Focus: Human Resource Development

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2. A declaration that the paper is original and has not been submitted elsewhere for publication.

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Productivity

Contents

Quality of Human Capital and Economic Development

S.K. CHAKRAVORTY

Quality of human capital determines the level of economic development in any country. Human capital can be defined and measured in many ways. It has been reported that the demand for highly educated/skilled work force outstrips supply of such man power. This article analyzes the various facets of human capital and its contribution to India's economic development. It is imperative that human resources need to be continuously upgraded through training and skill upgradation for sustaining economic development.

Human capital management is nothing but building ideal and interactive mix of intellectual, social, and emotional capital and leveraging the same meeting interests of individual and organization together. As individual, one should take responsibility for own career, instead of passively relying on others. Knowledge gets obsolete unless updated, relationships weakens unless continuously refreshed and courage to act diminishes unless regularly exercised. For a company, success depends on ability to attract, develop and retain people with high level of knowledge and skills, to create structures and process for building formal/informal relationships among people so that their knowledge is shared, integrated and exploited and to create an organizational culture which motivates and enables people to act.

Human capital is the sum of skills, talent, knowledge and experience of the people in any organization. Major elements of human capital can be identified as intellectual, social and emotional capital.

A. Intellectual Capital

- Stock of knowledge and skill of members of organization (specialized as well as tacit).

- Skills and expertise possessed collectively by members of organization.

- Expert/specialized knowledge that may be owned by the organization including patents, IT based knowledge systems etc.

- Ability to perceive complexities.

- Learning capacity of the individuals.

Technocrats often focus on knowledge alone, undervaluing the social and emotional components of human capital.

S.K. Chakravorty is Deputy Director General, National Productivity Council, New Delhi, India.

B. Social Capital

- Structure, quality and flexibility of human relationships (networks) both inside and outside the company.

- May be built in a company by making strong formal and informal relationships through job rotation long term employment, joint training, quality circles and small group activities.

- May be built externally with customers, suppliers, environmental pressure groups etc.

- Sociability and trustworthiness of individuals are very important.

C. Emotional Capital

- Special knowledge/skill and great network of friends are not enough.

- Individuals need self confidence, courage and resilience to convert their skill and relationships into effective action.

- Organizations need high internal energy and an environment of pride, trust and openness for taking proactive action in order to gain competitive edge. Elements of emotional capital may be further broken down to the following points:

  - Self confidence/self awareness

  - Self regulation (control one's self/integrity/openness to change)

  - Ambition and courage

  - Risk-taking ability

  - Motivation

  - Empathy (understand other's emotional make-up)

Goal of Human Capital

The goal of human capital is to develop a diverse, capable, motivated staff that operates with efficiency and integrity for achieving organisational goals. Human capital management is planning, organizing, staffing, directing, and controlling of all human resource activities through well designed HR practices towards achieving organizational excellence. People are assets whose value can be enhanced through investment. The goal is to maximise value while managing risk. Organization's human capital approaches should be designed, implemented and assessed by the standard of how well they help the organisation achieve results and pursue its mission. There is a floor to cost reduction but no ceiling to value creation. Human capital should be viewed as a value-producing asset instead of a cost to be minimized or reduced. Organization must identify those practices critical to success to:

- Ensure a strong foundation
- Allocate the right resources

The elements of human capital scorecard are:

- ROI in people programs
- Number of Kaizens / QC projects / suggestion scheme
- Competency Mapping (results and trends)
- Manpower norms (benchmarking)
- Motivation level and commitment of employees
- Attrition rate of people
- Labor productivity
- Higher qualification and certificates obtained by people
- Employee satisfaction index
- Customer satisfaction index
- Leadership type and succession planning strategies
- Papers published and patents registration etc.
- Labor cost as a percentage of manufacturing cost.
- Employee attitude and awareness

Human Capital Measurement

The human capital indices are given below-

1. Employee Satisfaction Index –

Tracking of employee satisfaction index indicates building or eroding human capital. Higher the index, more is the market value of the company. Time/resources spent on training, employee turnover, willingness to accept new projects, willingness to be relocated etc. are the parameters for measuring employee satisfaction Index.

2. Customer Satisfaction Index –

Customer satisfaction index indicators are – repeat orders, new customers who are referrals, number of customer contacts, number of customer complaints etc.

3. Knowledge Management Index –

Organization's knowledge is sum of the knowledge of all people ever worked.

Document everything employees have learned while working in the company by inducing team work so that learnings are always shared. It involves measurement of skill level and trending and extent of IT enabled systems and ICT.

4. Human Development Index (HDI) –

There are three basic dimensions of Human Development Index–

- A long healthy life – measured by 'life expectancy at birth'.

- Knowledge – measured by adult literacy rate (2/3wt) and combined primary, secondary and tertiary enrolment ratio (1/3 wt).

- Standard of living – measured by GDP/Capita in PPP US $.

The comparative ranking of HDI is given in Table 1 shows that India's rank is quite low at 134th among the country of nations. Indian HDI ranking was maintained at 127 out of about 180 countries upto 2005. But it declined to 134 out of 187 countries during 2011. HDI increased steadily from 0.344 to 0.547 from 1980 to 2011.

Table 1: Global HDI

COUNTRY	HDI	GLOBAL RANKING
NORWAY	0.943	1
USA	0.910	4
MALAYSIA	0.761	61
RUSSIAN FED.	0.755	66
SRILANKA	0.691	97
CHINA	0.687	101
THAILAND	0.682	103
INDIA	0.547	134
BANGLADESH	0.500	146
NEPAL	0.458	157
CONGO	0.286	187

Source: Human Development Report 2011

Elements of India's Economic Development

Poverty reduction and increase in quantity and quality of employment is extremely necessary. The agricultural development, social sector development (education and health) are to be accelerated and regional disparities need to be reduced.

Poverty declined from 55% in the early 1970s to 37% in 2009-10. Although there has been progress in decline, still more than 400 million population are below poverty line. 80% of the poor are from rural areas. Poverty is concentrated in few states (Bihar, Uttar Pradesh, Madhya Pradesh, Orissa, Chattisgarh and Jharkhand). It is also concentrated among agricultural labourers, casual workers, Scheduled Castes and Scheduled Tribes.

Problems in Employment

Share in output and employment of different sectors in 2009 – 2010 are viz in agriculture: 15% in GDP, 52% in employment; in industry: 28% in GDP,14% in employment; in services: 57% in GDP, 34% in employment. Employment growth has increased in recent years but quality is low. Available labour force is about 478 million and Unemployed labour force is about 10%.

Social Development

In social sector, there is a significant achievement in education and health. However, human development index rank is 134 out of 187 countries. Social indicators are much lower for scheduled castes and scheduled tribes. Malnutrition among children is one major problem (46% of children suffer from malnutrition).

Regional Disparities

There are significant regional disparities in India. Per capita income is highest (Rs.16,679) in Punjab and lowest (Rs.3557) in Bihar. Female infant mortality varies from 12 in Kerala to 88 in Madhya Pradesh and Female literacy varies from 33.6% in Bihar to 88% in Kerala.

Importance of Labour Productivity Measurement

Labour productivity measurement can be used as change strategy in the organisation. Creative bargaining can be accomplished more rationally once labour productivity estimates are available. Labour productivity can be measured as a single factor measure as follows:

Labour productivity = GDP(PPP)/number of persons employed

The GDP growth versus labour productivity at National and Sectoral levels are given in Table 2 and Table 3.

Table 2: GDP Growth versus Labour Productivity

Year	Gross Domestic Product (PPP*)	Real GDP Growth**	Rank with respect to GDP (PPP)	Overall Productivity (PPP)***	Labour Productivity (PPP)****	Average Labour Working hours per year	Hourly Compensation Levels
	US $ billions	%		US $	US $	in hours per year	US $
2004-05	3287	6.8	4	7277	3.10	2347	0.60
2005-06	3692	8.1	4	8307	3.54	2347	0.59
2006-07							
2007-08	2978	8.7	4	7160	3.14	2280	0.58
2008-09	3317	7.1	4	7445	3.27	2277	0.58
2009-10	3598	7.2	4	8213	3.77	2179	0.85

*PPP - Purchasing Power Parity
**Percentage change based on National Currency in constant Prices
***GDP (PPP) per person employed US $
****GDP (PPP) per person employed per hour US $

Table 3: Productivity in various sectors of Economy

Year	% Contribution of agriculture in GDP	Agriculture Productivity	% Contribution of industry sector in GDP	Productivity in Industry	% Contribution of services sector in GDP	Productivity in Services
2004-05	28	3592	27	11517	45	12709
2005-06	23	3327	24	11706	53	17179
2007-08	17	2527	27	9252	56	13404
2008-09	17	2550	26	9620	57	13937
2009-10	17	2945	28	10812	55	14385

GDP (PPP) per person employed in the sector US $
Source: World Competitiveness Yearbook 2004 to 2010

Causes of low Labour Productivity

The causes of low labour productivity are given below:

1. Based on world competitiveness yearbook 2010 India ranks 35th in terms of productive labour relations among 58 countries surveyed. In order to improve labour productivity Indian industry need to promote productive and healthy labour relations.

2. In terms of motivation level among workers India ranks 26th. Low motivation level among workers is also one of the cause of low labour productivity.

3. India ranks 29th in terms of providing training to employees. Formal training of workers/employees need to be taken up by Indian industry in order to improve labour productivity.

IMD world competitiveness yearbook 2010 ranks 58 economies based on 327 variables grouped into economic performance, government efficiency, business efficiency and infrastructure. India secured 31st rank in 2010 against 30th rank in 2009. The details are given in Table 4. In the economic performance factor – India ranked 20th.

Table 4: Overall Competitiveness

COUNTRIES	Rank	
	2009	2010
USA	1	3
HONG KONG	2	2
SINGAPORE	3	1
AUSTRALIA	7	5
GERMANY	13	16
JAPAN	17	27
CHINA	20	18
UK	21	22
FRANCE	28	24
INDIA	30	31
BRAZIL	40	38
PHILIPPINES	43	39
SOUTH AFRICA	48	44
ITALY	50	40

Source: World Competitiveness Yearbook 2009 and 2010

In Government efficiency – India ranked 30th. In Business efficiency – India ranked 17th. In Infrastructure – India ranked 54. The overall productivity and labour productivity rankings are given in Table 5 and Table 6.

Table 5: Overall Productivity (PPP)

COUNTRIES	Rank	US$
	2009-10	
LUXEMBOURG	2	103,483
NORWAY	1	109,953
USA	3	101,770
HONG KONG	6	85,106
FRANCE	8	80,725
SINGAPORE	9	78,182
ITALY	12	77,195
UK	21	71,474
GERMANY	25	65,665
AUSTRALIA	10	77,634
JAPAN	24	65,892
SOUTH AFRICA	39	37,251
BRAZIL	48	23,396
CHINA	55	11,015
PHILIPPINES	57	9,011
INDIA	58	8,213

Estimates: GDP (PPP) per person employed, US$
Source: World Competitiveness Yearbook 2009-10

Table 6: Labor Productivity (PPP)

COUNTRIES	Rank	
	2010	US$
LUXEMBOURG	2	57.78
NORWAY	1	62.09
FRANCE	4	50.83
USA	3	53.25
ITALY	10	43.13
GERMANY	18	38.54
AUSTRALIA	9	44.44
UK	14	40.56
JAPAN	25	33
SINGAPORE	21	37.44
HONG KONG	22	37.08
SOUTH AFRICA	39	19.47
BRAZIL	47	12.9
CHINA	55	5.51
PHILIPPINES	56	4.43
INDIA	58	3.77

Estimates: GDP (PPP) per person employed per hour US$
Source: World Competitiveness Yearbook 2009-10

Skills and education for human capital productivity

More than half of India's population are very young (25 years). By 2050 India will take over China's population and expected to have ¼th of the world's working age population. India is facing acute shortage of skilled workers due to inadequate manpower development and education system. There is a need to develop skills such as problem solving, communication, team work, self learning, basic technology, absorption of technological developments and new technology etc.

Basic skills:

In government elementary schools, 44% students in grade 2 – 5 cannot read short paras and 28% cannot do two digit subtraction. One in four teachers are absent and out of the present, half do not teach. Only 40% of primary teachers have college degrees and 30% have not completed secondary. 72% primary schools didn't have electricity in 2005. There is very high students drop – out (31% in primary). The regional disparities in education (varying literacy and enrollment rates) effects uniform economic development in the country. The enrollment rate in secondary education is 45% (Brazil – 100%, Russia – 100%, Korea – 92%, China – 70%). The public funding for secondary education is very low (~1.180% of GDP). Private school account for 60% in number but cater to only 25% of secondary students. Widespread illiteracy hamper labour productivity levels in informal sector (1/3rd of world's illiterate population lives in India).

Higher educational and knowledge workers –

The demand for highly educated / skilled knowledge workers outstrip the supply. Though highly ranked IIMs and IITs exist, they cannot supply sufficient managers and engineers for SMEs. High demand is fueled by country's popularity as an R and D destination for MNCs. About 3000 Engineering colleges are increasingly supporting the growing need, however quality of engineers lie only in islands of excellence. 80% PhDs in Engineering are awarded by 20 leading institutions, 65% PhDs in science come from 30 leading colleges (about 7000 PhDs per year). There is severe shortage of faculty (20 – 30% positions of lecturers / professors vacant). About 45% of PhDs are awarded in faculty of arts having week links to job market. There is also a problem of retaining best researchers in the country. Lack of skilled researchers is responsible for low output of high quality patents and publications. Enrolment in tertiary education is very low (12%) compared to China (20%), Russia (40%) and Korea (90%). Only

Table 7: Incremental human resources requirement in Vocational Stream (in '000s)
(Based on NSDC Report)

S.No	Sectors; requirements in '000s	Annual Requirement In Vocational Stream	S.No	Sectors; Requirement in '000s	Annual Requirement In Vocational Stream
1	Textiles (Spinning, Fabric Processing, Garmenting)	1,020	8	Furniture & Furnishings	195
2	Electronics & IT Hardware	81	9	Auto & Auto Components	1,350
3	Leather	282	10	Tourism & Hospitality	169
4	Organized Retail	991	11	Food Processing	530
5	Gems & Jewellery (including jewellery retail)	247	12	Construction Materials & Building Hardware	39
6	Building, Construction & Real Estate	2,365	13	Chemicals & Pharmaceuticals	34
7	Banking, Financial Services & Insurance	197	14	Transportation, logistics & Warehousing	506

Total Annual requirement = 8.006 million persons

$1/3^{rd}$ of science graduates pursue occupations related to their formal education. In most education institutes there is mismatch between industry needs and curricula taught. Public spending on higher education is also very low (0.7% of GDP).

The incremental human resources needed in vocational stream has been estimated in different sectors and is given in Table 7. There is an annual requirement of about 8 million persons in 14 identified vocational streams.

Conclusion:

The most important objective of human capital management is to monitor and improve the productivity of human resources. The world class organizations have to cut down idle time, overtime and idle capacity through better utilization of manpower, organization and methods study, productivity bargaining, technology upgradation, training and skill upgradation of human resources and inculcating cultural change in the organization. Quality of human capital available in the country critically determines the level of economic development. It is imperative to nurture and continuously upgrade the quality of human capital through training and skill upgradation for sustaining economic development.

> Not everything that is faced can be changed. But nothing can be changed until it is faced.
>
> —James Baldwin

Human Resource Management Practices in NTPC

JAI SINGH PARMAR AND MUNISH SINGLA

In this fast moving and rapidly changing world, it is essential to have latest knowledge of human resource skills in order to create innovative human resource policies and practices which can engage employees and drive competitive advantage for the business and organization. When employee engagement and knowledge is put together towards business goals, then it become key competitive success factors for business and organization. Human resource management is the only function where building capabilities of the organization and individuals takes place. Therefore, human resource need to build organizations on one hand and on the other building, grooming and preparing people with different kind of mind sets according to the emerging society and landscape become very essential. The special significance of the present study arises from the strategic importance occupied by NTPC limited in India. For the economic betterment and progress of the country, the power sector requires more attention for establishing better human resource management practices. Keeping this view in mind, through the present study an effort has been made to analyze the attitude and opinion of the different categories of the employees working in NTPC toward the existing human resource management policies and practices followed by the corporation.

Jai Singh Parmar is currently Associate Professor in Himachal Pradesh University Business School, Shimla and Munish Singla is Manager (Finance), EPIL(Engineering Projects India Limited) Delhi.

Human resource management has become a challenging domain and human resource activities are gaining tremendous importance in modern organizations. Human resource management practices and policies are necessary to carry out the people or personnel aspects of the managerial job. Human resource planning is key component of every organization's strategic business planning. It refers to evaluation and identification of human resource requirements for meeting organizational goals. Human resource planning is the process of forecasting an organization's future demand and supply of the right type of people in the right number. Effective human resources planning strategies are those which include having sufficient staff, with the right mixture of talent, and who are in the appropriate locations, performing their jobs as and when needed.

National Thermal Power Corporation Limited henceforth referred as NTPC, is the largest power generating company in India. It is a public sector company and was incorporated in the year 1975 to accelerate power development in the country as a wholly owned company of the government of India. NTPC's core business is engineering, construction and operation of power generating plants. It also provides consultancy in the area of power plant constructions and power generation to companies in India and abroad. NTPC has a vision of '*A world class integrated power major, powering India's growth, with increasing global presence*' and to realize its vision, it has identified its corporate objectives of business portfolio growth, customer focus, agile corporation, performance leadership, human resource development, financial soundness, sustainable power development and research & development.

NTPC is playing a prominent part in strengthening the powerbase of the country's economic growth. Aligning its corporate strategies to national priorities, market dynamics, environment protection, social responsibility and ethics, the company has been demonstrating consistently high performance. The installed capacity of NTPC is 31704 MW through its 15 coal based (24885 MW), 7 gas based (3955 MW) and 5 joint venture projects (2864 MW) and 17830 MW capacity is under construction at 17 locations. Total electricity generation increased by nearly six percent in 2009-10 compared to three percent generation growth achieved in 2008-09. NTPC currently accounts for about 20 percent of the country's installed capacity and almost 60 percent of the total installed capacity in the central sector in the country.

NTPC follows 'People First' approach to leverage the potential of it's around 25,000 employees to fulfill its business plans. It believes in achieving organizational excellence through human resources. The requirement of various skilled and unskilled persons in NTPC at different levels is assessed in the light of its business plan as a part of human resource planning. The organization believes in the philosophy of 'Grow your own timber'. NTPC is now seriously exploring opportunities to mark its footprints in different parts of the world. In line with its globalization strategy, the company is making consistent efforts to enter the overseas markets and is focusing its efforts on the Middle East, Asia Pacific and Africa regions. NTPC has plans to establish a global footprint through power projects, coal mining and a presence in value chain.

