

**FIRM FINANCIAL PERFORMANCE AND HUMAN ASSET VALUE**  
**A CASE STUDY ANALYSIS OF HUMAN RESOURCE ACCOUNTING PRACTICES IN OIL AND NATURAL**  
**GAS CORPORATION LIMITED (ONGC)**

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**SUBJECT: ACCOUNTING**

**ABSTRACT**

There is renewed interest in the human resource accounting for the growing power of knowledge- based industries. Owing to the substantial effect being made in the field of valuation of intangibles and human assets, more and more companies are initiating to report the results of human assets in the published accounts.

This paper intends to check objectivity of the valuation model and the HRA practice followed by public sector organizations. It is found almost all the organizations follow the salary-based economic valuation model proposed by Lev and Schwartz or the same model with some adjustments suggested by Flamholtz, Jaggi and Lau and or as per their requirements, even after following the same criteria of valuation and valuation model, different organizations are following different disclosure practices. Therefore, to check the objectivity of the valuation practice followed by the Indian organizations this study undertakes the case study analysis. For the case study analysis, a systematic approach has been adopted for the selection of the company.ONGC, is India 's premier and one of the world's few leading companies engaged in surveys, research, drilling, exploration, production of crude oil and gas,etc.

HRV is significantly and positively related with turnover per employee, net income per employee, total assets per employee . surprisingly it is negatively related with Total No. of employee and Return on HRV per employee.

**KEYWORDS:** Human asset value, Turnover, Net income, Employee, Total assets.

## INTRODUCTION

There is an increasing recognition of the fact that the core economic resources of the contemporary era are human resources rather than physical resources such as plants, equipments and inventories, etc. The main key to every organization's success in the market is its stocks of human capital (Flamholtz et al., 2002).

Accountants have recognized the value of human assets for at least 70 years. Research into true HRA began in the 1960s by Rensis Likert (Likert and Bowers, 1973). Likert defends long-term planning by strong pressure on human resources' qualitative variables, resulting in greater benefits in the long run.

Human Resource has long been recognized as a vital asset and value creator to companies. Swart (2006) refers to "core competence, knowledge creation and innovation ... creating value over and above physical and financial resources". The basic objective underlying Human Resource Accounting is to facilitate the effective and efficient management of human resources (Porwal, 2001).

In mission statements, annual reports and annual general meetings, organisations declare that "our greatest assets are our people" (Okpala & Chidi, 2010).

## **OIL AND NATURAL GAS CORPORATION LIMITED (ONGC):**

The government of India established Oil and Natural Gas Commission (ONGC) in October 1959. It became a statutory corporation on 23<sup>rd</sup> June 1993. ONGC follows the Lev and Schwartz model by accepting the modifications suggested by Flamholtz and Jaggi and Lau. ONGC divides total employees into four categories as under:

1. Managerial and Supervisory
2. Clerical
3. Skilled workers, and
4. Unskilled workers.

ONGC considers the rate of interest, at which the Government of India advances them loans, as the discount rate. ONGC reports the present value of future expected return of the employees by discounting it at 8 per cent constantly. ONGC reports HRV category wise as well as in total.

## **OBJECTIVES**

1. To analyze the relationship between the No. of Employees and sales revenue, net income and Human assets value.
2. To measure the relationship between human assets value to fixed assets, current assets, total assets.
3. To find out the relationship between Discount rate and Human assets value.
4. To explore the relationship between return on HRV and human assets value.

## **HYPOTHESES**

1. There is a significant relationship between Human assets value and total No. of employee.
2. There is a significant relationship between quantitative data net income and Human assets value.
3. There is a significant relationship between quantitative data of sales revenue and Human asset value.
4. There is a significant relationship between human assets value to fixed assets, current assets, and total assets.
5. There is a significant relationship between discount rate and human assets value.
6. There is a significant relationship between Return on HRV and human assets value.

## METHODOLOGY

**Time period :** The study covers a time period of the last 7 years commencing from the year 2005-06 to 2011-2012. This period is selected because during this period due to the liberalization policy of the government, oil sector has experienced a number of changes.

**Variables:** the study is carried out by analyzing the behavior of all the important variables from the HRA point of view . These variables are:

1. Total number of employees
2. Human resource value per employee
3. Net profit per employee
4. Revenue per employee
5. Total assets per employee
6. Discount rate
7. Return on HRV

ONGC does not report three important variables i.e. ,net profit per employee, revenue per employee and total assets per employee in the annual reports. For the analysis purpose the researcher calculated these variables by applying the appropriate method.

