰⁾ Therefore the movement of an employee from one position to another or over a period of time may be viewed as a stochastic process.

The model involves the following steps to arrive at the value of an employee:

- (i) The mutually exclusive set of states of the employee, which he may occupy in the organizational structure, is defined.
- (ii) The value of each state of the employee to the organization is determined.
- (iii) The employee's expected tenure of service in the organization is estimated.
- (iv) The probability of the employee occupying each possible state or role at specified future periods is found.

An employee's expected realizable value may be expressed in the shape of the formula as given below:

$$E(RV) = \sum_{t=1}^n \left[\sum_{i=1}^m \frac{R_i - P(R_i)}{(1 + r)^t} \right]$$

where:

RV = Realizable value

R_i = The value R to be derived by the organization in each possible service state i that an employee is expected to occupy

P(R_i) = Probability of obtaining R_i by the organization

t = Time

m = State of exit

r = Appropriate discount rate

This approach has considerable merits as it provides results based on the perceived probabilities of tenure and the promotability of an employee. It is an improvement on the Lev and Schwartz approach be-

cause it takes into consideration an employee's movement from one position to another and his probability of leaving organization before death or retirement.

On practical ground the approach suffers from a number of drawbacks because of the subjectivity of probability estimates regarding the position to be occupied by an employee. The employee's value in various services states and his expected tenure is also subjective.

Analysis of strength and value of the Employees of the Companies under study

To apply the ideas and models explained in the previous pages in aim of explaining how the strength and value of employees working in an organization may be measured, the researchers have selected three foreign companies, which apply H.R.A for this purpose. The attempts to collect data and information from Jordanian companies have faced many difficulties, one of them is that these companies have no serious attempt to employ this branch of accounting, and therefore, they have no adequate information for this purpose. The evaluation of employees' strength and value in the selected companies is discussed as the following:

The Steel Authority of India Limited (SAIL):

In its human resource account SAIL depicted human resource strength as well as human resource value. It used a tow-way classification to show them .It classified human resource as managers, executives, supervisors, clerical staff skilled workers and semi-skilled/unskilled workers⁽¹¹⁾. All these employees were further classified into the age groups of below 25,25 to 35, 35 to 45, 45 to 50 and over 50.

To calculate the value of employees SAIL used the economic valuation model, the Lev and Schwartz model, the Eric Flamholtz model

and the Jaggi and lau model. It used a discount rate of 15%. A condensed statement of employee value and strength was prepared and per employee value was also calculated for each category and each age group.

In SAIL the value per manager continuously marked an increasing trend. It was \$ 20325 in 1994-95, which ultimately went up to \$ 43300 in 1998-99. It may be noted that as the age group increased the average value per employee decreased in all the categories. The average value per executive was generally more than that of managers except in 1997-1998 and 1998-1999. The value per executive also marked a rising trend. It was \$ 23475 in 1994-1 995 and \$ 43150 in 1998-99. It is noteworthy that the number of managers increased from 3887 in 1994-95 to 7076 in 1998-99 while that of executives decreased from 12881 in 1994-1995 to 12605 in 1998-99. Obviously the company put more emphasis on the higher category of staff.

The average value per supervisor was just half the value per executive. It was \$ 11950 per supervisor in 1994-1995, which increased to \$22175 in 1998-99.

Table (1)
The Steel Authority of India Limited (SAIL)
Value and Strength of Human Resources
(1994-95 to 1998-99)(12)