The Study

In the era of rapidly changing scenario, the growth and profitability of an organization largely depends upon its human resources management practices. Therefore, in this fast moving and changing world, it is essential to have latest knowledge of human resource skills in order to create innovative human resource policies and practices which can engage employees and drive competitive advantage for the business and organization. The special significance of the present study arises from the strategic importance occupied by NTPC limited in India. For the economic betterment and progress of the country, the power sector requires more attention for establishing better human resource management practices. Keeping this view in mind, through the present study an effort has been made to analyze the attitude and opinion of the different categories of the employees towards the existing human resource management policies and practices followed by the corporation. Further, NTPC limited is playing a vital role in the economic development of India. Hence, it is pertinent to study the human resource management practices of the organization. The study would help us to understand the peculiarities of human resource management practices in NTPC limited. NTPC limited has a strong human resource base employing around 25,000 employees. It is therefore, necessary to examine the viewpoints of employees of NTPC limited in order to evaluate the human resource management practices followed by the corporation under study.

Objectives

The main objectives of the study were as under:

- To study the manpower planning practices followed by the NTPC limited.

- To study the recruitment and selection policies and practices followed by NTPC limited.

- To analyze the attitude of different categories of employees towards human resource management practices followed by NTPC limited.

Hypothesis

The study was undertaken with following hypothesis:-

H_1 The employees in general are satisfied with the recruitment and selection policies and practices followed of the corporation under study.

H_2 The existing human resource management policies in NTPC Ltd. are resulting into better performance and productivity of the corporation.

Methodology

The human resources planning and management practices in any organization may be affected by a number of components. We have considered the main components of human resource policies such as manpower planning, recruitment and selection policies and practices followed by NTPC limited. NTPC limited is having around 25,000 employees and it was not possible to make use of census method of investigation, therefore, sampling method of investigation has been used in order to know the opinion of employees towards the existing practices of manpower planning and management in NTPC Limited.

The management of NTPC limited has been divided into eleven regions namely CC region, ER region1, ER region2, Hydro region, JV region, Mining region, NCR region, NR region, SR region, Subsidiaries and WR region. The head office of NTPC is located at CC region. Overall control on different activities is exercised by the Corporate Office at New Delhi. We have selected CC and NCR region for the purpose of the present study. The CC and NCR region have approximately 5000 employees and we took the sample of 300 employees on the basis of convenient-cum-judgment method of sampling. In the study, we have tried to ensure the representation of all categories of employees such as managerial and workman at different levels. While making a choice for selecting the respondents a care has been taken to give more weightage to the experience. In order to get the required information a well designed questionnaire was prepared and administrated among the respondents of the selected regions. The information thus collected has been analyzed with the help of various statistical tools and techniques like WAS (Weighted Average Score), Standard Deviation, Skewness, Kurtosis, Chi-Square test and Contingency Co-efficient etc. Through the Likert Type Scale the score was calculated with the help of WAS(Mean), in which 5marks were allotted to Strongly Agree(SA), 4 marks to Agree(A), 3 to Undecided(U), 2 to Disagree(D) and 1 to Strongly Disagree(SD).

The most popularly used as a measure of representing entire data for one value is *Weighted Arithmetic Mean*. The weighted arithmetic mean, as a single number representing an entire data set, computed as under:-
where:-

$$\bar{X}w = \frac{\Sigma wx}{\Sigma w}$$

$\bar{X}w$ stands for weighted arithmetic mean,
x stands for variable values,
w stands for weight attached to variable values.

The standard deviation (σ) is a kind of average of all the deviation from the mean. It is also known as root mean square deviation for the reason that it is the square root of the mean of squared deviations from the arithmetic mean. It measures the absolute dispersion. Large amount of dispersion or greater value of standard deviation denotes greater magnitude of the deviations of the value from the mean and vice versa. The fundamental formula for computing this index of variability in the sample is:-

$$\sigma = \sqrt{\frac{\Sigma (x - \bar{x})^2}{N}}$$

Where:-

x = each value in the opulation
$\bar{x}$ = the mean of the values
N - the number of values (the population)

Co-efficient of Skewness has been used in order to understand the nature of the responses of the respondents regarding the various aspects of human resource management. Skewness shows the asymmetry of the frequency distribution. It denotes the degree of departure from symmetry and reveals the direction of scatterness of the items. *Karl Pearson's Co-efficient of Skewness* is calculated as under:-

$$SK = \frac{X - Z}{\sigma}$$

Where:-

X= Mean, Z= Mode, σ = Standard Deviation.

Kurtosis refers to the degree of flatness or peakedness in the region about the mode of a frequency curve. If the curve is more peaked than the normal curve, it is 'leptokurtic' and if a curve is more flat toped than the normal curve it is 'platykurtic'. The normal curve itself is known as mesokurtic. y_2 the derivative of β_2, is used as a measure of kurtosis, $y_2 = \beta_2 - 3$

For a normal distribution y_2=0. If y2 is positive, the curve is leptokurtic and if y_2 is negative, the curve is platykurtic.

χ^2 *test* of independence has been used to study the relationship between various demographic variables to the perception and attitude towards various aspects of human resource management. It describes the magnitude of difference between observed frequency and the expected frequency. It is test of independence, to know the likelihood by taking independent and dependent variables viz. designation of the respondent and perception towards human resource planning. The equation of χ^2 *test* is stated as under:-

$$X^2 = \sum \frac{(o - e)^2}{e}$$

Where:-

'o' refers to the observed frequency,
'e' refers to expected frequency
χ^2 = Symbol used for chi-square

Decision Rule:

If $\chi^2 > \chi^2 u$ then reject Ho otherwise, accept Ho

Where:-

χ^2 = calculated value of chi-square,

$\chi^2 u$= expected value of chi-square.

Contingency co-efficient has been used because the χ^2 *test* measures only the association between the elements, whereas contingency coefficient has been calculated to measure the strength of association in a table of any size. It is used to record and analyze the relation between two or more categorical variables. The value of contingency coefficient varies between 0 to 1. If there is no association then it can be said that the two variables are independent and if there is an association, then the two variables are dependent. The formula for calculating contingency co-efficient is as follows:-

$$C = \sqrt{\frac{\chi^2}{N + \chi^2}}$$

Where

χ^2 is derived from Pearson's χ^2 test, and N is the grand total of observations.

Results and Discussion

Human resource planning

Manpower planning is a neglected area in the Indian context. Only few companies indulge in this practice. Forecasting of long term manpower requirements helps organization to forecast the compensation cost involved. Effective human resource planning enables through performance appraisals in the manpower management cycles, determination of weaknesses of the existing manpower so that corrective training could be incorporated. It is thus the job of management of good companies to develop such skills in their employees showing potential. This can be only done through adequate manpower planning which makes it possible to plan career of the employees having the necessary potential. The perception of employees towards human resource planning strategies of NTPC have been analyzed in the light of various aspects of human resource planning such as age, salary, experience and their respective position in the organization. The information regarding these have been shown in tables 1 to 4.

Table 1: Age and human resource planning

Age	Is human resource planning initiated properly in NTPC?		Total
	Yes	No	
Below 26 years	22 (75.86)	7 (24.14)	29 (100)
26-50 years	140 (70.71)	58 (29.29)	198 (100)
51 years & above	35 (47.95)	38 (52.05)	73 (100)
Total	197 **(65.67)**	103 **(34.33)**	300 **(100)**

χ^2 = 13.74,   P= 0.001   C=0.209
(Figures in parenthesis shows percentages)

Table 1 shows that there is a significant relationship between age and human resource planning. The χ^2 test of independence shows that the relationship is significant at 1% level. The frequency table also shows that the 75.86% of the respondents below the age of 26 years have shown positive attitude towards human resource planning. The respondents of the age group of more than 51 years have shown a lower percentage (49.95%) towards proper human resource planning. It may be due to the reason that they are not positively accepting the entry of young people in the organizations at comparable levels to them. It can be concluded that the young respondents have perceived that organization is following good human resource planning practices.

Table 2: Salary and human resource planning

Salary (Rs.)	Is human resource planning initiated properly in NTPC?		Total
	Yes	No	
Upto 30000	37 (77.08)	11 (22.92)	48 (100)
30001 to 45000	101 (71.13)	41 (28.87)	142 (100)
45001 & above	59 (53.64)	51 (46.36)	110 (100)
Total	197 (65.67)	103 (34.33)	300 (100)

χ^2 = 11.71,   P= 0.002   C=0.194
(Figures in parenthesis shows percentages)

The association between salary and human resource planning is presented in table-2. The χ^2 value indicates that there is significant relation between these variables. The results show that majority (77.08%) of the respondents with salary less than 30,000 have shown positive attitude towards human resource planning. It has also been found that the respondents with salary range 30,001 to 4,5000 have shown almost similar results with 71.13%. The employees with salary more than 45,001 have also perceived it positively but with a lesser percentage (53.64%). It is interesting to note that the favorable attitude of the employees towards human resource planning is decreasing with the increase in the level of their salary. It may be due to the reason that as the employees moves towards higher salary levels they get an insight of the strategies and their perception is changing. It can be concluded that the employees with salary lesser than 45000 have perceived that organization is following good human resource planning practices.

Table 3: Experience and human resource planning

Experience	Is human resource planning initiated properly in NTPC?		Total
	Yes	No	
Upto 15 years	76 (60.80)	49 (39.20)	125 (100)
16-30 years	100 (70.42)	42 (29.58)	142 (100)
31 years & above	21 (63.64)	12 (36.36)	33 (100)
Total	197 (65.67)	103 (34.33)	300 (100)

χ^2 = 2.80,   P= 0.247   C=0.096
(Figures in parenthesis shows percentages)

The relationship between the experience of the employees and proper human resource planning has been worked out in table-3. The responses shows that the respondents with experience in the range of sixteen to thirty years has shown the positive attitude (70.42%) towards human resource planning. 63.64% of the employees with experience of more than 31 years have also shown a favorable attitude towards proper human resource planning. Further the majority of the respondents(60.80%) having experience upto 15 years have perceived the proper human resource planning. The χ^2 test of independence shows that the relationship between experience and perception towards the proper human resource planning is not significant. It can be

concluded that majority of the respondents with different years of experience feel that there is a proper human resource planning in NTPC limited.

The respondents categorized according to their positions in the organization and their response towards human resource planning has been depicted in table 4. The table reveals that the majority (65.67%) of the respondents in the different ranks have stated affirmatively towards human resource planning. Whereas only 34.33% of the employees of the different categories stated that the human resource planning is not properly initiated in NTPC. On the basis of this information, it can be concluded that majority of the employees with different positions held in the organization were of the view that there is a proper human resource planning in the organization.

Table 4: Post held and human resource planning

Post held	Is human resource planning initiated properly in NTPC?		Total
	Yes	No	
Upto AM	49 (64.47)	27 (35.53)	76 (100)
MGR to DGM	99 (66.44)	50 (33.56)	149 (100)
AGM & above	49 (65.33)	26 (34.67)	75 (100)
Total	197 (65.67)	103 (34.33)	300 (100)

χ^2 = 0.91,   P= 0.955   C=0.0179
(AM-Assistant Manager,
MGR-Manager,
DGM-Deputy General Manager,
AGM- Additional General Manager)

While analyzing the attitude of respondents towards human resource planning (table-5) 30.33% of the respondents have expressed their strong agreement to the statement "Human resource planning is done keeping in view the organizational goals". The mean score is more than the mean standard score i.e. 3 at five point Likert scale. The variation in the opinion for this statement have been worked out 1.38. Further the negative value of Skewness states that opinion is scattered more towards higher side. It is also supported by the calculated value of kurtosis. While applying χ^2 test of goodness of fit, it is significant implying that the opinion of the respondents is not equally distributed. Thus it can be concluded that majority of the respondents perceive that the human resource planning

Table 5: Employees attitude towards human resource planning practices in NTPC

S. No.	Statement	Frequences					WAS (Mean)	S.D.	Skew-ness	Kurto-sis	Chi-Square	P-Value
		Strongly Agree	Agree	Un-decided	Dis-Agree	Strongly Disagree						
1	Human resource planning is done keeping in view the organizational goals.	91 (30.33)	112 (37.33)	31 (10.33)	21 (7.00)	45 (15.00)	3.61	1.38	-0.834	-0.572	104.200	0.000
2	Human resource planning is initiated keeping in view the existing organization structure and manpower requirements.	20 (6.67)	22 (7.33)	148 (49.33)	93 (31.00)	17 (5.67)	2.783	0.91	0.522	0.605	228.767	0.000
3	Proper job analysis is done keeping in mind the job description and specification.	13 (4.33)	15 (5.00)	170 (56.67)	48 (16.00)	54 (18.00)	2.617	0.98	-0.051	0.134	275.230	0.000

Note: Figures in parenthesis shows percentages.
WAS- Weighted Average Score, S.D.- Standard Deviation.

is done keeping in view the organizational goals in the organization.

The perception of employees on the statement *"Human resource planning is initiated keeping in view the existing organization structure and manpower requirements"* shows that the 6.67% of the respondents were strongly agree and 7.33 % of the employees were agree to the statement. 49.33 % of the respondents were undecided about this statement. Whereas 31% of the respondents were found disagreed with the statement. The responses of employees relating to this statement deviates (0.91) up to some extent from the mean value. The results relating to Skewness and kurtosis also show the same direction. The χ^2 test of goodness of fit establishes the significance.

The opinion of the respondents regarding the statement *"Proper job analysis is done keeping in mind the job description and specification"* reveals that the majority of the respondents (56.67%) were undecided on this statement. The mean score is 2.617 which also supporting the viewpoint of respondents. The variation in the opinion is 0.98 which indicates deviation up to some extent from the mean value. The results relating to Skewness and kurtosis also support the above results. The χ^2 test of goodness of fit indicates that it is significant at one percent level.

The overall results shows a positive attitude of the respondents towards different aspects of human resource planning. However, there is an indication that the organization further need to improve its human resource planning strategies so as to achieve the maximum efficiency level.

Recruitment and selection policies

Recruitment and selection are very important aspects of human resource management. In today's rapidly changing business environment, organizations have to respond quickly for the requirements of manpower. Requirement for a manpower may arise due to transfer, promotion, retirement, termination, permanent disability or death, expansion of operations, diversification, growth or job re-classification. Therefore, it is important to have a well-defined recruitment policy in place, which can be executed effectively to get the best talent for the vacant positions. Selecting the wrong candidate or rejecting the right candidate can affect the overall performance of the organization. Hence, it becomes necessary to have an effective recruitment and selection policy in any organization. NTPC limited is following a transparent recruitment and selection policy as the organization is recruiting the candidates as per the guidelines of Government of India. 1n order to know the attitude of respondents towards overall recruitment and selection policies followed by NTPC, the satisfaction level of respondents of different age groups, salary level, experience and their position in the organization has been analyzed in table-6 to 9.

Table 6 shows that there is a significant relationship between age and satisfaction with recruitment and

Table 6: Age and satisfaction with recruitment and selection policies.

Age	Are you satisfied with the recruitment and selection policies followed by NTPC?		Total
	Yes	No	
Below 26 years	25 (86.21)	4 (13.79)	29 (100)
26-50 years	185 (93.43)	13 (6.57)	198 (100)
51 years & above	34 (46.58)	39 (53.42)	73 (100)
Total	244 (81.33)	56 (18.67)	300 (100)

χ^2 = 77.64,   P= 0.999   C=0.453
(Figures in parenthesis shows percentages)

selection policy. The frequency shows that majority of the respondents upto the age of 50 years have expressed their satisfaction on the recruitment and selection policies followed by NTPC whereas the majority of the respondents (53.42%) in the age of fifty one years and above were found dissatisfied with the existing recruitment and selection policies of the organization. 81.33% of the respondents from all age groups were found satisfied with the recruitment and selection policies followed by NTPC.

The distribution of respondents on the basis of salary and their satisfaction with the recruitment and selection policy is shown in table-7. The table reveals that there were 85.42 % respondents with salary upto

Table 7:   Salary and satisfaction with recruitment and selection policies.

Salary (Rs.)	Are you satisfied with the recruitment and selection policies followed by NTPC?		Total
	Yes	No	
Upto 30000	41 (85.42)	7 (14.58)	48 (100)
30001 to 45000	123 (86.62)	19 (13.38)	142 (100)
45001 & above	80 (72.73)	30 (27.27)	110 (100)
Total	244 (81.33)	56 (18.67)	300 (100)

χ^2 = 8.51,   P= 0.014   C=0.166
(Figures in parenthesis shows percentages)

30,000 and 86.62% of the respondents with salary 30001 to 45000 were satisfied with the recruitment and selection policy of the organization. On the basis of this information, it can be stated that majority of the employees with different salary structures are satisfied with the recruitment and selection policy of NTPC limited.

The different level of experience of the respondents and their level of satisfaction towards the recruitment and selection polices of NTPC has been presented in table-8. The information presented in the table shows that the large majority of respondents (90.40%) with experience upto 15 years have expressed their

Table 8: Experience and satisfaction with recruitment and selection policies.

Experience	Are you satisfied with the recruitment and selection policies followed by NTPC?		Total
	Yes	No	
Upto 30000	113 (90.40)	12 (9.60)	125 (100)
30001 to 45000	109 (76.76)	33 (23.24)	142 (100)
45001 & above	22 (66.67)	11 (33.33)	33 (100)
Total	244 (81.33)	56 (18.67)	300 (100)

χ^2 = 13.40,   P= 0.001   C=0.27
(Figures in parenthesis shows percentages)

satisfaction with recruitment and selection policies. Similarly, a majority of the employees (76.76%)in the experience range of 16-30 years have also found satisfied with the existing recruitment and selection policies followed in NTPC. The respondents having experience more than 31 years were also found satisfied(66.67%) with the recruitment and selection policy of NTPC. Further, the relationship between experience and satisfaction level of employees towards the recruitment and selection policy is significant. The overall results clearly indicate that majority of the respondents were satisfied with the recruitment policy followed in NTPC limited.

The different positions held by the respondents and their satisfaction towards recruitment and selection policies followed by NTPC Ltd. has been presented in table-9.

Table 9: Post and satisfaction with recruitment and selection policies.

Post held	Are you satisfied with the recruitment and selection policies followed by NTPC?		Total
	Yes	No	
Upto 30000	61 (80.26)	15 (19.74)	76 (100)
30001 to 45000	122 (81.88)	27 (18.12)	149 (100)
45001 & above	61 (81.33)	14 (18.67)	75 (100)
Total	244 (81.33)	56 (18.67)	300 (100)

$\chi^2 = 0.87$, P= 0.958 C=0.017

(Figures in parenthesis shows percentages)
(AM-Assistant Manager,
MGR-Manager,
DGM-Deputy General Manager,
AGM- Additional General Manager)

The table makes it clear that the majority of the respondents in all the positions were found satisfied with the recruitment and selection policy of the organization. Hence, it can be concluded that majority of the respondents with different designations are satisfied with the recruitment and selection policy followed by NTPC limited.