## TECHNIQUES OF ANALYSIS:

Four basic statistical techniques has been carried out for the entire case study analysis:

1. Behavioural Analysis
2. Bivariate Analysis
  - Simple Correlation
  - Regression Analysis
3. Multiple Data Analysis
  - Partial correlation analysis

- Multiple regression analysis

## DATA SOURCE:

The data used in the study has been collected from the annual reports of ONGC from the year 2005-06 to 2011-12.

## ➤ BEHAVIOURAL ANALYSIS:

The present analysis uses the index number analysis.

## Total number of employees:

ONGC reports the human resource value under the heading Human Resource Value. Here for the analysis of Number of employees and for the calculation of efficiency and profitability ratios, all the employees including apprentices are considered.

In the last 7 years, number of employees decreased by 0.95 times. At the year-end 2005-06 ,total employees were 34722 , which decreased 912 in the next year [ years-end 2006-07] to reach the strength of 33810. Again in the year 2007-08, total number of employee decreased by 814. In the following year [2008-09], it increased by 39 to reached 33035. In the year 2009-10 again it decreased by 209 to reach to 32826. At the year –end 2010-11, it increased by remarkable second highest number in last seven years that is by 447 to reach 33273. The same thing is clear from the table 1. During all these years, total number of employees decreased from 34722 to 32909, little more than 0.94 times table. The decrease in number of employees is not a constant or regular phenomenon. In the year 2008-09 and 2010-11 total number of employees increased in relation to the immediately preceding year. This is clear from the table 4 given below

Table 1

## Indices for Number of Employees

For the year ended on 31<sup>st</sup> March

Particulars	2006	2007	2008	2009	2010	2011	2012
Total number of employees	34722	33810	32996	33035	32826	33273	32909
Total employees- INDEX	100	97.37	95.02	95.14	94.53	95.82	94.77

Source: annual reports of ONGC from the year 2005-06 to 2011-12

**Discount rate:**

ONGC reports the present value of future expected return of the employees by discounting it at 8 per cent constantly. This helps in keeping the HRV near to reality based on the input of the model. This also make it clear that any change in the HRV is due to change in present actual future expected earnings of the employees responding the change in material factors like number of employees, employee cost etc. Therefore ,here at the ONGC, HRV is not distressed due to

change in discount rate which has nothing to do with the productivity or efficiency of either employee or organization as a whole . Thus any change in the HRV at ONGC is a result of change in facts and figures in reality and not due to change in discount rate only.

**Human Resource Value per Employee (HRV):**

Reason for selecting ONGC is that oil sector in India as well as the world wide is experiencing a number of changes and ups and downs in last 7 years.

Table 2

## Indices for Human Resource Value

For the year ended on 31 st March

Particulars	2006	2007	2008	2009	2010	2011	2012
HRV(Rs. In Crores)	27430.3	28512	29052.9	38516.9	43135.4	48955.5	50097.4
HRV- INDEX	100	103.94	105.91	140.41	157.25	178.47	182.63

Source: Annual reports of ONGC from the year 2006 to 2012

The total human resource value at ONGC was Rs 27430.3 crores at the year –end 2005-06, which increased remarkably during last seven years to reach to Rs.50097.4 crores at the

year-end 2011-12. This increase is 1.82 times over the base year i.e. 2005-06. The overblown value of HRV is experienced due to the following reason:

- At the year-end 2005-06 , total number of employees was 34722 whereas at the year-end 2011-2012 this number decreased to 32909. Decrease in number of employees by 0.94 times would persuade the HRV due to indirect relationship between number of employees and HRV in this organization.

Therefore , to analyse whether the increase in HRV is just due to increase or decrease in the sum or actual, HRV per employee is calculated as total HRV divided by the number of employees. The HRV per employee at the ONGC for the last seven years presented herewith in the following table 3.

Table 3

Indices for HRV Per Employee

For the year ended on 31 st March

Particulars	2006	2007	2008	2009	2010	2011	2012
HRV per employee (Rs. In crore)	0.79	0.84	0.88	1.17	1.31	1.47	1.52
HRV per employee- INDEX	100	106.32	111.39	148.10	165.82	186.07	192.40

Source: Annual reports of ONGC from the year 2005-06 to 2011-12.

Here the significant point is that the HRV per employee increased by 1.92 times in last seven years. This means that the HRV per employee increased at a higher rate than total HRV. This might be the result of the decreasing Number of employees by 0.94 times. This decrease in number has come from lower salary group at higher rate then decrease in number of employees from the highest salary group.

**Sales Revenue per employee and Net income per employee:**

H1:There is significant relationship between No. of employees and sales revenue and net income.