Category	1994-95			1995-96			1996-97		
	Value \$10000	Strength (No. of employees)	average Value per employee \$10000	Value \$10000	Strength (No. of employees)	average Value per employee \$10000	Value \$10000	Strength (No. of employees)	Average Value per employee \$10000
	1	2	(1 ÷ 2)	1	2	(1 ÷ 2)	1	2	(1 ÷ 2)
Managers									
Below 25	-	-		-	-		-	-	
25 to 35	225	45	5	160.75	30	5.3575	144.5	30	4.815
35 to 45	4273	1307	3.27	5226	1318	3.965	7132.2	1658	4.3
45 to 50	2162.25	1051	2.055	2491.2	1005	2.4775	3135	1192	2.63
Over 50	1239.25	1484	835	1402.7	1410	.9925	1772	1659	1.0675
Total	7899.5	3887	2.0325	9280.7	3763	2.465	12183.7	4539	2.6825
Executives									
Below 25	2353	639	3.68	2205.7	538	3.9525	345707	740	4.6725
25 to 35	11187.2	3346	3.342	13886.2	3407	4.075	14428	3271	4.41
35 to 45	11304.2	4268	2.6475	13594.7	4069	3.34	12828	3746	3.4225
45 to 50	3252.5	2146	1.515	4698	2320	2.025	4761.5	2307	2.0625
Over 50	2163	2482	.87	3318.	2854	1.1625	4050	3291	1.23
Total	30260	12881	2.3475	37702.7	13208	2.8525	395275.2	13355	2.9575
Supervisors									
Below 25	1212.75	451	2.6975	667	249	2.6775	2886.5	954	3.025
25 to 35	9115.25	3925	2.32	10432	4007	2.6025	13823	4911	2.8125
35 to 45	31490	18715	1.685	39319.2	18934	2.075	42767	19625	2.1775
45 to 50	18781.5	17572	1.0725	24204.2	19168	1.2625	24525	18364	1.335
Over 50	6704.5	15724	425	8705	17278	5025	10410.5	19458	535
Total	67302.5	56287	1.195	83327.5	59636	1.395	94412.5	63312	1.49

Table (1) cont.

Category	1997-98			1998-99		
	Value in \$10000	Strength (No. of employees)	Average Value per employee in \$10000	Value in \$10000	Strength (No. of employees)	Average Value per employee in \$10000
	1	2	(1 ÷ 2)	1	2	(1 ÷ 2)
Managers						
Below 25	-	-		-	-	
25 to 35	1269.75	114	11.1375	1706.75	308	5.54
35 to 45	19028	2636	7.2175	17935.75	2696	6.6525
45 to 50	7727.25	1763	4.3825	7211.25	1869	3.8575
Over 50	3243	1924	1.685	3786	2203	1.7175
Total	31268	6437	4.8575	30639.75	7076	4.33
Executives						
Below 25	7222.5	942	7.665	6592.25	1046	6.3
25 to 35	24533.75	2830	8.6675	21042.75	2894	7.27
35 to 45	16432.75	2824	5.8175	13536.25	2516	5.38
45 to 50	7804.75	2167	3.6	6072.5	2098	2.8925
Over 50	7287.5	3550	2.0525	7173.5	4051	1.77
Total	63281.5	12313	5.1375	54417.25	12605	4.315
Supervisors						
Below 25	6467.75	965	6.7025	2141	392	5.4625
25 to 35	23689	4589	5.1625	16209.75	3640	4.4525
35 to 45	74649	19385	3.85	77143.75	21470	3.5925
45 to 50	41871.5	18768	2.23	39067.75	19059	2.05
Over 50	20933.5	25296	.8275	22740	26404	.86
Total	167610.7	69003	2.43	157302.25	70965	2.2175

Table (1) cont.

Category	1994-95			1995-96			1996-97		
	Value In \$10000	Strength (No. of employees)	Average Value per employee In \$10000	Value In \$10000	Strength (No. of employee in	Average Value per employee In \$10000	Value In \$10000	Strength (No. of employees)	Average Value per employee In \$10000
	1	2	(1 ÷ 2)	1	2	(1 ÷ 2)	1	2	(1 ÷ 2)
Clerical Staff									
Below 25	508	246	2.065	405	179	2.2625	307.75	119	2.586
25 to 35	6269	3314	1.8925	6214	2974	2.089	5125.25	2131	2.405
35 to 45	8085.75	5543	1.4575	7715.2	4991	15.458	7496	4260	1.759
45 to 50	1622.25	1645	.985	1594.5	1561	1.021	2004.5	1758	1.140
Over 50	358.75	771	.465	341	719	0.474	914.25	1261	0.725
Total	16843.75	11519	1.4625	16269.7	10424	1.560	15847.75	9529	1.663
Skilled Workers									
Below 25	5674.75	2541	2.2325	4315	1932	2.233	5292	2065	2.562
25 to 35	25029.5	13074	1.915	27391.7	13159	2.081	29005.25	12716	2.281
35 to 45	39913.25	28991	1.3775	43285.5	27644	1.566	42434.75	25792	1.645
45 to 50	13131	15427	.85	14894.5	16494	.903	14852.25	15347	0.967
Over 50	4741	11961	.3975	381.5	10377	.0367	7898	11533	.684
Total	88489.7	71994	1.23	94268.2	69606	3.184	99482.25	67453	1.475
Semi-Skilled Workers									
Below 25	5523.25	2765	1.9975	5897.25	2789	2.114	7305.5	3258	.446
25 to 35	29392	17742	1.6575	31586.7	16697	1.891	2676.7	13072	.204
35 to 45	19695	16754	1.175	17929.5	14320	1.252	18313	13432	1.363
45 to 50	4275.5	5905	.725	3311	4329	.765	3438.5	4247	.809
Over 50	1009	3558	.2825	740	2524	.293	857.75	2675	.321
Total	59894.75	46724	1.2825	59464.5	40659	1.462	56681.75	36684	1.545
Grand Total	270691.7	203292	1.3325	300313.5	197296	1.522	318133.2	194872	1.632