Table-10 presents the attitude of employees towards the recruitment and selection procedure and practices followed by NTPC. For the statement, "Proper procedure is followed for recruitment and selection", 29.67% respondents were strongly agreed and 27% were agreed to this statement. The WAS for this statement was worked out as 3.70. Further, the negative value of skewness states that opinion is scattered more towards higher side. It is also supported by the calculated value of kurtosis. While applying χ^2 test of goodness of fit, it is significant which infer that the opinion of the respondents is not equally distributed. Thus, it can be concluded that a proper procedure is followed for recruitment and selection in NTPC limited.

The analysis for the statement, "The criteria adopted for recruitment is according to manpower planning" shows that 23.67% of the employees have expressed their agreement in favor of this statement and 27.67% were found undecided on this statement. The mean value (2.86) found in the results is less than the mean standard score (3). The deviation from the mean value is 1.08, which shows that the employees

have different perceptions about this view. The results of Skewness and kurtosis also give the same direction.

The majority of the respondents expressed their agreement with the statement, "The selection process is adequate & fair" shows that the majority of the employees (10% strongly agreed and 39.67% agreed) have expressed their agreement with this statement. The mean score (3.36) is more than the mean standard score for this statement. The negatively skewed value also indicates that opinion is scattered more towards higher side. It is also supported by the calculated value of kurtosis. While applying χ^2 test of goodness of fit, it is significant at 1% level. Thus it can be concluded that 'Screening of the applications is done properly' and 'The selection process is adequate & fair' in NTPC limited.

For the statement, "The cost involved in the recruitment and selection process is on higher side" the majority of the respondents expressed their disagreement (50.67%). The mean score is 2.39 which is less than the mean standard score. The value of Skewness and Kurtosis also supports the results. On the basis of this information, it can be concluded that majority of the employees do not agree to this statement. On the statement, "Constitutional considerations like SC, ST reservations are duly taken care of during the recruitment & selection process" a considerable majority of the respondents were found in agreement (38.33% agreed and 27% strongly agreed). Further, the values of mean, skewness and kurtosis also supports the results. While applying χ^2 test of goodness of fit, it is significant implying that the opinion of the respondents is not equally distributed. Thus it can be concluded that the constitutional considerations like SC and ST reservations are duly taken care of during the recruitment & selection process in the organization under study. The opinion of the employees towards the statement "The final selection of the candidates is done by the appropriate panel which consists of highly experienced and work knowledge people" have shown that the 45.67% have expressed their agreement with this statement(WAS=3.58). The mean score in this case also is more than 3. The negative value of Skewness indicates that opinion is scattered more towards higher side. While applying χ^2 test of goodness of fit, it is significant implying that the opinion of the respondents is not equally distributed. It can be concluded that the final selection of the candidates is done by the appropriate panel which consists of highly experienced and work knowledge people.

Table 10: Employees attitude towards recruitment and selection policies of NTPC   (N = 300)

S. No.	Statement	Frequences					WAS (Mean)	S.D.	Skewness	Kurtosis	Chi-Square	P-Value
		Strongly Agree	Agree	Un-decided	Dis-Agree	Strongly Disagree						
1	Proper procedure is followed for recruitment and selection.	89 (29.67)	81 (27.00)	95 (31.67)	21 (7.00)	14 (4.67)	3.70	1.11	-0.529	-0.319	102.400	0.000
2	The criteria adopted for recruitment is according to manpower planning.	20 (6.67)	71 (23.67)	83 (27.67)	101 (33.67)	25 (8.33)	2.86	1.08	0.187	-0.766	85.933	0.000
3	Screening of the applications is done properly.	43 (14.33)	126 (42.00)	84 (28.00)	29 (9.67)	18 (6.00)	3.49	1.05	-0.645	0.028	132.433	0.000
4	The selection process is adequate & fair	30 (10.00)	119 (39.67)	95 (31.67)	40 (13.33)	16 (5.33)	3.36	1.01	-0.487	-0.175	132.367	0.000
5	The cost involved in the recruitment and selection process is on higher side.	19 (6.33)	27 (9.00)	54 (18.00)	152 (50.67)	48 (16.00)	2.39	1.06	0.921	0.369	190.233	0.000
6	Constitutional considerations like SC, ST reservations are duly taken care of during the recruitment & selection process.	81 (27.00)	115 (38.33)	43 (14.33)	36 (12.00)	25 (8.33)	3.64	1.23	-0.751	-0.425	92.600	0.000
7	The final selection of the candidates is done by the appropriate panel which consists of highly experienced and work knowledge people.	46 (15.33)	137 (45.67)	77 (25.67)	25 (8.33)	15 (5.00)	3.58	1.01	-0.749	0.314	161.067	0.000

Note: Figures in parenthesis shows percentages.
WAS- Weighted Average Score, S.D.- Standard Deviation.

On the basis of this analysis, it can be stated that there is a structured recruitment and selection policies in the organization under study and the employees in general are satisfied with the recruitment and selection policies and practices followed by the corporation under study. This conclusion is in conformity with H_1 (*The employees in general are satisfied with the recruitment and selection policies and practices followed of the corporation under study*). Hence, *H_1 is accepted.*

Satisfaction with human resource management policies and practices

This section of the paper covers the perception of employees towards overall human resource management practices followed by NTPC limited Table-11 presents the responses of employees of NTPC limited towards the affect of human resource

Table 11: Affect of human resource management policies and practices.

Does human resource management policies and practices really affect the performance of employees in the organization?		
Response	Respondents	Percentage
Yes	246	82.00
No	54	18.00
Total	300	100.00

Table 12: Age and satisfaction with human resource management practices.

Age	Level of satisfaction					Total
	HS	S	UD	D	HD	
Below 26 years	10 (34.48)	15 (51.72)	2 (6.90)	2 (6.90)	0 (0.00)	29 (100)
26-50 years	53 (26.77)	133 (67.17)	4 (2.02)	5 (2.53)	3 (1.52)	198 (100)
51 years & above	35 (47.95)	0 (0.00)	12 (16.44)	15 (20.55)	11 (15.07)	73 (100)
Total	98 (32.67)	148 (49.33)	18 (6.00)	22 (7.33)	14 (4.67)	300 (100)

$\chi^2 = 1.21$,   P= 0.000   C= 0.536

(Figures in parenthesis shows percentages)
(HS- Highly Satisfied, S-Satisfied, UD-Undecided, D-Dissatisfied, HD-Highly Dissatisfied)

management policies on their performance level. A large majority of employees (82%) pointed out that the human resource management policies really affect the performance of employees in an organization. Only 18% of the employees expressed that there was no affect of human resource management practices on performance of the employees in the organization.

The satisfaction of employees with human resource management practices is presented in table-12. The χ^2 test of independence indicates that there is significant relationship between age and satisfaction level.

The frequency table shows that majority of the respondents from all age groups are falling towards higher side. 32.67% of the employees were highly satisfied and 49.33% were found satisfied. Satisfaction level is noted maximum in the age group of 26-50 years. Whereas 20.55% of the employees in the age group of

51 years and above were found dissatisfied with the human resource management practices in NTPC. The results shows that the satisfaction level of employees with different age groups is not similar whereas, most of the employees are satisfied with human resource management practices followed in NTPC limited.

Table-13 depicts the satisfaction of employees with human resource management practices having different years of experience. The χ^2 value shows that there is significant relationship between experience and satisfaction level. The frequency table shows that 38.40% of the employees with experience less than sixteen years were highly satisfied and 52% were found satisfied. In the age group of 16-30, 27.46% employees were highly satisfied and 50.70% were satisfied. The results reveals that most of the employees of each group were found satisfied with the human resource management practices followed in NTPC limited.

Table 13: Experience and satisfaction with human resource management practices.

Experience	Level of satisfaction					Total
	HS	S	UD	D	HD	
Upto 15 years	48 (38.40)	65 (52.00)	5 (4.00)	5 (4.00)	2 (1.60)	125 (100)
16-30 years	39 (27.46)	72 (50.70)	9 (6.34)	12 (8.45)	10 (7.04)	142 (100)
31 years & above	11 (33.33)	11 (33.33)	4 (12.12)	5 (15.15)	2 (6.06)	33 (100)
Total	98 (32.67)	148 (49.33)	18 (6.00)	22 (7.33)	14 (4.67)	300 (100)

$\chi^2 = 16.57$,   P= 0.035   C= 0.229

(Figures in parenthesis shows percentages)
(HS- Highly Satisfied, S-Satisfied, UD-Undecided, D-Dissatisfied, HD-Highly Dissatisfied)

Table 14: Post held and satisfaction with human resource management practices.

Post Held	Level of satisfaction					Total
	HS	S	UD	D	HD	
Upto AM	25 (32.89)	36 (47.37)	5 (6.58)	8 (10.53)	2 (2.63)	76 (100)
MGR to DGM years	48 (32.21)	75 (50.34)	8 (5.37)	8 (5.37)	10 (6.71)	149 (100)
AGM & above	25 (33.33)	37 (49.33)	5 (6.67)	6 (8.00)	2 (2.67)	75 (100)
Total	98 (32.67)	148 (49.33)	18 (6.00)	22 (7.33)	14 (4.67)	300 (100)

$\chi^2 = 4.846$,   P= 0.774   C= 0.126

(Figures in parenthesis shows percentages)
(AM-Assistant Manager,
MGR-Manager,
DGM-Deputy General Manager,
AGM- Additional General Manager)

The satisfaction level of employees of different positions with human resource management practices have been shown in table-14. In the analysis, χ^2 test of independence shows that the relationship is not significant between post held and satisfaction level.

While assessing the viewpoints of the employees on the major dimensions of human resource management viz. human resource planning, recruitment and selection, training and development, promotion and transfer, compensation and incentives, performance appraisal, redressal of grievances, quality of work-life and working conditions etc. in NTPC Limited, the respondents were asked to assign the rank for these dimensions keeping in view their respective importance to the effective human resource management in the corporation. The information regarding this has been worked out in table-15. The table shows that the respondents have given first rank to remuneration and incentives. The second rank is given to quality of work life and working conditions. Promotions and transfer is given third rank by the respondents. Fourth rank is given to recruitment and selection practices followed in the organization. Grievance redressal and human resource planning are being given fifth and sixth rank respectively. Seventh rank is given to training and development. The last rank i.e. eighth is given to performance appraisal system followed in the organization.

Conclusions and Implications

Human resource planning is the corner-stone of management of human resources. NTPC limited is following a proper human resource planning strategies, based on its corporate business objectives. The human resource department of NTPC undertakes various manpower planning strategies such as establishing the job specifications or the qualitative requirements of jobs, determining the number of personnel required and developing sources of supply of manpower. This has been supported by the analysis based on perception of employees towards human resource planning strategies of NTPC limited which revealed that they have shown their positive attitude towards the existing practice of human resource planning in the corporation. The majority of young employees stated that the human resource planning strategies are initiated properly in NTPC. However, 34.33% of the employees from the all age groups stated that the human resource planning in NTPC is not done properly. On the basis of this finding, it can be suggested that the proper human resource planning aspect needs to be strengthened on the basis of a proper job analysis and job contents. This will help the organization to anticipate the right talent required in future and their further utilization towards the betterment of the organization as a whole.

Recruitment is a process of discovering the sources of manpower to meet the requirements of the organization. It forms a means for attracting manpower in adequate numbers to permit effective selection of a capable and productive workforce. NTPC limited employs different kind of skilled and unskilled manpower for its smooth functioning. The organization has framed its recruitment and selection policy keeping in view the requirements of the services of various technical and non-technical professionals. NTPC limited being a central public sector enterprise, for its recruitment and selection procedure has to abide by the various guidelines of Department of Public Enterprises and Government of India issued from time to time.

Table 15 Importance of the different dimensions of human resource management in NTPC (ranking) (N = 300)

S. No.	Dimensions	Respondents giving 1st Rank	WS	Respondents giving 2nd Rank	WS	Respondents giving 3rd Rank	WS	Respondents giving 4th Rank	WS	Respondents giving 5th Rank	WS	Respondents giving 6th Rank	WS	Respondents giving 7th Rank	WS	Respondents giving 8th Rank	WS	TWS	RANK
1	Human Resource Planning.	16	128	15	105	19	114	25	125	30	120	166	498	19	38	10	10	1138	VI
2	Recruitment and Selection.	14	112	15	105	20	120	170	850	16	64	21	63	25	50	19	19	1383	IV
3	Training and Development	24	192	38	266	16	96	12	60	21	84	17	51	149	298	23	23	1070	VII
4	Promotion and Transfer.	23	184	22	154	168	1008	19	95	15	60	13	39	14	28	26	26	1594	III
5	Compensation and Incentives.	138	1104	38	266	17	102	25	125	19	76	10	30	27	54	10	10	1815	I
6	Performance Appraisal.	11	88	13	91	21	126	16	80	32	128	10	30	20	40	177	177	760	VIII
7	Grievance Redressal	22	176	30	210	24	144	18	90	149	596	14	42	21	42	22	22	1322	V
8	Quality of Work Life and Working Conditions	52	416	129	903	15	90	15	75	18	72	33	99	25	50	13	13	1718	II

Note:- First rank is given a score of eight, second rank a score of seven, third rank a score of six, fourth rank a score of five, fifth rank a score of four, sixth rank a score of three, seventh rank a score of two and eighth rank a score of one, Ranking is done on the basis of Total Weighted Score (TWS). WS denotes weighted scores.

Through the present study, the satisfaction level of employees towards the recruitment and selection was measured keeping in view their age, experience, salary and position held by them in the organization. A large majority(81.33%) of the employees stated that they were satisfied with the recruitment and selection policy of NTPC. The employees of the organization, when asked to express their attitude towards the procedure followed by the corporation for recruitment and selection, a considerable majority expressed that the proper procedure is followed for recruitment and selection in NTPC. Further a large number of respondents have admitted that the selection process is fair in the organization. By and large the employees have expressed their faith in the selection process and they were found satisfied with the recruitment and selection policies and practices of the organization. These findings are in conformity with hypothesis (H1) that *'The employees in general are satisfied with the recruitment and selection policies and practices followed by the organization'* has been verified. Hence, **H_1 was accepted.**

While analyzing the attitude of the employees towards the overall human resource management policies and practices followed by the corporation, it was found that the large majority of employees(82%) were in the opinion that human resource policies really affect the performance of the organization. The majority of the employees on the basis of their age, experience, salary and status and position held by them in the organization were found satisfied with the existing human resource policies and practices followed by the corporation. Therefore, the hypothesis (H2) that *'The existing human resource management policies in NTPC Ltd. are resulting into better performance and productivity of the corporation'* were verified and confirmed. Hence, **H_2 was accepted.** Since the economic situation is changing, in order to meet the challenges of the dearth of the talented manpower, the organization needs to modify its recruitment and selection policies so that the organization is capable of acquiring the best available talent from the market.

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> *Effective leadership is not about making speeches or being liked; leadership is defined by results not attributes.*
>
> —*Peter Drucker*

When it Comes to Motivation of Entrepreneurs-A Few Issues

RIMU CHAUDHURI, SOUMYENDRA KISHORE DATTA AND SUBHABRATA GHOSH

An entrepreneur is guided by some motives which inspire him to find the opportunity, choose the proper product or services, channelize the resources in proper direction and earn profit for the sustenance of the business in the long run.

The article tries to identify the major dimensions of human motivation affecting entrepreneurial behavior and also tries to determine the correlation among various motivational variables and their individual importance in regards to an entrepreneur's decision to start his own venture. Lastly the study focuses on the entrepreneurs' motivation level for each motivational variable.

The major finding of our study is that money motive is of paramount importance for an entrepreneur whereas an entrepreneur is least motivated by the achievement of targets and standards motive.

Rimu Chaudhuri is Assistant Professor, Heritage Institute of Technology-MEC , Kolkata; Soumyendra Kishore Datta is Professor, Department of Economics, University of Burdwan; and Subhabrata Ghosh is a post-graduate in Commerce from the University of Burdwan.

Entrepreneurs build companies that are specifically crafted to exploit a particular opportunity. This gives them an advantage over older companies that were designed in response to challenges of the past and must change to adapt to today's requirements. Entrepreneurs can build new companies. They can also rejuvenate existing companies via buyouts and turnarounds. They can also build new companies inside existing companies, which can be called corporate entrepreneurship.

All successful entrepreneurs should have the following qualities-inner drive to succeed, strong belief in themselves, search for new ideas and innovation, openness to change, competitive by nature, highly motivated and energetic, accepting of constructive criticism and rejection.

Recent research has been relatively accepting of arguments that people vary in their willingness and ability to engage in the entrepreneurial process because of non-motivational individual differences. Researchers have shown that the willingness of people to pursue entrepreneurial opportunities depends on such things as their opportunity cost (Amit, Meuller & Cockburn, 1995), their stocks of financial capital (Evans & Leighton, 1989), their social ties to investors (Aldrich & Zimmer, 1986), and their career experience (Carroll & Mosakowski, 1987; Cooper, Woo & Dunkleberg, 1989).

From the literature available on the entrepreneurial motivation, we find that the following motivational variables were introduced, identified and studied by various renowned researchers in various era that influence an entrepreneur: **Need for achievement** (i.e.; n-Ach of McClelland, 1961), **Risk taking** (McClelland, 1961), **Tolerance for ambiguity** (Schere, 1982), **Locus of control** (McClelland (1961), **Self-efficacy** (Bandura, 1997), **Goal-**

setting (Tracy, Locke, and Renard,1998), **Independence** (Hisrich,1985), **Drive** (Locke & Latham, 1990), **Egoistic passion** (Baum, 2001).

Entrepreneurship literature these days has very little to say about motives. It is, however, not implied that motives are not an important influence on entrepreneurial behavior. After all, it is logical to presume that every action of an individual is guided by some motive or the other and is intended to satisfy a basic need in the individual. There is, therefore, no action without a motive to satisfy a need. This implies even to reflex actions, not to speak of deliberate and calculated actions involved in entrepreneurial behavior. It is therefore; legitimate to look for the 'why' of entrepreneurial behavior, which would naturally take us back to the question of entrepreneurial motivation. Thus the importance of the person in any entrepreneurial pursuit is undeniable. Since the entrepreneur is to a large extent responsible for the creation of his enterprise (Manimala and Pearson, 1995), it is for this reason that the characteristics of the founder could be a powerful influence on the performance and growth of the enterprise. In fact, the single most important influence on the culture of a fledgling enterprise is that of its founder (Manimala,1986).