Sales revenue per employee has not reported in the annual report but for the analysis purpose the researcher calculated the Revenue per employee by appropriate method.

ONGC experienced tremendous increase in the total sales revenue in the last seven years

from 2005-06 to 2011-12. Total sales revenue for the year 2005-06 was of Rs. 49439.7 crores and it attained the level of Rs.76515.09 crores in the year 2011-12, thus the total sales revenue increased by 1.54 times. The increase in sales revenue is not a constant or regular phenomenon. In the year 2009-10 total sales revenue decreased in relation to the immediately preceding year. This is clear from the table 4 given below.

Calculating a company's sales revenue helps determine whether a profit was made or if losses were incurred. The revenue figure is important because a business must bring in money to turn a profit. If a company has less revenue, all else being equal, it's going to make less money.

Therefore to have an idea about the performance of employees i.e. human resources, study of revenue per employee at the ONGC is undertaken. To check the impact of increase in the value of human resources on the efficiency and productivity , that is on the

revenue, the analysis of revenue per employee is undertaken. Therefore, sales revenue per employee is calculated as total sales revenue

divided by the number of employees. This calculation is presented in the following table 5.

Table 4

Total sales revenue

For the year ended on 31 st March

Particulars	2006	2007	2008	2009	2010	2011	2012
<b>Total revenue (Rs. In Crores)</b>	49439.7	59057.5	61542.6	65049.4	61983.2	69532.2	76515.09
<b>Total revenue-INDEX</b>	100	119.45	124.48	131.57	125.37	140.67	154.76

Source: Annual reports of ONGC from the year 2005-06-2011-12.

Table5

Sales revenue per employee

For the year ended on 31 st March

Particulars	2006	2007	2008	2009	2010	2011	2012
<b>Sales revenue per employee</b>	1.42	1.74	1.86	1.96	1.88	2.08	2.32
<b>Sales revenue per employee-INDEX</b>	100	122.53	130.98	138.02	132.39	146.47	163.38

Source: Annual reports of ONGC from the year 2005-06 to 2011-12

The sales revenue of ONGC increased from Rs. 49439.7 crores in 2005-06 to Rs. 76515.09 crores for the year 2011-12. This increase in total revenue indicates that sales revenue increased by approximately 1.54 times over the period of seven years. On the other hand, revenue per employee increase by 1.63 times during the same period. Increase in revenue per employee at higher rate than the total revenue

, indicates that sales revenue respond at the same rate of increase in number of employees. The HRV increased at the higher rate than increase in the number of employees. This is a clear-cut indication of an increase in value of human resources with increasing the level of sales efficiency and performing at the level they were performing earlier.

Table 6

Employees strength and revenue growth since 2006 to 2012

Rs. In crores

Fiscal	Emp.	Growth in Per	Sales revenue	Growth in Per	Net income	Growth%
<b>2006</b>	<b>34722</b>		49439.7		14431	
<b>2007</b>	<b>33810</b>	-2.62	59057.5	19.45	15643	8.39
<b>2008</b>	<b>32996</b>	-2.40	61542.6	4.20	16702	6.76
<b>2009</b>	<b>33035</b>	0.11	65049.4	5.69	16126	-3.44
<b>2010</b>	<b>32826</b>	-0.63	61983.2	-4.71	16768	3.98
<b>2011</b>	<b>33273</b>	1.36	69532.2	0.12	18924	12.85
<b>2012</b>	<b>32909</b>	-1.09	76515.09	10.04	25123	32.75

Table6- it indicates the last 7 years scenario of company employees. Their number, cost, value, sales revenue and net income are presented by the table. This table helps to

understand correlation between human resources and its impact on profitability and growth of the company.

**TOTAL ASSETS PER EMPLOYEE**

TABLE 7

Indices for total Assets

For the year ended on 31<sup>st</sup> March

Particulars	2006	2007	2008	2009	2010	2011	2012
Total Assets	73037.41	83555.73	90470.90	102573.35	112606.46	115068.70	117456.76
Total ASSETS- INDEX	100	114.40	123.86	140.43	152.17	157.54	160.81

Source: annual reports of ONGC from the year 2005-06 to 2011-12

TABLE 8

Indices for total Assets Per Employee

For the year ended on 31<sup>st</sup> March

Particulars	2006	2007	2008	2009	2010	2011	2012
Total Assets Per Employee	2.10	2.47	2.74	3.10	3.43	3.45	3.56
Total ASSETS Per Employee- INDEX	100	117.61	130.47	147.61	163.33	164.28	169.52

Source: annual reports of ONGC from the year 2005-06 to 2011-12

In the last 7 years, total assets increased by 1.60 times. At the year-end 2005-06 ,total total assets were 73037.41 , which increased 10518.32 in the next year [ years-end 2006-07] to reach of 83555.73. The same thing is clear from the table 8. During all these years, total assets increased from 73037.41 to 117456.76,

little more than 1.60 times table. On the other hand, total assets per employee increase by 1.69 times during the same period. Increase in total assets per employee at higher rate than the total rassets ,indicates that total assets respond at the same rate of increase in number of employees.