Table (1) cont.

Category	1997-98			1998-99		
	Value In	Strength (No. of employees)	Average Value per employee In	Value In	Strength (No. of employees)	Average Value per employee in \$10000)
	\$10000		\$10000	\$10000		
	1	2	(1 + 2)	1	2	(1 + 2)
Clerical Staff						
Below 25	871	170	5.123	450.5	166	2.714
25 to 35	6968.5	1472	4.734	5032.75	1336	3.760
35 to 45	6877	2052	3.351	5968	1866	3.189
45 to 50	1821.5	885	2.058	1780	906	1.965
Over 50	770.5	578	1.333	631	599	1.053
Total	17308.5	5156	3.357	13853.2	4873	2.843
Skilled Workers						
Below 25	10585.25	1802	.928	6214.5	2034	3.055
25 to 35	52111.75	11411	4.567	45884.25	12094	3.794
35 to 45	74710.5	25004	2.988	67722.25	24605	2.752
45 to 50	23696	14421	1.643	19836.75	12780	.806
Over 50	11656.5	12570	.927	11021.5	12894	.855
Total	17260	65208	2.649	150679.25	64407	2.339
Semi-Skilled Workers						
Below 25	16551.25	3965	4.147	16327.5	4654	3.508
25 to 35	35972.25	9393	3.830	28998.5	8980	3.229
35 to 45	28261.5	11768	2.401	20891	8855	2.359
45 to 50	5157.75	3702	1.393	3609.25	2583	1.397
Over 50	1221	2250	.543	1160.25	2107	.551
Total	87163.75	31078	2.805	70986.5	27179	2.612
Grand Total	539392.5	189195	2.851	477878.25	187105	2.554

(12) - Source: Annual Reports of SAIL from 1994-95 to 1998-99

In the same way we can note that the value per member of the clerical staff was always more than the value per supervisor. However, the number of supervisors was about 5 times the number of clerical staff. The value per member of the clerical staff was \$ 14625 in 1994-95 which increased to \$ 28425 in 1998-99. This represents an annual average percentage of growth of %18.8 $((28425 - 14625) / 14625)$ during the period of study.

The average value per skilled worker was \$12300 in 1994-95 which increased to \$ 23400 in 1998-99, which gives an annual aver-

age percentage growth of %18. It needs to be mentioned that the average value per skilled worker was always more than the average value per semi-skilled worker. The average value per semi-skilled worker was \$ 12825 in 1994-95, which increased to \$26125 in 1998-99. This represents an increase of \$13300 during the period of study and an average percentage value of %20.7 annually.

A simple comparison between the annual average percentages of growth in value of the three types of labor power refers to fact that the clerical staff comes in the first, though the number of the clerical workers represents a simple fraction of the number of other types of workers.

Baharat Heavy Electrical Limited (BHEL):

The second selected company is the Baharat Heavy Electrical Limited (BETEL). This company calssified employees into six categories as;

(i) executives, (ii) supervisors, (iii) artisans, (iv) supporting technical staff (v) clerical and office supporting staff and (vi) unskilled and semiskilled staff. The company depicted (i) the employee strength i.e. the number of employees in each category. For valuing the human asset it used the Lev and Schwartz model with certain modifications. Along with the above two major statements, the company also showed:

(i) employee performance, (ii) employee compensation, (iii) employee training and development and (iv) evaluation of the total wealth employed and relative performance. For the purpose of analysis, the employee strength and the employee value have been combined in one statement and per employee value has been calculated.