It is true that the start up of a new enterprise would depend on many factors other than the person such as market, technology, capital and so on. These factors , however, would create nothing unless they are coordinated by the entrepreneurial person who spots the opportunity, chooses the appropriate product and market, finances the project using the appropriate resource mix, selects the right people for the right tasks, and so on. It then appears that the person is the most important factor in the process.

In our study, we tried to focus our research on the motivational criteria of the entrepreneurs of the refractory-making industry on which very little research-work was carried out previously. In that sense, the refractory-making industry is somewhat neglected by the previous researchers which is evident from the lack of literature on our area of research.

We, therefore, tried to link various previously researched motivational variables with the entrepreneurs in the refractory-making industry in the studied region to find out their relevance in case of the refractor- makers. This study will definitely highlight the motivation factors of the entrepreneurs in the refractory-making industry and will open up the scope for further research.

Objectives

The objective of this paper is to take a look at some important question of entrepreneurial motivation and to revisit the importance of different types of motivations of entrepreneurs in their already established enterprise.

The main opportunities for us are to examine the following:

i) Major dimensions of human motivation as well as entrepreneurial motivation

ii) The empirically defined and demonstrated concepts of some of the well researched motives

iii) The effects of these motives on the already established firm.

Methodology

Data for the study was collected through interview and questionnaires of 60 established entrepreneurs in the field of refractory situated in the region of Barakar to Raniganj (in the vicinity of Asansol) in West Bengal. Beside this, data was also collected with the help of oral history of those 60 entrepreneurs whose level of investment is between Rs. 10 lakh to Rs.1.5 crore. The questionnaire on motivation had 13 variables and data on these items forms the basis of this paper.

The questionnaires were given to 60 entrepreneurs selected on the basis of region and their amount of investment (which varies from Rs.10 lakh to Rs.1.5 crore) and all the 60 entrepreneurs responded properly without fail. The 13 variables of motivation were factor analyzed to identify the independent motives that are relevant for work. This analysis enabled us to re-examine the conceptual foundations of certain well established motives such as money motive, desire for independence motive, desire to do something new and path breaking etc. Inter-correlation among all these 13 motivational variables have been done. Not only this, the ranking on the basis of mean is also analyzed to see which motivation is of maximum importance so that we can analyze the behaviour pattern of already established entrepreneur. Lastly, we have calculated the percentage of entrepreneur with high and low level of motivation for each motivational variable.

In the present study, 13 motivational variables is considered based on prior research on human motives that influences human decision-making regarding setting up of entrepreneurial ventures. These 13 motivational variables are shown below:

TABLE 1: Table showing the motivation variables along with the respective codes:

VARIBLE CODE	DESCRIPTION
MV 1	Money motive
MV 2	Capability development and utilization
MV 3	Desire to do something new and path-breaking
MV 4	Satisfaction from one's work
MV 5	Aspiration for independent work
MV 6	Desire to lead a group and being recognized
MV 7	Desire to introduce novelty in task to avoid monotony
MV 8	Achievement of targets and standards set by oneself and others
MV 9	Working because it is one's duty(Deontic motive)
MV 10	Desire for social status
MV 11	Desire for a top position in the industry
MV 12	Desire to belong to a group
MV 13	Desire for influencing other

Findings and Analysis

The 13 statements on motives initially chosen on the basis of prior research on human motives are factor-analysed to identify the major work motives of an individual. The five factors, identified in the factor analysis, are shown in the following table, i.e. table-2 with the details of the variables and their loadings. Each of these factors is briefly described below, with the special emphasis on their implications for the conceptual definitions of certain well researched motives.

Findings of factor analysis:

The 13 variable of human motivation, initially chosen on the basis of prior research on human motives, were factor-analysed to identify the principal motives of an individual to become an entrepreneur. The five factors that were identified in the factor analysis were mentioned in the above table, with the details of their variables and their respective loadings. Each of these factors is briefly discussed below.

Success motive (F1):

This dimension combines five motives(arranged in the ascending order of their loading)-

Table 2: Table showing the details of factor analysis of variables and their respective loadings:

Success motive (F1)		Self-governing & status Motive (F2)		Financial security Motive (F3)		Innovation & Achievement Motive (F4)		Self- development & Leadership Motive (F5)	
Variable code & Description	Factor loading	Variable code & Description	Factor loading	Variable code & Description	Factor loading	Variable code & Description	Factor loading	Variable code & Description	Factor loading
1. 2. MV11- Desire for a top position in the industry	0.85	1. MV4- Satisfaction from one's work	0.82	1. MV1- Money motive	0.89	1. MV3- Desire to do something new and path-breaking	0.62	1. MV2- Capability development and utilization	0.94
2.MV12- Desire to belong to a group	0.83	2. MV5- Aspiration for independent work	0.77			2. MV8- Achievement of targets and standards set by oneself and others	-0.81	2. MV6- Desire to lead a group and being recognized	0.43
3. MV7- Desire to introduce novelty in task to avoid monotony	0.68	3. MV10- Desire for social status	0.61						
4. MV13- Desire for influencing other	0.60								
5. MV9- Working because it is one's duty	0.44								

i) Desire for a top position in the industry

ii) Desire to belong to a group

iii) Desire to introduce novelty in task to avoid monotony

iv) Desire for influencing other

v) Working because it is one's duty

These motives describe best an entrepreneur's desire to become successful and become the leader in his respective industry. We can arrange the above variables in the following sequence:

a) Form a group consisting of individuals with different skills

b) Influence the group members by his leadership qualities

c) Introducing novelty in task to motivate the group members

d) Working together towards a common goal in an responsible manner with utmost sincerity

e) Transforming oneself from the leader of a particular organization to a leader of a particular industry

It is noticeable that deontic motive i.e., working because it is one's duty, is not an independent motive. In our study, deontic motive has been found as a minor contributor, which is associated with other factors, towards an entrepreneur's success.

Self-governing and status motive (F2):

In the present analysis, the second principal component which is extracted consists of three components –

i) Satisfaction from one's work

ii) Aspiration for independent work

iii) Desire for social status

These motives keep focus on an individual's inclination of working independently by setting up his own venture. It suggests that an entrepreneur gets immense satisfaction by implementing his ideas which eventually helps him to get social recognition.

Financial security motive (F3):

This dimension consists of only a single variable, i.e.; money motive. An individual's one of the principal motivations to take up entrepreneurship is to satisfy his present monitory need and also to secure his future financial requirement. A person is ready to take risk associated of being a successful entrepreneur if he gets enough monetary reward in due course. The monetary benefit alone is sufficient to inspire an entrepreneur.

In our study, money motive has emerged as an independent motive. It is also a significant deviation from the findings of Manimala where money motive was a component of the self-actualization dimension and was negatively loaded which suggest that entrepreneurs are calculated risk-takers. But from our study, we can say that money or the eagerness to achieve financial security attracts an individual to take risk in order to gain in future.

PROPOSITION 1:

In a small town, where unemployment level is very high, achieving financial security for the family by earning money, is the primary objective of an entrepreneur.

Innovation & Achievement motive (F4):

This factor is constituted by two variables-

i) Desire to do something new and path-breaking

ii) Achievement of targets and standards set by oneself and others

These variables indicate an entrepreneur's tendency to do something innovative and path-breaking which will be followed by the generations to come. But the negative loading of the achievement of targets and standards suggests that the desire to do something new and path-breaking may create obstacle in achieving targets and standards set by one-self and others.

It the present study, the components of Manimala's self-actualization dimension are separately placed in the five different dimensions of human motivation. Only two variables- the desire to do something new and path-breaking and achievement of targets and standards set by oneself and others, are combined together to form a separate dimension named innovation and achievement motive.

Self-development and Leadership motive (F5):

This factor consists of two variables-

i) Capability development and utilization

ii) Desire to lead a group and being recognized

These variables refer to an individual's urge to develop his capability in order to utilize it for his own satisfaction. It shows an individual's desire to challenge himself to surpass his existing capability in order to fulfill his own

potential. This dimension also refers to an individual's leadership aspiration by mobilizing the resources for the benefit of the larger section of the society, will enable him to get the recognition from the society.

Correlation of the motivational variables:

The article also tries to determine the correlation among various motivational variables to find out the relation of one variable with the other variables. It will help us to understand how an entrepreneur reacts when different motivational variables (which may be positively or negatively correlated) influence his mental set-up.

In the above grid, the **pink**-shaded cells represent **high** degree of correlation (0.5000<=correlation<=0.9999) between the motivational variables. The **yellow**-shaded cells represent **moderate** degree of correlation (0.3000<=correlation<=0.4999) between the motivational variables. The **green**-shaded cells represent **low** degree

of correlation (0.0001<=correlation<=0.2999) between the motivational variables.

From the pink-shaded cells, it can be seen that people who want to get satisfaction from his work have a high degree of aspiration to work independently.

PROPOSITION 2:

In our studied region, the refractory-makers who wants satisfaction from his work, prefers to work independently.

Besides that, person who wants to reach the top position in his industry has a high degree of desire to work in a group. Moreover, the person who works because he thinks that it is his duty has a very high desire to belong to a group.

PROPOSITION 3:

In our studied region, where size of most of the firm is relatively small and most of the employees come from

TABLE 3: Table showing the inter-correlations among the motivation variables:

	MV 1	MV 2	MV 3	MV4	MV 5	MV 6	MV 7	MV 8	MV 9	MV10	MV11	MV12	MV13
MV 1	1.0000												
MV 2	0.0661	1.0000											
MV 3	0.0153	(0.1796)	1.0000										
MV4	(0.0547)	(0.0424)	(0.0919)	1.0000									
MV 5	(0.0430)	(0.0775	0.0944	0.5124	1.0000								
MV 6	0.0726	0.1683	0.1726	(0.3768)	(0.2713)	1.0000							
MV 7	(0.1543)	(0.2259	0.1887	(0.0462)	0.0271	0.2606	1.0000						
MV 8	0.0144	0.0774	(0.2352)	0.0525	0.0254	(0.0986)	(0.2071)	1.0000					
MV 9	(0.1968)	(0.1142	0.0303	0.0707	0.2089	(0.1030)	0.3123	0.0107	1.0000				
MV10	(0.1810)	(0.0816	0.0568	0.3874	0.2815	(0.1680)	0.2856	0.1869	0.4468	1.0000			
MV11	0.2968	0.0042	0.2702	(0.3263)	(0.1495)	0.3582	0.4907	(0.1741)	0.1060	(0.0373)	1.0000		
MV12	0.1048	0.0047	0.2331	(0.1897)	(0.0670)	0.2031	0.4496	(0.1614)	0.2188	0.0176	0.7430	1.0000	
MV13	(0.0321)	(0.0470	0.1963	(0.4466)	(0.1552	0.4260	0.3029	(0.1539)	0.1505	(0.1545)	0.4858	0.5083	1.0000

the same locality with whom the entrepreneur shares a great camaraderie, they collectively work to reach the top position in the refractory-making industry.

From the yellow-shaded cells, it can be noted that people who works thinking that it is his duty often starts entrepreneurial ventures to introduce novelty in task to avoid monotony. Again people with deontic motive may have moderate need for social status which inspires him to start his own venture. People who want to get satisfaction from their work have a moderate desire for social status because they are more concerned about actualizing themselves by achieving their goals. Besides that, person who wants to reach the top position in his industry has the need to lead a group and being recognized to fulfill his status need. He may also introduce novelty in task to avoid boredom in order to make the journey to the top full of new enthusiasm of novelty. An entrepreneur, who wants to introduce novelty in task to avoid boredom, desires to belong to a group to make the changes effective with the help of his associates. In this study, we find that people, who have a desire to influence others, can start their own business to lead a group of people to get recognition in the society. He also has a tendency to change the nature of the work by introducing new technologies and new work culture in order to become one of the major players in the industry.

From the green-shaded cells, it is evident that money motive (self-actualization need) has a low influence on capability development and utilization motive, desire to do something new and path-breaking, desire to lead a group and being recognized, achievement of targets and standards, desire for a top position in the industry and desire to belong to a group.

In case of capability development and utilization motive, it is noticeable that it is weakly related to desire to lead a group and being recognized, achievement of targets and standards set by oneself and others and desire for a top position in the industry and desire to belong to a group.

People who have the desire to do something new and path-breaking, have low aspiration for independent work, desire to lead a group and being recognized, desire to introduce novelty in task to avoid monotony, working because it is one's duty, desire for social status, desire for a top position in the industry, desire to belong to a group and desire for influencing other.

A person, who has satisfaction from his work, has a low need for achievement of targets and standards and deontic motive. People's aspiration for independent work, has a weak relation with desire to introduce novelty in task to avoid monotony, achievement of targets and standards, deontic motive and desire for social status.

People, who have the desire to lead a group and being recognized, sometimes desire to introduce novelty in task and like to belong to a group. An individual, who desires to introduce novelty in task to avoid monotony, has a low desire for social status.

TABLE 4: Table showing the mean, mean-based rank for each type of variables:

VARIBLE CODE	DESCRIPTION	MEAN	RANK (BASED ON MEAN)
MV1	Money motive	4.73	1
MV2	Capability development and utilization	4.70	2
MV3	Desire to do something new and path-breaking	3.20	7
MV4	Satisfaction from one's work	3.62	4.5
MV5	Aspiration for independent work	3.13	10
MV6	Desire to lead a group and being recognized	4.05	3
MV7	Desire to introduce novelty in task to avoid monotony	3.17	8
MV8	Achievement of targets and standards set by oneself and others	1.95	13
MV9	Working because it is one's duty(Deontic motive)	2.72	12
MV10	Desire for social status	3.17	9
MV11	Desire for a top position in the industry	3.62	4.5
MV12	Desire to belong to a group	3.45	6
MV13	Desire for influencing other	2.83	11

TABLE 5: Table showing the percentage of respondents with high or low level of motivation for each variable:

VARIBLE CODE	DESCRIPTION	% of entrepreneurs with high motivation (mean>=3)	% of entrepreneurs with low motivation) (mean<=2)
MV1	Money motive	98.33	1.67
MV2	Capability development and utilization	98.33	1.67
MV3	Desire to do something new and path-breaking	100	0
MV4	Satisfaction from one's work	91.67	8.33
MV5	Aspiration for independent work	86.67	13.33
MV6	Desire to lead a group and being recognized	100	0
MV7	Desire to introduce novelty in task to avoid monotony	90	10
MV8	Achievement of targets and standards set by oneself and others	3.33	96.67
MV9	Working because it is one's duty(Deontic motive)	66.67	33.33
MV10	Desire for social status	86.67	13.33
MV11	Desire for a top position in the industry	96.67	3.33
MV12	Desire to belong to a group	95	5
MV13	Desire for influencing other	73.33	26.67

Individual's need for achievement of targets and standards set by one-self and others does is seldom related to deontic motive and desire for social status. Deontic motive is weakly related to desire for a top position in the industry, desire to belong to a group and desire for influencing other. A person having the desire for social status does have low tendency to belong to a group.

From the correlation of various motivational variables, we have got a varied combination of how different degree of same set of motivational variables affects the same individual. These findings will help us to understand and study human behavior more effectively.

Calculation of ranking of the motivational variables:

The article tries to determine the individual importance of the motivational variables in regards to an entrepreneur's decision to start his own venture by calculating their individual ranking.

From the above table, it is clearly evident that money is the most important factor for a potential entrepreneur to start his own venture. An entrepreneur will start his business to ensure his family's present and future financial security.

An individual's desire to upgrade his capability and utilize it followed by his desire to lead a group and being recognized also have a great influence on his decision to become an entrepreneur. The desire to reach the top position in the industry coupled with sense of satisfaction from one's work also have an impact on an individual's

decision regarding entrepreneurship. From the table, it appears that deontic motive and achievement of targets and standards have the least capacity to influence a potential entrepreneur's decision-making.

PROPOSITION 4:

An entrepreneur is least motivated to achieve the targets and standards because of the fluctuation of demand in the refractory industry.

Calculation of motivation level of the entrepreneurs:

From the above table, it is evident that the desire to do something new and path-breaking and the desire to lead a group and being recognized motivate all the entrepreneurs of the sample. That means, the eagerness of being involved in something new and extremely different with the support and encouragement from a group of people excites a potential entrepreneur. As expected money motive and capability development and utilization motivates almost all the respondents.

Not surprisingly, deontic motive does not act as a motivator for most of the respondents because a truly entrepreneurial individual is rarely motivated by a sense of obligation. Achievement of targets and standards set by oneself and others influenced least number of entrepreneurs of the sample because targets and standards basically depends on many external conditions, such as economic policy of the government and the central bank, political situation of the nation.

PROPOSITION 5:

All the refractory-makers in our studied region, have the intention to do something innovative and path-breaking and also have the desire to lead a group and being recognized in the society.

Conclusion

It is noticeable that the region of our study, i.e.; the region of Barakar to Raniganj, is a small industrial town where the refractory-makers have to vie with each other for limited raw material and other resources, are characterized by strong desire for power and leadership. They also have to face fierce competition from fellow refractory-makers to capture the market share. It seems from the analysis, that they are not quite sure about supplying their total production in the face of stiff competition. In this circumstances, they are not self-motivated to achieve the target of production and also to maintain the standard of their product for the sustenance of the required target and standard in the long-run. It also conform to our previous findings that, the refractory-makers lack in deontic motive which also indicate that they are not self-motivated to achieve the target and standard set by themselves and others. This indicates that there is a gap between the ambition(i.e.; money motive) and the manner(i.e.; lack of self-motivation) in which they are pursuing their goal. It can be said from the above analysis that the refractory-makers are not efficient strategists and this very fact will act as a deterrent in creating a congenial environment for the next generation despite having all the necessary material resources.

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> *To give real service you must add something which cannot be bought or measured with money, and that is sincerity and integrity.*
>
> —*Douglas Adams*

Role of Communication for Innovative Scientific Research

ANJU CHAWLA AND J.P. SINGH

Scientific research is a collaborative enterprise .This transformation has been stimulated by the following developments: Increasing complexity of scientific technological and societal problems that cannot be solved by a single discipline and single expert. Increasing complexity and sophistication of research technology. R&D alliance among institutions and nations are playing a greater role in production and utilization of scientific knowledge which essentially entails communication and flow of ideas among researchers . With the rapid developments in science and its growing societal importance, scientific activity has become increasingly dependent on resources that are determined and allocated by decision makers .Another development is the transformation in the organizational model of conducting research. Transformation from solitary research to multi-institutional and multi-national research programmes. In this article the role and importance of communication for innovative scientific research has been discussed.

Anju Chawla is with National Institute of Science, Technology and Development Studies, Pusa Complex, New Delhi and J.P. Singh is with Raja Balwant Singh College, Bichpuri, Agra.