TABLE 9

HUMAN ASSET VALUE ANALYSIS-ONGC

Rs.In crores

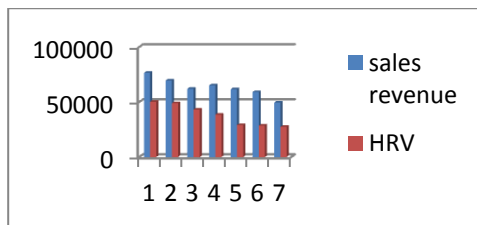
Particulars	2006	2007	2008	2009	2010	2011	2012
<b>Human asset value</b>	27430.3	28512	29052.9	38516.9	43135.4	48955.5	50097.4
<b>Fixed assets</b>	10665.29	13664.21	48572	59342.6	66865.6	74731.29	94936.26
<b>Current assets</b>	26573.58	30706.34	32224.87	33494.85	34271.35	34896.23	31484.83
<b>Total assets</b>	73037.41	83555.73	90470.90	102573.35	112606.46	115068.70	117456.76
<b>Turnover (sales revenue)</b>	49439.7	59057.5	61542.6	65049.4	61983.2	69532.2	76515.09
<b>No.of employees</b>	<b>34722</b>	<b>33810</b>	<b>32996</b>	<b>33035</b>	<b>32826</b>	<b>33273</b>	<b>32909</b>
<b>Turnover/human resource</b>	1.80	2.07	2.11	1.68	1.43	1.42	1.52
<b>Turnover/fixed assets</b>	4.63	4.32	1.26	1.09	0.92	0.93	0.80
<b>Turnover/total assets</b>	0.67	0.70	0.68	0.63	0.55	0.60	0.65
<b>Human resource value per employee</b>	0.79	0.84	0.88	1.17	1.31	1.47	1.52

Table 9: human assets value is being analyzed in the table. Various ratios are calculated to show the relation between human

resources value to fixed assets, current assets, total assets . interpretation by each ratio is as:

Figure 1

Turnover/human resource



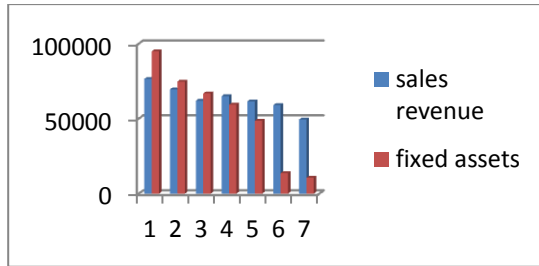
It shows the efficient utilization of human resource. The efficiency and productivity is increase during the last seven year. With the help of human resources turnover ratio, it is determined that number of times in a year the

money is being received from the human resources in comparison to investment. Earlier at 2006 it was 1.80 but it decrease in year 2012 to 1.54 means productivity is decreasing.



Figure 2

Turnover/Fixed Assets

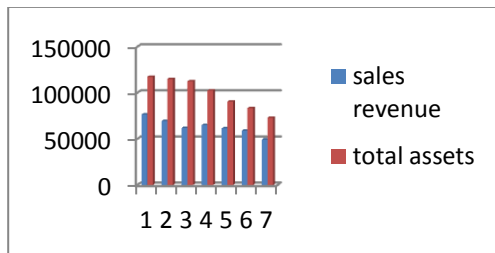


It shows the optimum utilization of fixed assets. The efficient use of assets can be measured by it. With the help of fixed assets turnover ratio, it is determined that number of

times in a year the money is being received from the fixed assets. Earlier at 2006 it was 4.63 but it decrease in year 2012 to 0.80 means productivity is decreasing.

Figure 3

Turnover/Total Assets



These ratio are a measure to determine the managerial efficiency of the concerned business entity. This ratio shows the firm's ability in generating sales from all financial resources to total assets. Earlier at 2006 it was 0.67 but it decreases in year 2012 to 0.65 means productivity is decreasing. Overall in comparison to turnover ratio, human resources are being efficiently. Total assets are 0.65 and fixed assets are used 0.80 but human resources ratio to turnover is 1.54. it means human resources are being more efficiently used.