It is apparent from Table 2 that the value of an executive was highest among all the categories of employees and it continuously marked

an increasing trend. It was \$ 8850 in 1994-95, which ultimately rose to \$ 20610 in 1998-99, with an annual percentage average growth in the value of %26.5. This shows the increasing importance of executives in the organization. The percentage of executives in the total number of employees also increased from %14.9 in 1994-95 to %16.8 in 1998-99.

The value of a supervisor was \$6225 in 1994-95 which continuously increased and reached \$14711 in 1998-99, with an annual average growth in the value of supervisors equal to %27.2. This average growth in the value indicates that the supervisors taking a decline trend for the company importance. Therefore , it is easy to note that the percentage of supervisors in the total number of staff employed decreased from %16.7 per cent in 1994-95 to %15.6 per cent in 1998-99. The number of supervisors was 12543 in 1994-95, which decreased to 11219 in 1998-99. This was due to the fact that some supervisors were promoted executives as BHEL attached more importance to executives.

The per employee value of artisans, supporting technical staff, clerical and office supporting staff was about the same and marked an increasing trend. This shows that the salary grade of all the three categories is about the same.

The per employee value of unskilled and semi-skilled staff was \$ 3600 in 1994-95 which increased to \$ 8133 in 1998-99, which gives an annual average percent of growth of %25.

Table (2)
Bharat Heavy Electicals Limited
Value and Strength of Human Resources
(1994-95 to 1998-99)(13)

Category	1994-1995			1995-1996			1996-1997		
	Value In \$10000	Strength (No. of employee)	Average Value per employee In \$10000	Value In \$10000	Strength (No. of employee)	Average Value per employee In \$1000	Value In \$10000	Strength (No. of employee)	Average Value per employee In \$10000
	1	2	(1+2)	1	2	(1+2)	1	2	(1+2)
Executives	9900	11185	.885	11860	11529	1.02	13417	11870	1.13
%	(24.9)	(14.9)		(26.0)	(15.4)		(24.6)	(15.8)	
Index No.			(100)			(116)			(128)
Supervisors	7802	12543	.6225	9602	12486	.77	11332	12305	.92
%	(19.7)	(16.7)		(21.0)	(16.7)		(20.8)	(16.4)	
Index No.			(100)			(124)			(148)
Artisans	12922	28426	.455	14624	28723	.51	17995	29670	.624
%	(32.5)	(37.9)		(32.0)	(38.4)		(33.0)	(39.5)	
Index No.			(100)			(112)			(134)
Supporting Technical Staff	1745	3839	.4725	1855	3743	.495	2307	3804	.624
%	(4.4)	(5.1)		(4.06)	(5.0)		(4.2)	(5.1)	
Index No.			(100)			(105)			(129)
Clerical & Office Supporting staff	2590	5699	.455	2765	5580	.495	3385	5581	.660
%	(6.5)	(7.6)		(6.1)	(7.5)		(6.2)	(7.4)	
Index No.			(100)			(109)			(134)
Unskilled & Semi-skilled Staff	4747	13226	.36	4955	12752	.387	6147	11886	.5206
%	(12.0)	(17.7)		(10.9)	(17.1)		(11.3)	(15.9)	
Index No.			(100)			(108)			(144)
Total	39707	74918	.53	45662	74813	.61	54585	75116	.729
%	(100.0)	(100.0)		(100.0)	(100.0)		(100.0)	(100.0)	
Index No.			(100)			(115)			(137)

Table (2) cont.

Category	1997-1998			1998-1999		
	Value in \$10000 1	Strength (no. of employees) 2	Average Value Per employee In \$10000 (1+2)	Value in \$10000 1	Strength (no. of employees) 2	Average Per employee In \$10000 (1+2)
Executives	23932.5	11970	2.00	24897.5	12081	2.061
%	(29.6)	(16.5)		(29.5)	(16.8)	
Index NO.			(226)			(233)
Supervisors	16000	11197	1.429	16505	11219	1.471
%	(19.8)	(15.4)		(19.6)	(15.6)	
Index No.			(230)			(236)
Artisans	25077.5	29712	.844	26600	29354	.906
%	(31.0)	(40.9)		(31.5)	(40.9)	
Index No.			(186)			(199)
Supporting Technical Staff	3105	3679	.844	3252.5	3589	.906
%	(3.8)	(5.1)		(3.9)	(5.0)	
Index No.			(179)			(192)
Clerical & Office Supporting Staff	4672.5	5537	.844	4895	5397	.907
%	(5.8)	(7.6)		(5.8)	(7.5)	
Index No.			(186)			(199)
Unskilled & Semi-skilled Staff	8012.5	10525	.761	8220	10106	.813
%	(9.9)	(14.5)		(9.7)	(14.1)	
Index No.			(212)			(226)
Total	80825	72620	1.113	48367.5	71746	1.176
%	(100.0)	(100.0)		(100.0)	(100.0)	
Index No.			(210)			(222)

• Figures in parenthesis show percentages from the respective totals.