Scientific research is essentially team work with members working together depending upon each others ideas, knowledge and feedback during the process of investigation. Its organization is structured around a complex division of labour, involving professional technicians and scientists of various specialists and experiences. This organizational mode of conducting scientific research has taken on great significance primarily as a result of two concurrent developments:

Increasing complexity of scientific technological and societal problems that cannot be solved by a single discipline and single expert.

Increasing complexity and sophistication of research technology.

Thus science which had been a collaborative enterprise in a cognitive and intellectual sense has also become a collective enterprise in a social sense.

This collective enterprise has taken several forms of collaboration. This could be classified into the following four categories.

(1) Intra-departmental collaboration-collaboration between researchers within the same department.

(2) Inter-departmental,intra-institutional collaboration-collaboration between researchers in different departments within the same university or institution.

(3) Inter-institutional,intra-national collaboration-collaboration between researchers in different institutions in the same country

(4) Transnational collaboration --collaboration between researchers in different countries.

Collaborative research is becoming more frequent and more extensive and is playing a significant role in the production of scientific knowledge.

According to Narin and Whitlow,(1990),multi-institution publications receive more citations than single –institution publication.

There are a variety of kinds and modes of cooperation between researchers and institutions.These include national and international meetings of experts,exchange of scientists and students,sharing of information as well as collaborative projects.

Collaboration really means communication.Without communication collaboration is not meaningful. There are several factors that can affect the incidence of collaboration. Among these geographical distance and socio-cultural differences among partner institutions are considered to be more important. Empirical studies indicate that the intensity of communication is inversely proportional to the square of geographical distance.

Cabo (1994) examined the effect of cultural differences on the participation of research organizations from different countries. It was concluded that cultural differences tended to reduce the effectiveness of participation and require frequent consultation and coordination etc.

Communication plays a primordial role in technology transfer. Technology is tranferred by "agents" and not by agencies. "Agents" have to communicate with the users of research results, unless there are open channels of communication,this would become ineffective.

Communication for Technology Transfer

Communication between the research institutions and industry occupies a central place in the process of successful commercialization of technology. It is also an effective means for selecting ideas for research identifying the market needs and for removing technical snags in the production of technologies. Communication and gatekeeping are closely related. Three types of gatekeeping activities have been identified as crucial for innovation: technological gatekeeping, market gatekeeping and production gatekeeping.It is essential to assess not only the market needs but also the nature of production technologies available for mass production. Such technical and market intelligence must quickly come to the attention of those who need it for problem identification, for formulating research proposals and for decision making. The proposals that do not have the benefit of latest ideas available are likely to be inferior. Both insufficient information flow and lack of mission orientation of scientific and technical personnel become barriers to

innovation.There should be effective coordination of all activities of specialists to facilitate exchange of ideas in all related fields, which means good communication and effective coordination both within the institutions and between the institutions and industrial firms. The specific characteristics of scientific ethos are often viewed as a major barrier to cooperation with industry. Scientific collaboration with industry can undermine the very foundation of communalism of science. Communilism implies that the knowledge generated through scientific research is subjected not to private but to public ownership. This is contradictory to the norms of most corporate enterprises, they tend to regard their scientific and technological knowledge as proprietary (Nagpaul & Roy, 2000).

The production of useful and novel ideas, their evaluation and implementation is the hard core of scientific research.This process is stimulated and strengthened by interaction among the scientist.Studies on idea generation and problem solving in research have emphasized the role of informal communication among scientists within and outside their immediate work environment.

External communication with R&D professionals and communication with potential users of research plays an important role in research activity. It is therefore essential and desirable that deliberate mechanisms are created and financial resources are provided to encourage the scientists to visit other research institutions and industrial enterprises and participate in seminars and conferences.

However the barriers to communicaton are not solely due to lack of financial resources They are also due to organizational•and social psychological factors.In the traditional budgeting system, these kinds of investments are considered as extra expenditure for instance there are ceilings on budget for travel and little avenues for mobility.

Communication with Scientists

In essence,research is the pursuit and production of knowledge. The production or generation of new knowledge depends upon certain types of prior knowledge (Cohen and Levithal,1990)

This means that the production of knowledge involves 'bootstrapping" i.e. using existing knowledge as a platform for the production of new knowledge,scientific research is essentially an information-conversion process.Its input is information and its output is also information.

Communication plays an important role not only in the creation of knowledge but also in the diffusion of knowledge.

In scientific work groups, information processing is primarily the amount of communication among the scientists and engineers working in project groups both within and outside their groups. These communications are critical for project group success.

The project groups should be designed to enhance information processing.

The designs that increase information processing capabilities include such characteristics as cross functional membership, permeable group boundaries, physical proximity of members and the oppurtunities for informal face to face interactions among members (Nagpaul and Pruthi, 1979)

Client linkage behaviour

Communication is important not only for scientific research but also for technology transfer. The generation of scientific and technical knowledge can take various forms –hard ware, software (computer programmes , informal agricultural practices, livestock management etc) and development of knowledge. In the context of an applied research organization such as ICAR the generation of knowledge should be viewed in terms of its marketization. Thus there is a need towards the use of market or quasi market mechanism of organizing knowledge (Scarbrough, 1995)

Havelock (1972) has described research organization as being components of larger problem-solving systems, which include users of research findings.

Researchers and their clients or users should ideally engage in a problem solving dialogue interacting with each other, concerning both research needs and the application of research findings to the solution of problems. A research organization with an applied mission should not only work on research questions and produce relevant findings but should also communicate with users concerning what to research in the first place and how to transform findings into usable form or even test them out in practice ie. extension etc. Havelock has suggested the building of two subsystems: Micro system and Macro system . The micro system building refers to the establishment of regular pattern of linking behaviour between researchers and user over very specific problems and issues. The macro system building refers to the monitoring of the total problem solving process at a super-organizational level.

Methodology

The data

This paper presents the results of an empirical study of 200 research scientists in agriculture sciences in India. The main objective of the study was to explore the importance of communication on R&D effectiveness.

The data was collected using a combination of personal interviews, organizational records and on-site administration of standardized questionnaire.

Elaborate procedures were adopted to anonymize the data for preserving the confidentiality of the respondents. The potential respondents were informed about the anonymization procedures prior to the survey so that possible bias could be reduced. The respondents were instructed to work alone and not to consult anybody while filing the questionnaire.

All items were scaled on a five-point semantic differential scale

Anchor points	Scale value
Y applies	1
Tendency to Y	2
Intermediate	3
Tendency to X	4
X applies	5

The respondents were asked to indicate their answers by picking one of five categories along a scale ranging X to Y according to the degree to which the X or Y statement applies. For example communication with the leader of the research group was tapped by two polar statements with anchor points 1 and 5

Anchor point	Statement
X	I have continues working contacts with my supervisor
Y	I seldom have working contacts with my supervisor Straitified Random sampling procedure was adopted.

Variables and measurement

The dimensions of communication were External scientific communication, Internal scientific communication and Client linkage behaviour. Other dimensions taken in the study are financial resources and equipment and facilities. The indicators of various dimensions

Each dimension (except adequacy of financial resources) was operationalized by using multiple indicators. All the items were rated on 5 point semantic differential scale (5 representing a high value and 1 ,low value) (see Appendix).

Average of indicators was taken as the score for each dimension.

Analysis and results

Canonical correlation analysis was performed using MGLH module of SYSTAT package using four effectiveness dimensions in the criterion set and five dimensions in the predictor set . The null hypothesis was that canonical variates derived from the criterion and predictor variable sets are unrelated was tested by Bartlet's chi-square test.

The first three canonical correlation are statistically significant at $p < 0.01$ level, while the fourth canonical correlation is not significant. Redundancy analysis was carried out to decide the number of canonical functions to be retained for interpretation.

The results of canonical analysis for the first two canonical functions are presented in tables 1 and 2. Typically the nature of canonical relationship is inferred from the sign and magnitude of canonical weight assigned to each variable in computing the canonical functions.

Canonical weights are considered to be equivalent to beta weights in regression analysis and are sometimes interpreted as indicative of relative importance of the variables to within set criterion variate, but the validity of weight statistics has been questioned by several authors. Thus we have used canonical loadings for interpreting the substantive content of the canonical variates. Canonical loadings represent the correlations of the canonical variate with each variable in their respective set.

Canonical loadings are interpretable as being analogous to factor loadings. Tables 1 and 2 show the canonical loadings of the first and second canonical functions.

There are no definite guidelines as to the threshold above which loading values are non-trivial. In the literature the value 0.30 is most frequently used.

First Canonical Function

An examination of the canonical loadings for the first canonical function in the predictor set shows that most important variables influencing the effectiveness of the research group are Internal scientific communication, client linkage behaviour and external scientific communication followed by equipment and facilities, and lastly financial resources. The values of canonical loadings on the criterion

TABLE 1 : Relationships Between Canonical Functions and Original Variables (Function 1)

Variable	Canonical Relationships (Function1)		
	Loading L	L²	Percentage L²
Criterion set			
General R&D effectiveness	0.850	0.723	32.2
Recognition	0.546	0.298	13.3
User oriented effectiveness	0.811	0.657	29.3
Administrative effectiveness	0.751	0.564	25.2
		2.242	100.0
Predictor set			
Financial resources	0.396	0.157	8.60
Equipment and facilities	0.453	0.205	11.23
Internal scientific communication	0.786	0.618	33.84
External Scientific communication	0.686	0.471	25.79
Client linkage behaviour	0.612	0.375	20.54
		1.826	100.00

Table 2: Relationship between canonical functions and original variables (function 2)

Variables	Canonical relationships (Function 2) Loading L
Criterion set	
General R&D effectiveness	-0.26
Recognition	-0.501
User oriented effectiveness	-0.422
Administrative effectiveness	0.388
Predictor set	
Financial resources	0.513
Equipment and facilities	0.319
Internal scientific communication	0.182
External Scientific communication	-0.417
Client linkage behaviour	-0.077

set indicate that all the loadings are positive and well above the threshold level.

Second Canonical Function

An examination of the canonical loadings of the predictor set variables indicates that all variables except financial resources and equipment and facilities have negative or non trivial loadings.

An examination of the loadings of the criterion set variables indicate that except Administrative effectiveness all the variables have negative loadings .

A comparison of the loadings of the first and second canonical functions (Table 1 and Table 2 respectively) indicates that the canonical loadings for both independent canonical functions are almost mirror images of one another, with the exception of the loadings of financial resources and equipment and facilities.

Financial resources are very important but communication dimensions –strength of linkages with clients or potential users of research results and external scientific communication along with internal scientific communication emerged to be more important indicators for R&D effectiveness.

Discussion and Suggestions :

Resources for research and development are usually conceived in terms of money, equipment and facilities. Since these resources though important are not a sufficient condition for research.

The frame work adopted in this study for measuring research performance is essentially multiperspective and multidimensional.

Multidimensionality of the framework implies that the variety of aspects of research performance cannot be encapsulated into a single universal criterion. Multiperspectiveness of the framework implies that the performance of the research group should be measured from the perspective of different constituencies ie scientific community, potential users of research results, providers of research funds and policy makers each representing a distinct dimension of effectiveness .

In research, it is essential to take a broader view of resources that include an atmosphere of open communication and opportunities for communication of research group members with peers inside and outside the boundaries of research lab. Ideas are most important resource for any research. Innovative ideas are not necessarily the prerogative of a single individual. The management should encourage every researcher to express their ideas for choice of research problem and effective functioning of the research group. The management should provide effective interface between research groups and potential users of research results. Communication with potential users of research plays an important role in the performance of a research group. It is therefore essential and desirable that deliberate mechanisms are created and financial resources are provided to encourage the scientists to visit other research institutions and industrial enterprises and participate in seminars and conferences,

Communication between the research institute and potential users of research results occupies a central place in the process of successful utilization of technology. It is an effective means for selecting ideas for research, identifying the market needs and for removing technical snags in the utilization of technologies. Hence linkages with the potential users of research results and with individuals and organizations involved with the dissemination of research results are important for the effective performance of research groups. It needs to be emphasized that the linkages between researchers and clients is essential not only for utilization of research results but also for identifying problems for research.

The performance of research groups can be measured quantitatively in terms of number of papers ,patents prototypes etc. And subjectively on the basis of self-evaluation and peer review.

In this study perceptual measures of effectiveness which tap both intrascientific and extrascientific dimensions of research. These dimensions are general R&D effectiveness, recognition,user effectiveness and administrativeness.

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> *The world is blessed most by men who do things, not by those who merely talk about them.*
>
> —*James Oliver*

APPENDIX

External Scientific communication

1. Satisfaction about contacts with members of other groups within the institution.

2. Satisfaction about contacts with colleagues working in the same field outside the institute

3. Extent of beneficial effect on scientific or technical performance arising from contacts with other groups

Internal Scientific Communication

1. Satisfaction with opportunities for S&T contact within the research group with supervisor

2. Satisfaction with opportunities for S&T contact within the research group with other scientists and engineers

3. Satisfaction with opportunities for S&T contact within the research group with technical staff

4. Beneficial effect on my performance arising from S&T contacts within the research group with supervisor

5. Beneficial effect on my performance arising from S&T contacts within the research group with scientists and engineers

6. Beneficial effect on my performance arising from S&T contacts within the research group with technical staff

Client linkage behaviour

1. Contact with potential users of research results

2. Involvement of the unit members in the dissemination of results of research to potential users

3. Contacts with individuals/organizations responsible for follow-up or practical utilization of research results

Satisfaction with Budget

1. Adequacy of the budget

Satisfaction with equipment and facilities

1. Adequacy of scientific equipment in terms of quantity and quality

2. Satisfaction with the way laboratory equipment is shared by the researcher

3. Satisfaction with the technical services received by the research group.

4. Adequacy of the laboratory space

General R&D Effectiveness

1. Contribution to science & technology

2. Innovativeness

3. Productiveness

4. Meeting quality requirements

5. Meeting institute's R&D objectives

Recognition

1. National reputation of the research work

2. International reputation of the research work

3. Demand for publication

Application effectiveness

1. Social value of output

2. usefulness in solving societal problems

3. use of R&D results.

Administrative effectiveness

1. Success in meeting time –schedule

2. Success in staying within the budget

HRD and Empowerment-A Study of Indian Companies

P.S. SWAMINATHAN AND S. RAJKUMAR

With changing business scenario, the market has become extremely competitive. There are now more players in the market in almost every area of business. Therefore it has become imperative for every organization to achieve corporate excellence. Competition necessitates improving the quality of products, reduction in the cost, to be able to sell at competitive price, innovation in product development and enhancement of productivity leading to achieving corporate excellence.

Organisations, therefore, before looking at technological upgradation should ensure human competency, upgradation, to cope with the technological change. The new economic policies have created tremendous opportunity for the industrial enterprises to grow, develop and excel. Experience shows that successful companies follow a combination of policies of growth i.e. those related to efficiency, productivity and human resource development. Important HR issues for achieving corporate excellence:-

Aligning business strategy with HR strategy, competency mapping and skill development, job enlargement, job enrichment. Development of mutual trust and synergy among work teams.

Corporate excellence is the combination of people, systems, products and marketing excellence. Out of these, people excellence is important because it has a direct bearing on systems, products and marketing. Therefore, Human Resource is no more a support service in an organization; rather it is a partner in the strategic function every organization.

P.S. Swaminathan is Professor, Prist University, Thanjavur and S. Rajkumar is Professor, Prist University, Thanjavur.

Corporate India has yet to invest in intangible assets in a big way. The critical crunch of competition has yet to envelop the commercial landscape on account of limited exposure at the international level. This is made evident since:-

The share of foreign investment in India vis-à-vis Asian Countries is a meager 1.00 while the ratio vis-à-vis the world is a minuscule 0:14. The share of FDI to GDP is 1.0% for India as compared to 4–5% share for growing economies like China, Malaysia and Singapore. Actual inflows of FDI are about one-fifth of approved investment.

Yet there has been a fair amount of activity in recent times. For example, Motorolo India acquired a small Delhi based company which makes microchips with the precondition that the expertise of its 20 employees would continue to be utilized by the unit.

Similarly, a number of Indian companies are realizing that a successful organization needs people with appropriate skills and competencies who can work together effectively. It is felt that prosperity of, the organisation would be assured if the workforce is committed; competent (competencies can be developed and can bring improved product quality and productivity); and cost effective

Hence a number of Indian companies have developed ingenious methods of channelizing human resources to achieve productivity improvement. At the plant level, many firms have been engaged in the task of productivity enhancement through HRD within their organisations and have demonstrated that with strong efforts and determination it is possible to "succeed". For example, Godrej Soaps Ltd., adopted the Japanese system of Kaizen, involving continuous improvement, with excellent results.

Some of the other companies which have emerged as winners are Larsen and Toubro, Modi Xerox, TISCO etc. An outline of their strategies are given below: TISCO gave a thrust to technology upgradation and modernisation through its TISTECH programme wherein technology push was made possible through effective manpower management. For this purpose, extensive overseas trainings were arranged for workmen to acquire the latest technical know-how and special training courses were organised for employees to update their knowledge. Generous rewards were also provided for innovative ideas. Such measures, according to the company, helped greatly in inculcating the right attitudes which contributed, in a large measure, to augment productivity levels in the company. This example, has been emulated by many other companies which aim to become front-runners in technology development in their area of operation. Larsen and Toubro recognized that to become, pioneers in the engineering industry, it is of utmost important to go in for sophisticated and modern technology. This meant utilising human talent for in-house R&D activities to assimilate and adapt acquired technology. Some of the other efforts aimed at productivity enhancement included dissemination of technology information at shop floor level to generate awareness among employees, decentralisation of technical operations etc. Modi–Xerox, another successful company, attributes its growth to successful management of strategic alliances. The efficiency of the technology assimilation procedure adopted by the company aimed at manufacturing internally critical components demanding high reliability through technical's who were sent to Japan for training. Modi–Xerox thus adopted skill transfer through strategic alliance as its strategy for assimilation and adaptation of foreign technology.

Objectives

1) To make a Study on Factors Effecting Empowerment, viz Technology, Customers and organisations

2) To Study Steps In Work In Empowerment Cycle

3) To Analyse the Benefits of Empowerment

4) To Evaluate the Productivity through Empowerment

Research Methodology

The researcher in a systematic, orderly and scientific way made a survey of professionals, from different organizations, industries, using structured questionnaire and subsequently interviewed them on the following five items:

- Their definition of the term empowerment

- Their feeling the need to be empowered in their organizations

- Their feeling that they are already empowered in their positions/ jobs.

- Their views that employees should be empowered.

- Their views as to how to empower people in an organization.

A well structured questionnaire, covering all facets, keeping in view the objectives outlined above, was used. Responses were recorded, interacting with Senior Managers, Managers and supervisory personnel. Opportunity was availed to meet them in their Organisations. The selected companies are based at Chennai metro, located in the industrial areas.