### Return on HRV:

Proving the absence of uniform HRA reporting practices in India, ONGC does not publish the information about the Return on HRV in the annual report. Return on HRV is calculated as profit after tax (PAT) divided by the human resource value. Both these figures are collected from the annual report of the company for the respective year.

Table 10

## Return on HRV

For the year ended on 31<sup>st</sup> March

Particulars	2006	2007	2008	2009	2010	2011	2012
<b>Return on HRV ( per cent)</b>	52.60	54.86	57.48	41.86	38.87	38.65	50.14
<b>Return on HRV-INDEX</b>	100.00	104.29	109.27	79.58	73.89	73.47	95.32

Source: Annual reports of ONGC from the year 2006-2012

Return on HRV was 52.60 percent of HRV in the year 2005-06 which increased to 54.86 percent of HRV in the year 2006-07 and 57.48 percent of HRV in the year 2007-08 but then fell in the year 2008-09 and continued the trend in the year 2009-10 and 2010-11. In the year 2011-12 it had shown recovery and reached 50.14 percent of HRV. In this manner return on HRV kept fluctuating in the last seven years. The same picture is clear from the table 9.

Return on HRV of the organization reflects the efficient use of resources. The above table shows that the return on HRV was fluctuating very abruptly. Therefore to have an idea about the change in HRV whether it was real or just mathematical, net income , one of the components of Return on HRV is analysed here in the table 10.

Table 11

## Net income ( profit after tax)

For the year ended on 31<sup>st</sup> March

Particulars	2006	2007	2008	2009	2010	2011	2012
<b>Net income</b>	14431	15643	16702	16126	16768	18924	25123
<b>Net income- INDEX</b>	100.00	108.39	115.73	111.74	116.19	131.13	174.09

Source: Annual reports of ONGC from the year 2006-2012

The above table makes it clear that net income fluctuated in last seven years. If we check with the help of index numbers, then in the past seven years, net income increased from index number 100 in the year 2005-06 to 174.09 in the year 2011-12. In the last seven years, net income decreased remarkably in 2008-09 in relation to previous years but it never went below the level of the base year.

The return on HRV fell even below the base year level and reached 73 percent of the base year i.e. the year 2005-06. Thus Return on HRV decreased not due to a decrease in profit after tax ( net income).

Therefore , to have an idea about the efficiency of human resources and to check reasons for fluctuations in return on HRV the study of return on HRV per employee was undertaken. For this purpose , net income per employee was calculated as net income divided by the number of employees. Then HRV per employee calculated as human resource value divided by the number of employees. All these figures are collected from the annual reports of the company for all these years. Then Return on HRV per employee was calculated as Net Income per employee divided by the HRV per employee. The the figures of return on HRV per employee given in the following table 11.

Table 12

Return on HRV per employee

For the year ended on 31<sup>st</sup> March

Particulars	2006	2007	2008	2009	2010	2011	2012
Return on HRV per employee (%)	50	38.09	38.93	41.02	56.81	54.76	51.89
Return on HRV per employee-INDEX	100.00	76.18	77.86	82.04	113.62	109.52	103.78

Source: Annual reports of ONGC from the year 2005-06 to 2011-12

Return on HRV per employee was also moving in the same direction as the return on HRV. Therefore again here net income per

employee calculated and analyse. net income per employee is given below in the table 13.

Table 13

Net Income per Employee

For the year ended on 31<sup>st</sup> March

Particular	2006	2007	2008	2009	2010	2011	2012
Net income per employee	0.41	0.46	0.5	0.48	0.51	0.56	0.76
Net income per employee-INDEX	100.00	112.19	121.95	117.07	124.39	136.58	185.36

Source: annual reports of ONGC from the year 2006 to 2012

The above table makes it clear that net income per employee fluctuated in last seven years. If we check the help of index numbers, then in past seven years, net income has increased from index number 100 in the year 2005-2006 to 185.36 in the year 2011-2012.

The Return on HRV per employee fell at a higher rate than the fall in net income per employee. Therefore, the falls in return on HRV was at a higher rate than the net income is the result of increase in the HRV at a higher rate.

expected return unwaveringly depends on number of variables.

As Human Resources are the only active asset of the organization it is an important resource for the business. Therefore, in the first section the behavior and in second section growth and volatility of variables are studied individually. In both the studies, relationship of HRV with majority of these variables was found at very high degree. Now a question arises: How closely is the HRV related to each of these variables?