(13) Source : *Annual Reports of BHEL from 1994-95 to 1998-99.*

It may be noted that in 1998-99 the employee in the case of executives was 2.33 times it what is 1994-95 while in the case of supervisors it was 2.36 times, in the case of artisans 1.99 times, in the case of supporting technical staff 1.92 times, in the case of clerical office supporting staff 1.99 times and in the case of unskilled and semi-skilled staff 2.26 times. It is clear from the data that supervisors enjoyed the maximum benefit of increase in salaries and other perquisites and that BHEL put increasing reliance on executive, supervisors and artisans while the number of staff employed below the level of artisans re-

duced considerably. This ultimately increased the working efficiency of BHEL.

The Minerals and Metals Trading Corporation Limited:

The third company selected for the purpose of explaining the process of measuring and evaluation of employees strength and value is the Minerals and Metal Trading Corporation Limited (MMTCL) . For valuing the employees, the company used the Lev and Schwartz model, applying a discount factor of 12 per cent Based on its human resource statement, the value per employee in each category of employees was also calculated. It may be noted from Table (3) that the strength of managers registered a fluctuating trend throughout the period of the study i.e., from 1994-95 to 1998-99. It was 930 in 1994-95, which slightly increased to 968 in 1995-96, while it decreased to 939 in 1996-97. However, it rose to 1243 in 1997-98 and decreased to 1010 in 1998-1999. The value per manager was \$10618 in 1994-95 , which increased to \$ 23075 in 1998-99. Among the staff, the number of non-supervisory staff was greater than that of supervisory staff, so much so that during the later years of the study the Non-supervisory staff was more than double the supervisory staff. The value per employee of the supervisory staff was \$9714 in 1994-95, which increased to \$20870 in 1998-99. However, the value per employee of the Non-supervisory staff marked a fluctuating trend. It was \$ 8087 in 1994-95. Nonetheless, it sharply rose to \$16833 in 1997-98 and \$16947 in 1998-99.

Table (3)
The Minerals and Metals Trading Corporation Limited
Value and Strength of Human Resources
(1994-95 to 1998-99)(14)

Category	1994-1995			1995-1996			1996-1997		
	Value in \$1000	Strength (No. of employees)	Average Value per employee in \$10000 (1÷2)	Value in \$1000	Strength (No. of employees)	Average Value per employee in \$10000 (1÷2)	Value in \$1000	Strength (No. of employ)	Average Value per employee in \$10000 (1÷2)
1. Managers	987.1	930	1.062	1073.1	968	1.109	1264.1	939	1.347
%	28.1	24.28		27.1	25.06		29.0	24.5	
Index No.			(100.00)			(104.4)			(126.8)
2. Staff									
Supervisory	1054	1085	971	1321	1256	1.052	1663.1	1321	1.253
%	30.0	28.34		33.4	32.53		38.2	34.7	
Index No.			(100.00)			(108.5)			(129.1)
Non-Supervisory	1467.1	1815	808	1558	1638	952	1425	1560	914
%	41.8	47.38		39.4	42.41		32.7	40.7	
Index No.			(100.00)			(117.9)			(113.3)
Total Staff	2521.1	2900	869	2880.1	2894	995	3089.1	2884	1.070
%	71.8	75.72		72.8	74.94		70.9	75.4	
Index No.			(100.00)			(114.3)			(122.9)
Grand Total	3509.1	3830	916	3953.1	3862	1.024	4354	3821	1.138
%	100.0	100.00		100.0	100.00		100.0	100.0	
Index No.			(100.00)			(111.7)			(123.9)

Table (3) cont.