Primary Data - Sample

The respondents were selected from the top, middle and operating levels of hierarchy of large, multi-national public and private organizations. The study covered Directors, General Managers (heads of divisions). Functional Managers (Head of departments) and supervisory personnel. The sample represented the decision makers as well as the decision implementors.

The questionnaire was administered to the respondents of industries located in the Chennai metro city as well as in the adjoining districts such as Chenglepet, Kancheepuram, and Tiruvellore. At a few places, especially interior villages courier/ mail was used to send the questionnaire. Telephone was used to remind the far-off respondents to send their responses. Only 138 responded. Two responses were incomplete. Personal interviews conducted by the researcher were also analysed.

Secondary Data

The researcher utilized opportunities to discuss with chiefs/ heads of successful business entrepreneurs with a view to share their views/ opinions and experience of empowerment, especially those who have made a mark in India as well as globally. Their views were codified and analysed so as to examine them from the points of support or otherwise of the primary data revealing.

Data Analysis

TABLE A. DEMOGRAPHIC DETAILS OF THE RESPONDENTS

	Managerial Cadre	Percentage	Supervisory Cadre	Percentage
EDUCATIONAL QUALIFICATION				
Non- Graduate	2	4	8	10
Graduate	10	20	31	40
Post – Graduate	18	36	10	12
Technical	20	40	29	38
Total	50	100	78	100
AGE				
< 30 years	9	18	12	15
31-40 years	11	22	9	10
41-50 years	17	34	30	40
> 51 years	13	26	27	35
Total	50	100	78	100
MARITAL STATUS				
Married	47	94	72	91
Unmarried	3	6	6	9
Total	50	100	78	100
EXPERIENCE				
<1 Year	-	-	-	-
2-5 years	7	14	11	14
6-9 years	8	16	10	12
10-13 years	19	40	32	40
>13 years	16	30	25	34
Total	50	100	78	100

Note: (1) Names of the companies/Managers/Executives/selected for the study are disguised at the companies request.
(2) The above table analysis covers 128 against 138, as details of 10 respondents were incomplete

Table 1. Definition of Empowerment

SI. No.	Responses	Respondents	
		Number	Percentage
1.	Delegation of Authority	107	78.1
2.	Freedom of Decision-Making	37	27.0
3.	Enabling people to perform and make effective use of power delegated	35	25.5
4.	Participation and team work	22	16.1
5.	Developing confidence and trust	12	9.5
6.	Sharing of knowledge and proper feed back	3	2.2

Note: *Total is more than 138 because of multiple responses
N=138 Source ; Primary Data

While defining empowerment 78.1% of respondents defined it as power and authority, 27% defined it as Freedom and flexibility in decision-making, 25% defined it as enabling, 16% defined it as the capability in decision-making, acquisition of talent and process of building self-confidence, 9.5% felt empowerment to be enthusiasm and a feeling of responsibility and 2.2% understood it to be the sharing of knowledge. Since the respondents gave more than one definition, the %age does not total to 100. The content analysis of the responses to item number 1 on definition of empowerment is summarized in the above table.

The need for empowerment was measured on five point scale ranging from "not at all" to "to a great extent." The results suggest that 46% of the respondents felt that there is considerable need for empowerment and 77.5%

Table 2: Do you feel the need to be Empowered?

Sl. No.	Responses	Respondents	
		Number	Percentage
1.	Not at all	5	3.6
2.	To a little extent	9	5.8
3.	To some extent	18	13.1
4.	To a considerable extent	63	46.0
5.	To a great extent	43	31.5
	Total	138	100.00

Note: N=138 source : Primary Data

felt a positively definite need for empowerment. This indicates that empowerment has distinct supportive tool, method and system to make employees work better, achieve good and accomplish their goals and objectives.

Table 3: Do you feel empowered?

Sl. No.	Responses	Respondents	
		Number	Percentage
1.	Not at all	5	3.6
2.	To a little extent	26	18.3
3.	To some extent	54	39.4
4.	To a considerable extent	34	24.8
5.	To a great extent	19	13.9
	Total	138	100.00

Note: N=138 source : Primary Data

Similarly on the responses on feeling empowered which was measured on five points scale, ranging from "Not at all" to "to a great extent", 3.6% felt not at all empowered, 18.3% felt empowered to a title extent and 39.4% felt empowered to some extent. This totals to around 61% which indicates towards the need to improve the empowerment.

Table 4: Do Employees need to be Empowered?

Sl. No.	Responses	Respondents	
		Number	Percentage
1.	Not at all	2	1.5
2.	To a little extent	10	6.6
3.	To some extent	26	19.0
4.	To a considerable extent	57	41.6
5.	To a great extent	43	31.3
	Total	138	100.00

Note: N=138 source : Primary Data

As can be seen from the above table, 1.5% of the respondents expressed no necessity to empower employees; 6.6% expressed the necessity to a little extent, 19% felt the necessity to some extent, 41.6% felt the need to a considerable extent and 31.5% expressed the necessity to a great extent. This indicates that over 73% expressed the necessity, which is an overwhelming%age and goes to show how employees also feel the necessity to be empowered in doing their work to their satisfaction as well as to benefit the organizations.

Table 5: How to Empower?

Sl. No.	Responses	Respondents	
		Number	Percentage
1.	Clear job definition, responsibility and accountability through proper communication to reduce role ambiguity and to increase satisfaction	48	35
2.	Proper delegation of authority with required skill development to improve competence and confidence	39	28.5
3	Adequate training for skill development and to achieve required attitudinal change	34	24.7
4	Providing regular feed back on individual and team performance to develop trust	33	24.0
5	Encouragement for innovation and autonomy through team building, care and love to improve competence and trust	21	15.3
6.	Involving employees for participation in decision – making to improve commitment	17	12.4
7.	Flexible organization structure and a climate of open communication to encourage innovation	14	10.2
8.	Providing required resources and enough opportunities for self development	13	9.5
9.	Proper recognition and reward	10	7.2
10.	Restructuring business into a profit centre, proper orientation to company policies	9	6.6

· Total is more than 138 because of multiple responses

Source : Primary Data

Human Resource Strategic Contribution

Table 6. Organisation Strategy

|		Reduce Costs	Create close agent relations	Cross sell products	Total
Human Resource strategy	Delayer and empower	70%	10%	20%	100%
	Create Multiskills	10%	10%	80%	100%
	Develop performance oriented culture	-	50%	50%	100%

Source : Primary Data

Table 7: Hr Activity Contribution

Training Activities	Delayer and Empower	Create Multi-skilling	Develop a performance oriented culture	Total
Cross train employees to handle all product areas	20%	80%	-	100%
Implement performance management training for all supervisory staff	20%	-	80%	100%
Establish basic training for all employees in how to act in an empowered way, including limitations (e.g. how to seek and obtain an authorization	80%	-	20%	100%

Source : Primary Data

The above two tables 6 and 7 indicate the HR contribution matrix and HR activity contribution matrix as was revealed during the study. Most managements have adopted their HR strategy dovetailing them with organization strategy. The empowerment activities through continuous training/ development in chosen areas have their impact on the overall confidence and competence levels of employees and managers. The effect of these strategies have shown in the contribution they have received from the employees and Managers. The tables demonstrably show the extent to which the training have led to development in terms of performance –oriented culture.

Table 8. Survey Results on Working Environment
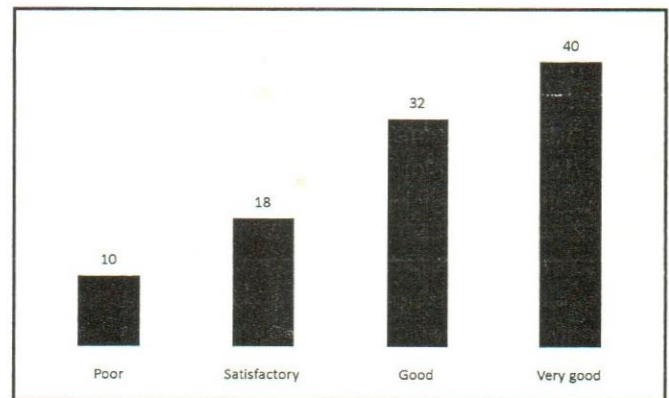
Environment – Percentage

The study revealed that the managers and supervisory staff had a positive outlook in that excepting 10% stated that the working environment was poor, the balance 90% was favorable disposed with 72% reporting that the working environment is good and very good.

This shows that, with the managements commitment to empowerment, the positive and congenial working environment would foster a state of continued cooperation and contribution to the profitability of the organizations. This trend was perceivably most suited for a competitive situation.

Table 9. Survey results showing the Companies are Good Places to Work
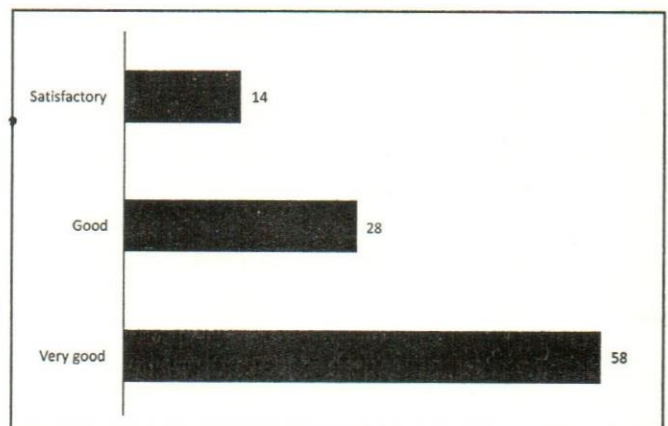
Satisfaction – Percentage

The above table categorically proves the positive and overwhelming outcome from empowerment. The satisfactory report of 14% is in respect of those organizations which have not fully implemented the various

facets of empowerment due to variety of reasons, a contributing factor being financial restructuring; 58% of the management personnel reported the improvement as very good, mainly from the point of trouble-free, smooth functioning with everyone endeavouring to put in his best for the betterment of the organization, keeping their individual egos and concerns as secondary and non-vital.

Conclusions

1. 20 out of 138 top executives/ middle level managers and senior supervisory staff were selected for personal interview, based on the content analysis of their response. Prior appointment was taken and meeting with 19 executives could be arranged. It was observed during personal discussions that the understanding of the term "EMPOWERMENT" was partial as they focused their attention towards power, delegation, communication, responsibility etc. The analysis of data shows that the understanding of the concept is partial, limited, and varied.

2. At the same time, on feeling the necessity to be empowered, it is seen that majority of the respondents felt that it is necessary to be empowered and only a handful of persons feel that they are empowered.

3. There is an urgent requirement to study and develop wider frame work in the field of empowerment. Empowerment is the most desired and required path to follow to achieve the goals of organization for sustenance and growth.

4. Several suggestions came out during interview:-

    a. Team work with emphasis on good superior-subordinate relationship – Discipline should be enforced in the team by way of motivation

    b. Developing the work force through mutual cooperation, proper persuasion, effective communication and team spirit.

    c. Proper planning of the task with clear cut contribution of each member.

    d. Good quality of work life

    e. Appropriate reward system

    f. Multiskilling and continuous development plans.

    Of all the suggested measures, the respondents considered team work and developing the workforce to be crucial while implementing empowerment.

5. To foster a culture of cooperation, altruism as a corporate value must be encouraged. The researcher found that those managers who valued altruism (i.e. helping others) reported to value authority (That is willingness to assume responsibility for other people), creativity (to discover develop or design new things) and working conditions (the congenial physical atmosphere of the work set up).

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> If there is any one secret of success, it lies in the ability to get the other person's point of view and see things from that person's angle as well as from your own.
>
> —Henry Ford

Impact of Human Resources Management to Develop Knowledge Management Practices in Indian Organization

GEETA RANA AND ALOK GOEL

Knowledge management is a managerial activity which develops, transfers, transmits stores and applies knowledge, as well as providing the members of the organization with real information to make the right decisions, in order to attain the organization's goals. Organizations operate in all areas through people and it is their contribution which determines success and it is their skills and knowledge which need to be cultivated and then leveraged to create competitive advantage. This paper examined the relationship between knowledge management (KM) and human resource management practices and help organizations as they embark on their KM journey.

Knowledge is now being seen as the most important strategic resource in organizations, and the management of this knowledge is considered critical to organizational success. If organizations have to capitalize on the knowledge they possess, they have to understand how knowledge is created, shared, and used within the organization. Knowledge exists and is shared at different levels in organizations. Knowledge Management (KM) refers to all systematic activities for creation and sharing of knowledge so that knowledge can be used for the success of the organization. KM processes provide a framework for connecting people with people and people with information to develop and share distilled learning and formulate best practices. It requires a well defined framework that relates investment in expertise or internal competencies to corporate performance. It can also help members share information, and turn this sharing into actions that improve organizational effectiveness. The sustainable competitive advantage a firm has comes from what it "collectively knows" how efficiently it uses what it knows and how readily it "acquires and uses new knowledge" in short by becoming a "Learning Organization". Knowledge Management (KM) provides an enabling framework to derive this advantage. It helps institutionalize processes to fully leverage the "collective knowledge" in an organization.

The importance of knowledge as a source of sustainable competitive advantage has been discussed by many authors (Drucker, 1993, p.167; Prahalad and Hamel, 1990, p.80) but only few have articulated how organizations actually create and manage knowledge. There are two kinds of knowledge; viz., explicit knowledge and tacit knowledge. Explicit knowledge can be expressed in words and numbers and shared in the form of data, scientific formulae etc. Explicit knowledge is stored in a mechanical or technological device, such as

Geeta Rana is Research Scholar, Department of Management Studies, I.I.T. Roorkee, Uttarakhand, India and Alok Goel is Research Scholar, Department of Management Studies, I.I.T. Roorkee, Uttarakhand, India.

documents or databases. On the other hand, tacit knowledge is highly personal, hard to formalize, hence difficult to communicate or share with others. Subjective insights and intuitions fall into this category of knowledge. These two forms of knowledge are complementary to each other, and both are crucial to knowledge creation. Nonaka (1990) described four knowledge conversion processes in the form of SECI model that is socialization, externalization, combination, and internalization. Each process involves converting one form of knowledge (tacit or explicit) into other (tacit or explicit). This model focuses on the important issue of knowledge creation through organizational sharing, and can help identify and evaluate certain key activities in KM practices.

Managing human resources to achieve better knowledge-related outcomes means retaining personnel, building their expertise into the organizational routines through learning processes, and establishing mechanisms for the distribution of benefits arising from the utilization of this expertise (Kamoche and Mueller, 1998, p.1034). In this paper, we have made an initiative to study human resource management (HRM) practices as predictors of knowledge management (KM), with a viewpoint to explore this linkage to address very important aspects of the interpretation and empirical support. The research work aims to explore why this association exists and how various HRM practices influence knowledge management.

Theoretical Framework and Literature Review

Knowledge acquires greater value when it forms part of a knowledge creation or knowledge transfer process. In this way, firms achieve success if they create new knowledge spread across the organization and incorporate it into new technologies and products (Nonaka and Takeuchi, 1995, p.13). The organization's success finally depends on the speed at which it can generate, capture and disseminate knowledge and then use this knowledge to develop capabilities that can not easily be copied by rivals. The ability to create knowledge and to continue to learn from constitutes the competitive advantage as innovative knowledge developed today will be the core knowledge of tomorrow (Zack, 1999, p.124; Davenport and Prusak, 1998, p.79). Synthesizing the explanations of the KM process term from the literature (Lin, 2007, pp.645) the KM process can be described as four business processes viz. knowledge acquisition, knowledge conversion, knowledge application and knowledge protection. The knowledge acquisition process refers to the business process involving

accumulation of knowledge and creation of new knowledge from the existing knowledge (Gold et al., 2001, p.187). The knowledge conversion process represents a business process that renders the existing knowledge useful. Knowledge conversion involves organizing, structuring, storing, combining, and linking digital storage such as documents and images with knowledge units. The knowledge application process is the process of making knowledge active and relevant for the firm in creating value. The knowledge protection process is the ability to protect organizational knowledge from illegal or inappropriate use or theft. Protecting a firm's knowledge is necessary to preserve its competitive advantage (Liebskind, 1996, p.96). Knowledge Management Systems are dedicated to retaining and leveraging knowledge (Goel, et al., 2011, p.24).

Human resource management (HRM) practices are universally recognized as playing a crucial role in creating and sustaining organizational performance. Organizations manage human resources through establishing human resource (HR) departments in a functional organizational structure, even though the role of HR is not limited to just the HR departments itself. A considerable number of experts in the area warn that HRM faces extinction if it does not respond to changes brought about by the shift from a traditional to a knowledge-based economy (Birasnav and Rangnekar, 2010, p.58; Goel et al., 2010, p.384; Lengnick and Lengnick, 2003). Unable to add value under these conditions, the HRM function is perceived to be under extreme threat. It has been suggested that one way for HRM to reinvent itself is through its contribution to effective linkages between HRM and KM within organizations (Gloet, 2004). Thus it is important to choose appropriate HRM practices that facilitate knowledge sharing in a particular organization. There are certain HRM practices that are found to be effective in encouraging knowledge sharing behavior, e.g. recruitment and selection; compensation and reward; performance appraisal; teamwork; employee training and development (Goel and Rastogi, 2011, p.27).

Substantial research has been done on knowledge management and organizational culture and attempts have been made to correlate knowledge management and organizational culture with variables as: human capital, leadership, information technology. But very few researches have been done on knowledge management processes with the perspective of human resource management especially in the Indian knowledge intensive service organizations. Clearly, HRM practices and

knowledge-related outcomes are associated, but their link still misses some important aspects of the interpretation and empirical support. On the basis of the above literature review, a concrete study is required to be looked into these variables like knowledge acquisition, knowledge conversion, knowledge application, knowledge protection and their inter-relationship with dimensions of HRM. For this study we have chosen six HRM practices that we anticipate would give a significant positive impact to knowledge management in Indian knowledge intensive service organizations. These are: reward strategy, career oriented training, performance appraisal, recruitment strategy, career management and performance oriented training. This study will help other organizations as they embark on their KM journey.

Methodology

Sample

This study is designed to explore, document and analyze the nature of the links knowledge management might have with human resource management. The Indian knowledge intensive service firms are chosen as the context of the study. A Survey was conducted wherein 150 valid, complete responses were received from executives of knowledge intensive service firms. The online survey tools were also used in addition to personal interviews with respondents for data collection. The survey instrument comprises ten modules out of which 4 concerned with knowledge management processes i.e knowledge acquisition, knowledge conversion, knowledge application and knowledge protection and also served as dependent set of variables and whereas HRM (human resource management) act as predictors having 6 modules namely reward strategy, career oriented training, performance appraisal, recruitment strategy, career management and performance oriented training.