To answer this question, the present section undertakes two important bivariate analyses as under:

➤ **BIVARIATE ANALYSIS**

ONGC is following the Lev and Schwartz model, which represents the present value of future expected return. present value of future

1. Simple Correlation Analysis
2. Simple Regression Analysis

For both these bivariate studies, all variables which were considered for the behavioural analysis as well as growth rate and volatility analysis have been influenced.

**Simple Correlation Analysis:**

The researcher purpose is to check the possibilities of objective valuation and consideration of human resources of an organization as an asset and also to check the accepted practical application of the human resource accounting as a system. There fore, the question raises : Is objective valuation of human resources possible?

To answer this question the researcher has studied the relationship of HRV with different variables representing the present profitability and efficiency of the business. Here in this section, relationship of each variable with the human resource value is premeditated. For this purpose, some variables influencing the human resource value as well as the variables that are the pointer of present business profitability and efficiency are considered. These variables are:

1. Turnover per employee
2. Return on HRV
3. Total number of employee
4. Net income per employee
5. Total asset per employee

TABLE 14

SIMPLE CORRELATIONS

	Turnover per Employee	Net income per employee	Total asset per employee	TotalNo.of Employee	Return on HRV per Employee
HRV per Employee	0.862	0.785	0.955	-0.652	-0.690

- Correlation coefficient with discount rate can not be computed since discount rate is constant throughout the period.

The analysis identifies high degree of correlations of each identified variable with the exceptions of total No.of employee and return on HRV with the human resource value. A correlation between human resource value and all these variables other than the total No. of employee and return on HRV gives a positive and significant amount of relationship.This study identifies maximum correlation of HRV with Total asset per employee and Turnover per employee .The correlation of HRV per employee with total assets per employee is the highest and positive at 0.955 and next high and positive relation is for turnover per employee at 0.862.The relation of HRV per employee and net income per employee is also positive at 0.785 which is less than the correlation with the turnover per employee. The relation of HRV per

employee and total No.of employee is -0.652 and HRV per employee and return on HRV per employee is -0.690 lowest among this entire faction of variable.

This means that HRV has quite a significant positive relation with the turnover. We can also say that HRV and turnover stir in the same direction. The turnover is the measure of state of affairs of the business. This means that present turnover is highly influenced by the human resource value and present total assets is also highly influenced by the human assets value.

The relationship between HRV per employee with net income per employee found at the lower rate but still at very significant

level. HRV and net income per employee has positive degree relation at 0.785. The net income per employee has significant amount of relation with HRV.

Total assets and Turnover have highest relationships is indication of impact of increase in HRV on the present efficiency and productivity of an organization.

The bivariate analysis of all these variables and HRV reveals that there is higher a degree of positive relationship between human resource value per employee and the total assets and the turnover. The third highest degree of relation is found with net income per employee. It is apparent that with increase in the net income, human resource value also increases but here the degree of relationship is less with human resource value. This indicates that there are other factors distressing the human resource value per employee.

### Simple Regression Analysis

The simple correlation analysis, as examined in table 14, reveals the direction and

numerical strength of relationship but does not expound the relative importance of different variables forming the conglomerate that influence the degree of relationship.

The researcher examines the impact of all the variables individually on HRV separately, by assuming possibility of existence of straight-line relationship using linear regression. This analysis enables the researcher to find the answer to the question, How HRV does respond to the movement in an individual variable?

The ordinary least square [OLS] method has been used for the regression analysis. The following function has been estimated for the variables.

$$\text{HRVper employee} = f [X_i]$$

For all  $i = 1, 2, 3, 4, 5$ .

In a simple regression analysis, the above function leads to five regression equations as given in the table 15:

Table 15

Simple Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
	(Constant)	-0.648	0.474		
TURNOVERperEMP	.944	.248	.862	3.810	.013
(Constant)	10.914	5.082		2.147	0.085
TOTALNo.ofEMP	.000	.000	-.652	-1.924	.112
(Constant)	2.417	.606		3.987	.010
RETURNonHRVperEMP	-.027	.013	-.690	-2.131	.086
(Constant)	.022	.402		.056	.958
NETINCOMEperEMP	2.126	.751	.785	2.832	.037
(Constant)	-.422	.220		-1.916	.114
TOTALASSETperEMP	.525	.073	.955	7.192	.001

a. Dependent Variable: HRVperEMP

The following inferences may be derived from the above regression results:

i. The regression results with respect to all variables under consideration are statistically significant.

ii. The values of coefficients with respect to net income per employee [2.126], turnover per employee [0.944], and total asset per employee [0.525] is positive. The increase in the values of these variables would enhance the HRV at ONGC.

iii. It implies that a one unit change in each of these variables would lead to 2.126,0.944,0.525 unit change in HRV per employee respectively at ONGC , assuming other factors to be constant.

iv. The values of coefficients with respect to return on HRV [-0.027] is negative. This is because of growth in HRV at very high rate and movement of return on HRV in opposite direction.