Category	1997-1998			1998-1999		
	Value in \$10000	Strength (No. of employees)	Average Value per employee in \$10000 (1÷2)	Value in \$10000	Strength (No. of employees)	Average Value per employee in \$10000 (1÷2)
1. Managers	2784.75	1243	2.240	2329.75	1010	2.307
%	40.00	34.07		36.70	31.12	
Index No.			(211.32)			(217.69)
2. Staff						
Supervisory	1203.25	638	1.886	1218.75	584	2.087
%	17.28	17.49		19.20	17.19	
Index No.			(194.33)			(215.21)
Non-supervisory	2974.5	1767	1.683	2799.75	1652	1.6947
%	42.72	48.44		44.10	50.89	
Index No.			(208.36)			(209.91)
Total staff	4177.75	2405	1.737	4018.5	2236	1.797
%	60.00	65.93		63.30	68.88	
Index No.			(199.71)			(206.61)
Grand Total	6962.5	3648	1.908	6348.25	3246	1.956
%	100.00	100.00		100.00	100.00	
Index No.			(207.90)			(213.08)

• Figures in parenthesis show percentages from the respective totals.
(14):Source : Annual Reports of MMTC from 1994-95 to 1998-99

The number of non-supervisory staff was 1815 in 1994-95 which decreased to 1638 in 1995-96 and 1560 in 1996-97, though it sharply increased to 1767 in 1997-98 and decreased to 1652 in 1998-99. The value of the total staff continuously marked an upward trend from 1994-95 to 1997-98. It was \$25217500 in 1994-95, which increased to \$28802500 in 1995-96 and to \$ 30892500 in 1996-97.

Nevertheless, it again increased to \$ 41777500 in 1997-98 and came down to \$ 40185000 in 1998-99 employee. It may be noted here that the average value per employee was \$ 9162 in 1994-95 which ultimately increased to \$19557 in 1998-99. It shows the company's commendable efforts directed at the training, development and welfare of its employees.

A Model Suggested for Arithmetic Procedures of Human Resource Valuation

An organization employs various physical as well as human assets. Physical assets possess variable characteristics and their efficiency fully depends on two factors: (i) the variable characteristics they possess and (ii) their operating /handling by human beings. Variable characteristics refer to such factors as the speed of operation, the working life of an employee, the estimated number of hours the machine can be used etc.

Human assets possess two types of characteristics: (i) variable characteristics and (ii) attributes. Variable characteristics are such as efficiency with which a person can make use of his qualification, his ability to perform a job, specialization, fatigue etc. Attributes on the other hand, comprise loyalty, wisdom, decision making power, honesty etc. In two different organization the number of employee may be the same, their qualifications may be the same, the operating level of both

of them may be the same, their land, capital and other resources may be the same, but in spite of all this their profit figures may differ. The differences in Profit is mainly caused by the positive or negative attributes of the employees. Therefore it may be argued that the excess profit earned by an organization or its normal profit is due to its employees efficiency. Employee efficiency may be calculated with the help of the following ratio:

$$\text{Efficiency ratio} = \frac{N}{n_1 X \frac{RS1}{RU1} + \dots + X_n \frac{RSn}{RUn} + \dots + X_{n2} \frac{RS2}{RU2} + \dots + X_{n3} \frac{RS3}{RU3}}$$

Where:

n = Number of employees for each year

N = Total number of employees i.e. $n_1 + n_2 + n_3$

$RS1$ = Accounting rate of return on the total resources employed for the firm (or sample unit) for the previous year.

$RU1$ = Average accounting rate of return on the total resources employed for all the firms (universe) in the economy for the previous year.

RSO = Accounting rate of return on the total resources employed for the firm (or sample unit) for the current year.

RUO = Average accounting rate of return on the total resources employed for all the firms (universe) in the economy for the current year.

$RS2$ = Accounting rate of return on the total resources employed for the firm (or sample unit) for the coming year.

$RU2$ = Average accounting rate of the return on the total resources employed for all the firm(universe)in the economy for the

coming year.

In the above model the efficiency ratio is based on the employed performance in three years i.e. the current year (present), the previous year (past), and the coming year (future). The coming years data are taken from the budgets prepared by a firm. The efficiency ratio is based on the geometric mean as it is considered best for calculating the representative value of proportion. In the above efficiency ratio return on the total, assets employed is a proportion of the profit and the total resources employed.

The efficiency ratio uses the total resources employed rather than the human resources employed as all the resources employed are used in the firm and play a role in determining the efficiency. The efficiency ratio will be based on all the employees taken together as the profit figure is the end result of the efficiency of all the employees taken together. For the purpose of valuing the human resources of a firm the estimated salary of a homogeneous group of employees for their respective estimated periods of stay in the organization should be calculated keeping in view their chances of promotion or changes in their roles.