Measurement

Two questionnaires were used for the present study. These were:

(1) **"Knowledge Management Questionnaire (KM)"**developed by **Hsiu-Fen Lin (2007).** It consists of 28 items for measuring knowledge management processes, measuring KM processes, the scores in the scale ranges from values 1=strongly disagree to 5=strongly agree. The reliability co-efficient of the scale is .88. Knowledge management measures four aspects of knowledge viz. knowledge acquisition,

knowledge conversion, knowledge application and knowledge protection.

(2) Human resource management is being measured with a 42-item scale developed by Birasnav, M. and Rangnekar, S. (2010), with the reliability co-efficient .73. HRM questionnaire measures six aspects of HRM viz. reward strategy, career oriented training, performance appraisal, recruitment strategy, career management and performance oriented training.

For the purpose of analysis apart from generating the correlation matrix among these 10 attributes as shown below in tabular form, step up multiple regression was deployed to build regressions between the 4 dependent attributes over the 6 independent attributes representing knowledge and its aspects. SPSS 17.0 was used to perform the computation.

Results

The primary goal of this investigation is to assess the relationship between knowledge management and human resource management practices. Table 1 presents the mean, standard deviation and intercorelation for all the variables. It can be observed that our hypotheses is generally supported by the strong correlations between each of the independent variables and the dependent variables, the strength of this relationship varies widely between .10 (lowest) and .68 (highest). A significant relations has been found between human resource management and knowledge management practices (on over all basis) with the calculated correlation value as $r = .47^{**}$ ($p<.01$ level). The relationship of human resource management and knowledge management practice (on overall basis) has been displayed through graph (Figure 1).

To identify the genuine and most critical predictors of knowledge management practices, therefore, it is necessary to go beyond the zero order correlations and undertake multivariate analysis. This was done with the help of stepwise multiple regression technique. The dimensions of human resource management were entered for the stepwise multiple regression equation and it was found that among all the dimensions of human resource management only reward strategy, career oriented training and recruitment strategy were significant for knowledge management practices. On the basis of table 2, the results of stepwise multiple regression reveal that reward strategy predicted multiple R as .40 ($F=29.17^{**}$, $p<.01$, $\beta =.40$, $R^2 =.15$); career oriented training with multiple R as .45

Table 1: Mean, Standard Deviation, and Intercorelation between Organizational Justice and Managerial Effectiveness Dimensions (N=150)

Variables	Mean	S.D	1	2	3	4	5	6	7	8	9	10
1. Knowledge acquisition	20.86	4.34	1									
2. Knowledge conversion	24.59	5.58	.62**	1								
3. Knowledge application	30.14	6.71	.61**	.72**	1							
4. Knowledge protection	28.29	2.80	.45**	.57**	.57**	1						
5. Reward strategy	17.91	2.93	.40**	.10	.14	.11	1					
6. Career oriented training	13.93	2.46	.51**	.20*	.27**	.23**	.55**	1				
7. Performance appraisal	17.32	2.63	.34**	.16*	.28**	.20*	.52**	.62**	1			
8. Recruitment strategy	14.89	3.86	.44**	.14*	.24**	.17*	.56**	.66**	.62**	1		
9. Career management	15.27	3.37	.43**	.16*	.16*	.20*	.66**	.66**	.60**	.68**	1	
10. Performance oriented training	17.74	3.41	.49**	.27**	.32**	.29**	.54**	.74**	.61**	.53**	.68**	1

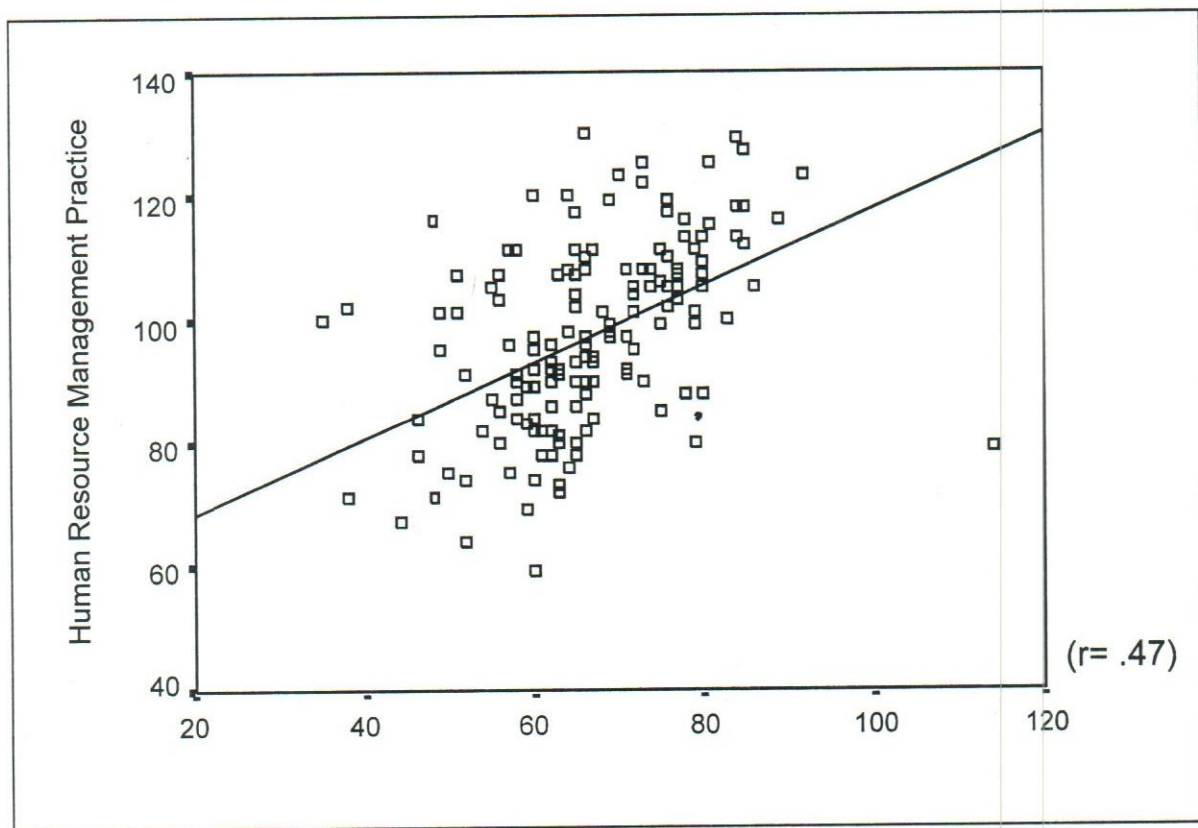**Significant at .01 level (2-tailed), *Significant at .05 level (2-tailed)

Figure 1. Knowledge Management Practices
Graph showing Relationship b/w HRMT and KMT

Impact of Human Resources Management to Develop Knowledge Management Practices in Indian Organization

Table 2: Stepwise Regression Analysis for the Prediction of Human Resource Management with the Independent Variable as Human Resource Management and Dependent Variable as Knowledge Management, on overall basis (N=150)

Variables	R	R²	F-value	DF	β
D.V.- Knowledge Management					
Reward strategy	.40	.15	29.17**	1,148	.40
Reward strategy, Career oriented training	.45	.19	7.97**	1,147	.26, .25
Reward strategy, Career oriented Training, Recruitment strategy	.48	.22	5.41**	1,146	.20, .12, .23

**Significant at .01 level, D.F-Degree of Freedom

(F=7.97**, p<.01, β =.25, R²=.19); recruitment strategy multiple R as .48(F=5.41**, p<.01, β =.23, R²=.22) and jointly explained 22 % variance in the prediction of knowledge management practices. And as a whole, rewards strategy has been found as the strongest predictor of knowledge management practices with the calculated Beta value as .40.

Discussion

On the basis of the obtained results, it can be suggested that there is a significant relationship between knowledge management and human resource management practices. The findings have indicated that human resources management practices (reward strategy, career oriented training and recruitment strategy) leads to knowledge management culture in organization. It can be stated that reward strategy, career oriented training and recruitment strategy related to the fulfillment of the cognitive needs (thinking, growth and decision making) of employees and also affects their task performance and contextual performance. These practices mainly increase organizational commitment, motivate employees and generally affect employee's willingness to create, share or explore knowledge across the organization (Theriou and Chatzoglou, 2008, p.189). Therefore, human resource management practices effectively provide a conducive platform for developing and creating new learning as well as to the acquisition, sharing and dissemination of knowledge within organization (Gloet, 2006, p.406) which help to perform employee's activities and developing further potential for attaining sustainable competitive advantage. Effective recruitment strategy and career oriented programme at workplace develop employees competency, knowledge, learning and increased latitude in decision making which further generate the feelings of being accepted, continued growth and overall work satisfaction.

This brings cultural transformation that understands how knowledge is important and then to create processes to put that knowledge into action (Martin, 2000, p.19). Effective reward strategy and training programme at workplace definitely provide career development and self-enhancement among employees and they are more open to change which acts as a main driver for enhancing knowledge management practices.

In today's competitive environment both human resource management and knowledge management practices are considered as the key factors for continuous improvement and help in establishing employees as well as organization's identity. This resultantly leads to establish a bonding between the employees, organization and clients for continuous growth and competitive advantages (Oltra, 2005, p.75). Finally, HRM practices at workplace not only develop employees and their interpersonal relations with the organization but also increase their personal capacities and deployed by nurturing of interpersonal and inter-group relations (Svetlik and Costea, 2007, p.199). Besides this HRM practices at workplace also create a supportive environment, for individuals, groups and teams in order to solve the organizational problems and make them innovative for the creation of knowledge. Thus knowledge management practices and managing human resources both are highly interrelated.

Conclusions

The purpose of this study was to investigate the associations between the human resource management practices and knowledge management processes among executives of Indian knowledge intensive service firms. The results of this study provide ample support for the notion that knowledge management and human resource management are significantly, positively and strongly

related to each other. Many of the researchers that have theorized about this relationship have lacked empirical data on which to base their ideas, but the present study clearly details the link. This study, however, attempts to present key human resource management factors that appear to support effective knowledge management processes. Apart from this, the findings provide evidence showing when reward strategy, career oriented training and recruitment strategy are on a higher enabling level, it encourages the knowledge management process in the organization. The results of this study will be of interest to business managers and to any organization wishing to implement knowledge management. Organizational members need to be aware of the needs to manage knowledge and to recognize it as a key resource for the viability of the organization. Finally, this study makes a significant contribution in understanding the potential antecedents and consequences of knowledge components. Its intent is to provide a starting point from where senior executives can begin assessing their HR practices, and its ability to develop and sustain a knowledge management initiative.

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The virtue of achievement is victory over oneself. Those who know this can never know defeat.

—*A.J. Cronin*

Growth and Performance of FDI Inflows to India and Pakistan: An Empirical Analysis

NEERJA DHINGRA AND GULSHAN KUMAR

India and Pakistan are the two countries which have dominated the FDI scenario of South Asia for the past three decades. An attempt has been made by the present study to compare their positions as far as the magnitude, potential, and performance of FDI inflows are concerned. The study finds that out of the two, India experienced higher compound annual growth to the tune of 28.68% during the study period. Although, both the countries are underperformers as far as FDI potential and performance are concerned. However, Pakistan's performance indices have been better than those of India. Still, both the countries need to enhance their attraction toward FDI by improving their macroeconomic positions.

Neerja Dhingra is Associate Professor (Economics) B.D. Arya Girls College, Jalandhar Cantt. and Gulshan Kumar is Associate Professor (Economics), University Institute of Legal Studies, Panjab University, Chandigarh.

The last two decades of the 20th century witnessed a dramatic worldwide surge of FDI accompanied by marked change in the attitude of most developing countries toward inward FDI. As against highly suspicious attitude of these countries toward FDI in the past, most countries now regard FDI as beneficial for their development efforts and compete with each other to attract it. The explanation for this shift in attitude lies in the change in political and economic systems that have occurred during the closing years of the last century. Many developing countries have abandoned socialism in its various forms and have embraced the market economy. In many developing countries, mass privatization has taken place mainly with funds from abroad. The success of South East and East Asian countries is attributable, to a large extent, to a high level of foreign investment and export promotion (Sury, 2004, p. 44). This is precisely the reason that FDI is now welcomed and indeed actively sought by virtually all the developing countries of the world. Eager to achieve high rate of growth, the countries in South Asia like India and Pakistan have also deregulated their markets, privatized national enterprises, liberalized private ownership and encouraged regional integration in an effort to create more favorable settings for foreign investments. The global flows of FDI have taken a dramatic stride in recent years. The global FDI inflows rose from US$ 540 billion in 1980–81 to US$1114 billion in the year 2009–10, growing annually at the rate of 18% faster than other economic aggregates like world production, capital formation, and trade. India and Pakistan are the two countries which dominated the FDI scenario of South Asia since the past three decades (Refer Table 1). An attempt has been made by present study to compare their positions as far as the magnitude, potential and performance of FDI inflows are concerned.

Table 1: FDI Inflows To South Asian Countries

Amount in US$ million

Year	Afghanistan	Bangladesh	Bhutan	India	Iran	Maldives	Nepal	Pakistan	Sri Lanka	South Asia
1980–81	9	8.51	–	79.16	80.91	-0.13	0.3	63.63	42.9	284.28
1981–82	0.18	5.36	–	91.92	28.22	-0.03	-0.23	108.09	50.2	283.71
1982–83	0.1	6.96	–	72.08	-136.09	-2.88	-0.03	63.83	63.6	67.57
1983–84	–	0.4	–	5.64	-78.52	0.24	-0.6	29.46	37.5	-5.88
1984–85	–	-0.55	–	19.24	42.69	-0.14	0.95	55.51	32.61	150.31
1985–86	–	-6.66	–	106.09	-38.15	1.21	0.65	47.44	24.4	134.98
1986–87	–	2.44	–	117.73	-112.44	5.4	1.17	92.24	28.2	134.74
1987–88	0.4	3.21	–	212.32	-307.63	5.1	1.39	110.07	58.2	83.06
1988–89	–	1.84	–	91.25	60.54	1.2	0.68	133.72	43	332.23
1989–90	–	0.25	–	252.1	-19.42	4.4	0.42	184.35	17.9	440.00
1990–91	–	3.24	1.6	236.69	-361.95	5.6	5.94	278.33	43.35	212.80
1991–92	-0.28	1.39	0.6	75	22.59	6.5	2.22	271.92	67	446.94
1992–93	0.36	3.72	–	252	8.5	6.6	–	360.57	122.63	754.38
1993–94	-0.02	14.05	–	532	207.55	6.9	–	399.30	194.49	1354.27
1994–95	0.02	11.15	–	974	0.294	8.74	–	789.34	166.41	1949.96
1995–96	-0.0933266667	92.3	0.05	2151	8.763	7.23	–	492.10	65	2816.35
1996–97	0.69	231.6	1.4	2525	20.49	9.32	19.16	439.31	133	3379.9603
1997–98	-1.46	575.31	-0.7	3619	43.01	11.41	23.06	711	433	5413.63
1998–99	-0.01	576.46	–	2633	37.60	11.5	12.02	506	150	3926.57
1999–00	6.04	309.1	1.05	2168	15.62	12.3	4.35	532	201	3249.46
2000–01	0.17	578.7	0.00	3588.0	193.58	13	-0.484827	309	172.95	4854.90
2001–02	0.68	354.5	0.00	5477.6	1084.48	11.7	20.85	383	171.79	7504.63
2002–03	50	328.3	2.08	5629.7	3657.07	12.4	-5.953	823	196.5	10693.067
2003–04	57.8	350.2	2.53	4321.1	2697.87	13.5	14.78	534	228.72	8220.4704
2004–05	186.9	460.4	3.46	5777.8	2863.39	14.69	-0.417	1118	233	10657.237
2005–06	271	845.3	9	7621.8	3135.59	9.49	2.44	2201	272	14367.587
2006–07	238	792.5	6.1	20327.8	1646.57	13.87	-6.5548218969	4273	480	27771.245
2007–08	243	666.4	73.3	25001.1	1669.58	15	5.89	5590	603.4	33867.715
2008–09	300	1086.3	29.7	40418.4	1615.45	12	1.01	5438	752.2	49653.046
2009–10	185	716	36.37	34613.2	3016.08	9.6	38.56	2387	404	41405.759
Total1981–2010	1549.34	8025.89	167.24	168989.6	22156.41	228.90	155.84	28724.19	5488.95	234404.96
Percent Share in Aggregate	0.66	3.42	0.07	72.09	9.45	0.10	0.07	12.25	2.34	100
Rank	6	4	8	1	3	7	9	2	5	

Source: 1 World Investment Report, 2010, UNCTAD.

2. Author's calculations on the basis of UNCTAD data.

Note: Highest figure given rank 1 and subsequent figures ascending ranks.

Objectives of the Study

The study has been conducted keeping in mind the following objectives:

1. To compare the growth of FDI inflows to India and Pakistan for the last three decades

2. To compare the potential and performance of FDI inflows to India and Pakistan

Data Base and Methodological Framework:

The present study is based on secondary data and is confined to the period of 1981 to 2010. The required data have been extracted from various issues of World Investment Report (UNCTAD) and publications of World Bank and Global Competitive Reports. Using the percentage share approach the relative standing of India and Pakistan has been visualized. Percentage shares of both the countries in FDI inflows to the whole world, Asia and that of South Asian countries have been calculated. To study the potential and performance of FDI inflows to India and Pakistan, the compiled data was arranged in the form of tables so that meaningful inferences can be drawn. The relative growth has been compared by computing compound annual growth rate.

Compound Annual Growth Rate

To calculate the compound annual growth rates (CAGRs), first of all, an exponential function has been fitted as shown below:

$$Y_t = \beta_0 \beta_1{}^t e^{ut} \qquad (1)$$

Here Y_t is dependent variable, β_0 and β_1 are the unknown parameters and U_t is the disturbance term (Gujarati, 2004). If we present equation (1) in the logarithmic manner it assumes the following form:

$$\log Y_t = \log \beta_0 + \log \beta_1 + U_t \qquad (2)$$

Equation (2) makes use of Ordinary Least Square Method of regression. The compound rate of growth (gr_c) has been computed by taking antilog of estimated regression coefficient, subtracting 1 from it and multiplying by 100, as shown below:

$$gr_c = (A.L.\hat{\beta}_1 - 1) \times 100 \qquad (3)$$

where $\hat{\beta}_1$ is a regression estimate for β_1. To check whether the growth rates are significant or not student's t-test has been applied which is as follows:

$$t = \frac{\hat{\beta}_1}{s(\hat{\beta}_1)} \sim t(n-2) \, d.f \qquad (4)$$

where $\hat{\beta}_1$ is the regression estimate $s(\hat{\beta}_1)$ the respective standard error (Gupta and Kumar, 2006, p.297).