#### ➤ **MULTIPLE DATA ANALYSIS**

The bivariate data analysis carried out earlier have established that HRV is the result of multiparty impact of number of influencing variables. Therefore, to examine the degree and strength of relationship of financial as well as predictor variables on HRV , the researcher now go to multiple data analysis. The multiple data analysis is carried out with the help of partial correlation, multiple regression models and principle component analysis.

#### **Partial correlations**

Bivariate studies carried out earlier show that all variables, except return on HRV per employee, have a significant amount of positive relationship with human resource value per employee.this simple bivariate relation establishes the direct relationship but does not consider other variables for the calculation of relationship. This means relationship studied by applying bivariate correlation establishes relationship of individual variables with dependent variable HRV. It establishes the direction of relationship but does not expound the relative importance of different variables forming congregate that influence the degree of relationship. This is the limitation of bivariate correlation study. To overcome this limitation of bivariate correlation study. To overcome this limitation, further partial correlation study has been carried out , with a view to highlight the relative influence of different variables. Therefore, this section seeks to apply the technique of partial correlations with a view to highlighting the relative influence of different variables. For partial correlation study , the researcher continuing with the same set of all the variables which considered for the biavriate correlation study. Partial correlation, calculations have been carried out with help of SPSS 20. It studies relations of human resource value with each of these variables by controlling all other variables.

TABLE 16  
Partial correlation coefficient of HRV

VARIABLES	PARTIAL CORRELATIONS	CONTROLLING FOR
<b>Turn Over Per Employee</b>	0.695	i. Total Number of employee, ii. Return on HRV per Employee iii. Total assets per employee iv. Net income per employee
<b>Total Number of Employee</b>	0.931	i. Turn over per employee ii. Return on HRV per employee iii. Total assets per employee iv. Net income per employee
<b>Return on HRV per Employee</b>	-0.833	i. Total Number of employee ii. Total assets per employee iii. Net income per employee iv. Turnover per employee
<b>Total assets per employee</b>	0.934	i. Total Number of employee ii. Turnover per employee iii. Return on HRV per employee iv. Net income per employee
<b>Net inome per employee</b>	0.839	i. Total Number of employee ii. Turnover per employee iii. Total assets per employee iv. Return on HRV per employee

- i. Partial correlation between HRV per Employee and Turnover per Employee.

In the bivariate correlation study carried out in the earlier section, between human resource value per employee and turnover per employee, a direct positive relationship was found 0.862. but a meticulous study of relationship between both these variables carried out by controlling all other variables, i.e. turnover per employee and HRV per employee, gives a degree of positive relations at 0.695.

The value of human resources is equal to the present value of the future expected return. Turnover is not considered at all for the valuation of the human resources, the only active asset. Therefore, the study of relationship between human resource value and turnover per employee is geared up. A higher correlation using both the

techniques is a clear-cut indication of having significant relations of human resource value per employee and turnover per employee.

- ii. Partial correlation between HRV per employee and Total Number of employee.

Suprising result of the study carried out to check the bivariate correlation study of human resource value per employee and total number of employees was found negative at -0.652. In the partial correlation study of HRV per employee and total number of employee was found at the higher degree of positive relationship at 0.931.

- iii. Partial correlation between HRV per employee and return on HRV per employee.

Return on HRV is the result of the calculation of profit after tax (PAT) divided by the HRV. In the behavioural study of PAT and Return on HRV in percentage, it was found that PAT is not moving in the same direction and in the same proportion. This was the clear indication of having no relation among both these variables. The same result was found in the bivariate correlation study also. The partial correlation study of the relation of HRV with the return on HRV also gave the negative relationship among both these variables representing assets or resources of production and results of the efforts made by the resources. The degree of relation found between HRV and Return on HRV by controlling all other variables at -0.833. The results of bivariate study and partial correlation study also outcry the reality of having no consideration of Return i.e. present efficiency and profitability.

- iv. Partial correlation between HRV per employee and total assets per employee.

In the bivariate correlation study of HRV per employee and total assets per employee, a higher degree of positive relationship was found at 0.955. The result of the partial correlation study was also found in the same direction and degree between HRV and total assets per employee at ONGC by controlling all other variables at 0.934.

- v. Partial correlation between HRV per employee and net income per employee.