The present value of the estimated salary may be calculated as suggested by Lev & Schwartz. To arrive at the value of human resources the present value of the estimated salary should be multiplied by the efficiency factor.

Thus it can be said that the suggested model is developed on the basis of the discussed models taking into consideration the shortcomings and the subjectivity surrounding the factors and variables used in these models.

The data and information needed for the model is also easy to be gathered since the periods involved are not far away from reach and need no solid ability for estimation or forecasting. This will facilitate

the applicability of the model

The suggested model has also taken into account all the resources used by the company rather than the human resources available to the company which give the model the ability to measure the comprehensive efficiency of the resources used by the company.

Conclusions and Suggestions:

This research discusses the available models and methods intended to measure and value of human resource, and to develop certain model, which hopefully overcome the shortcomings, which the existed models suffer. According to research results, The following conclusions may be indicated:

- 1 - Though they may give an organization many choices in practice, the existence of many models and methods to measure and value human resource in an organization may lead to complexity of comparison and evaluation processes. This may also produce different results if the organization uses other models than it employs now. This case was obvious from the results obtained from the empirical study in the companies under study.
- 2 - It is noted that all the models available and which are discussed in this study have, mostly, all directed the attention to measure current value of human resource, though they use different method to do that Except for Harmansons model, all the available models have not given any attention to employee's efficiency and its effect on value of "HR".
- 3 - The suggested model by this study concentrated on the measurement of the efficiency ratio which refer to the relative effectiveness of human resource in an organization comparing with all the organizations in the economy. This ratio is multiplied by the present value of the stream of the employees compensations ex-

pected to be given to them until the date of retirement or leaving the organization. However, the method to calculate this present value is not the concern of this study. This value can be calculated using any other method from those discussed in this study. This research, however, suggests using Lev & Schwarts model for this purpose.

- 4 - Though, the suggested model has not been applied in the companies under study, the model, however is built on the basis of the applications made in the companies under study, and its use will not differ from those applications. In addition, the model does not require information for more than three years, which can easily be obtained from the books of the organization and its budgets. Also it does not require distinguished Information about the type of companies working in the economy, as it is the case with the other models discussed. This may facilitate the application of the suggested model and increase objectivity of the results obtained.
- 5 - It is noted that all the companies under study have classified their human resource to groups according to their positions and capabilities to estimate the value, strength, and the periods of stay in the organization. This may require a lot of time, effort, and costs in preparing statements of H.R. The suggested model, however, takes all the employees as together, as the profit figure and the organizations efficiency are a result of all its employees' effort .This will, certainly, lead to reduced efforts and costs.
- 6 - Obviously, all the models discussed have taken the accounting rate of return on owned assets as a basis for measuring and evaluating of the value and strength of H.R. However, the suggested model depends on the accounting rate of return on all the resources used by the organization, as the efficiency depends on all the resources employed by an organization not only on human resources. This

may lead to more objectivity in practice and improve the measurement process.

- 7 - In the only model which use the efficiency ratio, i.e., Hermansons model, the ratio was based on the weighted ratio of return on investment of the organization under review in comparison to that of other companies in the same sector or the same nature. This requires distinguished information. The suggested model, however, use, for comparison purposes, the weighted rate of return on investment of all the companies (universe) working in the economy. This may facilitate using the figures without the need to separate those related to corresponding (of the same nature) from other companies.
- 8 - The suggested model uses the geometric average to calculate efficiency ratio. This would lead to more representative ratios from those obtained using simple average.

According to these conclusions, the following suggestions may be mentioned to be taken into consideration by the organizations under review and Jordanian companies which are concerned or willing to apply this sort of accounting:

- 1 - Using the suggested model by the companies in their practice regarding human resources accounting. This will facilitate collecting data and information necessary for applying the model, and giving more objective results. This is so particularly for the model suggested which does not require complicated processes of classification and ranking of human assets in the organization.
- 2 - keeping books, which can supply information about the accounting, weighted rate of return on investment for previous and current years, as well as the next one through planning budgets.

- 3 - Preparing budgets for subsequent year in such a way, which can facilitate obtaining information about the accounting rate of return.
- 4 - Using the suggested model for measuring efficiency rate together with any suitable model for calculating present value of the amounts to be received by employees for the next periods until leaving the organization. This research suggests that an organization may use Lev & Schwarts Model for this purpose because of its simplicity in practice.

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