In the bivariate correlation study of human resource value per employee and net income per employee, a direct positive relationship was found 0.785. But a meticulous study of relationship between both these variables carried out by controlling all other variables, i.e. net income per employee and HRV per employee, gives a degree of positive relations at 0.839.

A higher correlation using both the techniques is a clear –cut indication of having significant relations of human resource value per employee and net income per employee.

### Linear Multiple Regression Analysis

The ordinary least square [OLS] method has been used for the linear multiple regression analysis. The following function has been estimated for formulation of linear multiple regression equation of the HRV per employee.

$$\text{HRV per Employee} = f[X_i], \text{ i.e.,}$$

$$\text{HRV} = a + \sum_{i=1}^4 b_i X_i$$
, where  $X_i$  are as follows:

- $X_1$ : Turn over/ employee
- $X_2$ : Net income/ employee
- $X_3$ : Total assets/ employee
- $X_4$ : Total No. of employee
- $X_5$ : Return on HRV

In a linear multiple regression analysis, the above function leads to the following regression equation as given in the table 16.



Table 17  
Linear Multiple Regression Coefficient Dependent Variable:  
HRV per Employee

Model	Unstandardized coefficients	Std. Error	Standardized Coefficients	t	Sig.
	B		Beta		
a ( Constant)	-5.687	2.666		-2.133	0.279
X <sub>1</sub> Turn over/ employee	0.119	0.123	0.108	0.966	0.511
X <sub>2</sub> Net income/ employee	0.721	0.467	0.266	1.542	0.366
X <sub>3</sub> Total assets/ employee	0.445	0.170	0.810	2.619	0.232
X <sub>4</sub> Total No.of employee	0.000	0.000	0.354	2.553	0.238
X <sub>5</sub> Return on HRV	-0.009	0.006	-0.224	-1.503	0.374

Table 18

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	1.000 <sup>a</sup>	.999	.996	.02030

a. Predictors: (Constant), TOTALASSETperEMP, RETURNonHRVperEMP, TOTALNo.ofEMP, TURNOVERperEMP, NETINCOMEperEMP

In order of formulating linear multiple regressions the researcher is assuming insignificant effect of regressor in the

relationship. To evaluate this , ANOVA and F-ratios are used as depicted in the Table 18.

Table 19

ANOVA<sup>a</sup>

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	.563	5	.113	273.163	.046 <sup>b</sup>
1 Residual	.000	1	.000		
Total	.563	6			

a. Dependent Variable: HRVperEMP

b. Predictors: (Constant), TOTALASSETperEMP, RETURNonHRVperEMP, TOTALNo.ofEMP, TURNOVERperEMP, NETINCOMEperEMP

The test statistic is the F value of 273.163. Using an  $\alpha$  of .05, we have that  $F_{.05; 5, 1} = 230.162$ . Therefore, the assumption of insignificant effect of regressor in the relationship does not hold correct.

The following inferences may be derived from the above linear multiple regression results:

1. The linear multiple regression results with respect to all variables under consideration is statistically significant. ( table 17 and 19)

2. The formulated model will explain 99.6 percentage variations.(table 18)

3. The values of multiple regression coefficients with respect to turnover per employee [ 0.119], net

income per employee [ 0.721], total asset per employee [0.445] , total number of employee [ 0.000] and return on HRV [-0.009].

4. The unit change in the regressor turnover per employee, net income per employee, total asset per employee, enhances HRV per employee

by 0.119,0.721,and 0.445 units respectively.

5. The co-efficient of linear multiple regression with respect to return on HRV per employee [ -0.009]. therefore, these regressor influence HRV per employee adversely at ONGC.

TABLE 20

Comparative study of simple and multiple regression coefficients

	Simple regression coefficient	Linear multiple regression coefficient
<b>Turnover/employee</b>	0.944	0.119
<b>Net income/employee</b>	2.126	0.721
<b>Total asset/employee</b>	0.525	0.445
<b>Total No of employee</b>	0.000	0.000
<b>Return on HRV</b>	-0.027	-0.009

The results of the linear multiple regression analysis all the variables is contradicting as presented in the table 20. ONGC is following the Lev and Schwartz Model for the valuation of HUMAN Resources. As per this model value of human resources is equal to the present value of future expected return of the employee. The results of simple regression analysis and multiple regression analysis are differing and contradict from on another.

**CONCLUSIONS**

HRV is significantly and positively related with turnover per employee, net income per employee, total assets per employee . surprisingly it is negatively related with Total No of employee and return on HRV per employee. Total assets and Turnover have highest relationships is indication of impact of increase in HRV on the present efficiency and productivity of an organization.

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