Discussion and Results

The study has been done in two sections. Section I describes the results of the computation of growth rates of FDI inflows to India and Pakistan and Section II presents the findings of the performance of FDI inflows to both the countries.

Section I

The world investment reports have noted that India's FDI inflows have escalated manifolds during the last three decades. From a nominal amount of US$ 79.16 million in the year 1980–81, the FDI inflows have jumped to a substantial amount of US$ 34613.15 million in the year 2009–10. As far as the FDI inflows of Pakistan are concerned we can notice a sharp rise in absolute terms from US$ 64 million in the year 1980–81, to US$ 2367 million in the year 2009–10 (Refer Table 1).

During the last thirty years, India received scored rank one by garnering 72.09% share of the aggregate inflows coming to the countries of South Asia. The second place is secured by Pakistan which accounted for 12.25% share of South Asian aggregate for the same period. Iran, though not consistent in receiving FDI inflows during the last thirty years comes at number three with share equal to 9%. Next are Bangladesh and Sri Lanka with percentage share equal to 3.42 and 2.34%, respectively. Afghanistan, Maldives, Bhutan, and Nepal got the negligible share of FDI inflows coming to South Asia during the last three decades. This clearly indicates that India and Pakistan are the two countries which are the leaders in South Asia as far as the FDI inflows are concerned.

To compare their relative position in the world inflows, the percentage share of both the countries in the global FDI inflows has been calculated and exhibited in Table 2. On close perusal of the table we can observe that India has received average share of 0.56% in the aggregate FDI inflows of the world during the last three decades and its counterpart Pakistan has accounted for 0.14% share. In the year 1980–81, both India and Pakistan had almost equal share, that is, 0.15% and 0.12%, in the world FDI inflows respectively but in the year 2009–10, when India was able to attain 3.11% share, Pakistan got just 0.21% share.

Similar kind of picture can be seen from the Table 3 which shows the percentage share of India and Pakistan

Table 2: Percentage Shares of India and Pakistan in FDI inflows of World

Year	Amount of FDI inflows to World in US$ mn	Percent share of India	Percent share of Pakistan
1980–81	54076	0.15	0.12
1981–82	69567	0.13	0.16
1982–83	58059	0.12	0.11
1983–84	50268	0.01	0.06
1984–85	56839	0.03	0.10
1985–86	55832	0.19	0.08
1986–87	86316	0.14	0.11
1987–88	136576	0.16	0.08
1988–89	163913	0.06	0.08
1989–90	197369	0.13	0.09
1990–91	207697	0.11	0.13
1991–92	154009	0.05	0.18
1992–93	165973	0.15	0.22
1993–94	223454	0.24	0.18
1994–95	256112	0.38	0.31
1995–96	342544	0.63	0.14
1996–97	388998	0.65	0.11
1997–98	486476	0.74	0.15
1998–99	707185	0.37	0.07
1999–00	1087500	0.20	0.05
2000–01	1401466	0.26	0.02
2001–02	825280	0.66	0.05
2002–03	628114	0.90	0.13
2003–04	565739	0.76	0.09
2004–05	732397	0.79	0.15
2005–06	985796	0.77	0.22
2006–07	1459133	1.39	0.29
2007–08	2099973	1.19	0.27
2008–09	1770873	2.28	0.31
2009–10	1114189	3.11	0.21
Average 1981–2010		0.56	0.14

Source: 1.World Investment Report,2010,UNCTAD
2. Author's calculations on the basis of UNCTAD data.

in the aggregate FDI inflows to Asia. On the average in the last thirty years India has garnered 3.37% share and Pakistan obtained 1.17% share. In the year 2009–10, India's share escalated to 11.49% where as Pakistan received 0.79%.

It is however interesting to see that the share of these countries are as high as 14.59% and 11.73% respectively in the year 1980–81. But these percentages are high because of the fact that in 1980–81 there was a huge flight of FDI from many countries of Asia—Bahrain, Brunei

Table 3: Share of Indian and Pakistan in Asian FDI Inflows

Year	Amount of FDI inflows to Asia in US$ mn	Percent share of India	Percent share of Pakistan
1980–81	542.59	14.59	11.73
1981–82	13328.57	0.69	0.81
1982–83	17136.24	0.42	0.37
1983–84	10893.67	0.05	0.27
1984–85	11556.64	0.17	0.48
1985–86	5397.47	1.97	0.88
1986–87	9254.25	1.27	1.00
1987–88	13441.45	1.58	0.82
1988–89	17963.98	0.51	0.74
1989–90	16948.35	1.49	1.09
1990–91	22628.36	1.05	1.23
1991–92	24155.80	0.31	1.13
1992–93	32994.92	0.76	1.09
1993–94	55973.25	0.95	0.71
1994–95	68103.41	1.43	1.16
1995–96	80084.33	2.69	0.61
1996–97	94185.85	2.68	0.47
1997–98	105813.82	3.42	0.67
1998–99	95296.60	2.76	0.53
1999–00	111536.78	1.94	0.48
2000–01	148735.08	2.41	0.21
2001–02	114039.87	4.80	0.34
2002–03	101344.58	5.55	0.81
2003–04	117179.84	3.69	0.46
2004–05	174589.79	3.31	0.64
2005–06	215768.80	3.53	1.02
2006–07	283112.82	7.18	1.51
2007–08	336922.39	7.42	1.66
2008–09	372738.95	10.84	1.46
2009–10	301366.54	11.49	0.79
Average 1981–2010		3.37	1.17

Source: 1.World Investment Report,2010,UNCTAD
2. Author's calculations on the basis of UNCTAD data.

Darussalam, Maldives, Lebanon, Syria and maximum from Saudi Arabia (www.unctad.org).

As far as the FDI inflows to the South Asian countries are concerned, Table 4 exhibits that India enjoys the lion's share among them. It received 27.83% of the total amount of FDI received by South Asia in 1980–81 and more than 80% share in the year 2009–10. Pakistan on the other hand was getting 22.37% share in 1980–81 but lost it to come to as low as 5.76% in the year 2009–10.

Table 4: Share of India and Pakistan in FDI Inflows

Year	Amount of FDI inflows to South Asia in US$ mn	Percent share of India	share of Pakistan
1980–81	284	27.83	22.37
1981–82	284	32.37	38.06
1982–83	207	34.89	30.90
1983–84	73	7.70	40.22
1984–85	151	12.74	36.76
1985–86	180	59.01	26.39
1986–87	247	47.63	37.32
1987–88	391	54.35	28.17
1988–89	332	27.47	40.25
1989–90	459	54.87	40.13
1990–91	575	41.18	48.43
1991–92	447	16.77	60.80
1992–93	754	33.40	47.80
1993–94	1354	39.28	29.48
1994–95	1950	49.95	40.48
1995–96	2816	76.37	17.47
1996–97	3380	74.71	13.00
1997–98	5416	66.82	13.13
1998–99	3927	67.06	12.89
1999–00	3249	66.72	16.37
2000–01	4855	73.90	6.36
2001–02	7505	72.99	5.10
2002–03	10699	52.62	7.69
2003–04	8220	52.56	6.50
2004–05	10658	54.21	10.49
2005–06	14368	53.05	15.32
2006–07	27778	73.18	15.38
2007–08	33868	73.82	16.51
2008–09	49653	81.40	10.95
2009–10	41406	83.60	5.76
Average 1981–2010		52.08	24.68

Source: 1.World Investment Report,2010,UNCTAD
2. Author's calculations on the basis of UNCTAD data.

Coming to the growth rate of FDI inflows in case of both the countries for the period of last thirty years (shown in Table 5), we find that the growth rate is drastically different. FDI inflows to India have escalated at the compound annual growth rate (CAGR) of 28.68% which is statistically significant at 5% level of significance. The

Table 5: Compound Annual Growth Rate of FDI inflows

Year	FDI inflows to India in US$ mn	FDI inflows to Pakistan in US$mn
1980–81	79	64
1981–82	92	108
1982–83	72	64
1983–84	6	29
1984–85	19	56
1985–86	106	47
1986–87	118	92
1987–88	212	110
1988–89	91	134
1989–90	252	184
1990–91	237	278
1991–92	75	272
1992–93	252	361
1993–94	532	399
1994–95	974	789
1995–96	2151	492
1996–97	2525	439
1997–98	3619	711
1998–99	2633	506
1999–00	2168	532
2000–01	3588	309
2001–02	5478	383
2002–03	5630	823
2003–04	4321	534
2004–05	5778	1118
2005–06	7622	2201
2006–07	20328	4273
2007–08	25001	5590
2008–09	40418	5438
2009–10	34613	2387
CAGR 1981–2010	28.68*	16*

Source: 1.World Investment Report,2010,UNCTAD
2. Author's calculations on the basis of UNCTAD data.
Note: * significant at 5 percent level of significance

CAGR in case of Pakistan is 16% again statistically significant at 5% level of significance.

Many accounts are made for the large growth of FDI inflows in India. Some experts are of the opinion that liberalization of FDI policy had a significant impact and has resulted in pouring in of huge inflows (Radhakrishanan and Pradhan, 2000, p.454). But, it is also observed that the years when FDI inflows in India have expanded, have also been those when global inflows of FDI have expanded dramatically. Hence, it is difficult to say if all the increase in FDI inflows to India has been brought about by liberalization of policy or it is the result of a global phenomenon (Kumar, 1998, p.1323). However, it is certain that India has much strength to fuel the investors' enthusiasm. This strength rests on strong fundamentals large and growing domestic market, abundant natural resources, huge supply of trained and cost effective manpower, vast pool of world class technical and managerial professionals and well-developed capital market, etc. The robust growth of FDI inflows which India has witnessed can be attributed to these factors. Actually, the country's service oriented development path has helped it bypass obstacles like weak infrastructure. A "wired" India has played to its strong suit—a well-educated, IT-savvy workforce with English language proficiency. At the same time, India emerges as an R&D hub. Manufacturing and communication services are the most bullish on India, ranking it second most attractive market globally (FDI Confidence Index Survey, 2004). Similarly, Pakistan has comparatively higher amount of FDI over the past two decades due to its market oriented policies (Khan and Khan, 2011, p.5).

Section II

UNCTAD benchmarks inward FDI potential of many countries, ranking them by how they do in attracting inward direct investment. The potential index captures several factors (apart from market size) which are expected to affect economy's attractiveness to foreign investors. The top factors are GDP per capita and GDP growth over previous ten years which are supposed to indicate the local demand on the assumption that higher income economies attract relative more FDI geared to innovative and differentiated products and services. The other factors include level of exports (both resources and services), level of infrastructure, energy usage, expenditure on R&D, availability of high level skill, position of service sector, country risk (composite indicator capturing some macroeconomic and other factors that affect the risk

perception of investors) and share of world inward FDI stock (www.unctad.org).

Table 6: Index of FDI Potential

Year	India		Pakistan	
	Score	Rank in World	Score	Rank in World
1989–1991	0.123	71	0.1	87
1990–1992	0.138	97	0.127	107
1991–1993	0.149	94	0.134	103
1992–1994	0.152	95	0.138	101
1993–1995	0.163	93	0.136	113
1994–1996	0.165	84	0.133	109
1995–1998	0.158	92	0.122	117
1996–1998	0.167	88	0.118	125
1997–1999	0.165	87	0.113	128
1998–1999	0.156	91	0.103	· 129
1999–2001	0.153	91	0.102	129
2000–2002	0.159	89	0.104	128
2001–2003	0.157	85	0.1	125
2002–2004	0.166	82	0.1	128
2003–2005	0.159	85	0.089	160
2004–2006	0.163	84	0.097	125

Source: Compiled from UNCTAD data, www.unctad.org
Note: Scores show three years moving average

The inward FDI potential indices of India and Pakistan from the year 1989 to 2006 (that is the latest available at www.unctad.org) have been shown in the Table 6. The table clearly indicates that India has the potential of attracting FDI inflows which has been greater than Pakistan in each time period, although its rank in the world out of 139 countries is not very heartening. Pakistan has registered less potential and low ranks during all these years. But it is indeed surprising that the FDI performance of Pakistan has been certainly better than India as exhibited in the Table 7.

Like inward FDI potential index, FDI performance index also ranks the countries by the FDI they receive relative to their economic size. It is the ratio of a country's share in global FDI inflows to its share in global GDP. The performance index of Pakistan has (in all the years shown in the table) been higher than that of India. It means that India's share in world GDP is higher than its share in world FDI inflows. But Pakistan on the other hand is getting reasonable inflows of FDI relative to its GDP. Except the

Table 7: Index of Performance of FDI Inflows

Year	India Score	India Rank in World	Pakistan Score	Pakistan Rank in World
1989–1991	0.972	58	0.073	103
1990–1992	0.088	118	0.833	75
1991–1993	0.144	113	0.865	76
1992–1994	0.243	112	0.856	83
1993–1995	0.378	108	0.869	85
1994–1996	0.467	104	1.018	79
1995–1998	0.534	105	0.928	91
1996–1998	0.417	113	0.652	106
1997–1999	0.265	116	0.381	109
1998–1999	0.155	119	0.216	114
1999–2001	0.166	121	0.198	117
2000–2002	0.215	121	0.278	116
2001–2003	0.357	114	0.668	97
2002–2004	0.41	112	0.564	102
2003–2005	0.451	121	0.748	104
2004–2006	0.615	110	1.025	88
2005–2007	0.629	106	1.119	83

Source: Compiled from UNCTAD data, www.unctad.org
Note: Scores show three years moving average

period 1989–91, in all the other periods, India's rank and score are lower than those of Pakistan. India's score in 2005–07 is 0.629 and rank is 106 where as Pakistan is attaining rank 83 with the performance index equal to 1.119.

Some macroeconomic variables associated with FDI potential are depicted in the Table 8. India has managed to achieve the highest growth of FDI during the last three decades. But its potential indices show a gloomy picture. It is at almost the lowest ebb in most of the macro economic variables generally associated to determination of FDI inflows' potential. Only the largest size of domestic and foreign market supplemented with good strength of investors' protection are overcoming the variables like frustratingly high degree of bureaucratic control, huge budgetary deficit and discouraging business conditions. Although, its emergence as an R&D hub with abundant availability of scientists and engineers is helping it bypass the obstacles like weak infrastructure. But to attain the positive view of global investors much more remains to be done. India is still caught in the fourth quadrant of under performers in the matrix of potential and performance

Table 8: Scores and Ranks of Macroeconomic Variables

Macro Variable	India Score	India Rank in world	Pakistan Score	Pakistan Rank in world
1. GDP per capita (US $)	1031	112	1017	113
2. Export as % of GDP	20.4	117	12.8	128
3. Size of domestic market	6.2	4	4.6	26
4. Size of foreign market	6.1	4	4.6	61
5. Quality of Infrastructure	3.6	91	3.5	100
6. Energy supply	3.1	110	2.1	128
7. Mobile phone lines (per hundred)	43.8	118	57	107
8. Port infrastructure	3.9	83	4	73
9. Air transport	4.6	71	4.3	81
10. Spending on R& D	3.6	37	3	67
11. Tertiary education rate	13.5	101	5.2	121
12. Availability of scientists & engineers	5.2	15	3.9	80
13. Capacity for innovation	3.6	33	3.1	58
14. Time required to start business (days)	30	93	20	71
15. No. of procedures required	13	121	10	99
16. Hiring & firing practises	3.7	89	4.2	51
17. Extent & effect of taxation	4	36	3.8	46
18. Transparency of Govt.'s policy	4.7	42	3.7	115
19. Govt.'s budget as surplus of GDP	-4.6	81	-5.4	91
20. Strength of investors' protection	6	33	6.3	27

Source: Compiled from Global Competitive Report 2010.
Note: Rank among 139 countries

indices. Even Pakistan's position in these macro economic variables is not much satisfactory. Easy hiring and firing practices, less time and less number of procedures required to start business and good strength to protect the investors' interest can help Pakistan to be attractive to the investors but other variables which determine the potential of FDI are not much favorable.

Actually uneasy business conditions and cumbersome business procedures are the most critical factors acting as barriers to the FDI inflows to India as well as Pakistan. There is a strong perception among foreign investors that the pro active policies and inducement used to attract prospective new investors are

Table 9: Ranks of India and Pakistan in Doing Business

	India	Pakistan
Ease of doing business	134	83
Starting a business	165	85
Construction permits	177	98
Registering property	94	126
Getting credit	32	65
Protecting investors	44	28
Paying taxes	164	145
Trading across borders	100	81
Enforcing contracts	182	155
Closing business	134	67

Source: Compiled from "Doing Business," World Bank, 2010
Note: Rank among 188 countries

somehow weak given the realities of business conditions when they actually begin to set up and operate their business in Pakistan (Khan and Kim, 2011). The same can be said for India. The picture of business conditions in India is dark, if we observe the World Bank Report on "Ease of Doing Business" which ranks 180 countries of the world on the basis of the convenience of doing business in them. Table 9 mirrors the position and ranks of both the countries in "Doing Business" out of 180 countries for the year 2009–10. India occupies position among the bottom most countries in the rankings of prepositions like ease of doing business, starting a business, paying of taxes, closing of business and being the worst in enforcing contracts. Only in two prepositions those of ease of getting credit and protecting investors' interest India is faring well. In all other prepositions India is almost in the lowest quarter among the 188 countries of the world. However, Pakistan is at a far better off position among 188 countries of world. Except in registering property and getting credit in all other prepositions India is faring worse than Pakistan. All this indicates that India needs to improve its image as an investment destination.

Conclusion

The fact remains that stronger investors' enthusiasm and FDI boom are yet to arrive India as well as Pakistan. Out of the two, India experienced higher compound annual growth to the tune of 28.68% during the period of last three decades. But both the countries are the under performers as far as FDI potential and performance are concerned. However, Pakistan's performance indices have been better than those of India. Both the countries need to enhance their attraction toward foreign direct investment by improving the macroeconomic position. Hence, they must pay intense attention to strengthen the macro economic factors such as growth rate of economy and industry; investments in socioeconomic infrastructure and other supportive policies if they actually desire to create a stable and enabled environment for FDI in the country.

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> *The essence of competitiveness is liberated when we make people believe that what they think and do is important and then get out of their way while they do it.*
>
> —*Jack Welch*

Authentication Methods: A Review

NITIN AGGRAWAL

The authentication methods have evolved from primitive method of recognizing a person from his face to the modern method of recognizing his message from his digital signature. Once the identity of the person was established through these authentication methods, the person was either allowed to access or control over the activity or thing. Each time the older authentication method was compromised; the new authentication method was founded and developed. Thus authentication methods evolved.

Nitin Aggrawal is Deputy Director, National Productivity Council, New Delhi, India.

Authentication is the process of determining whether someone or something is, in fact, who or what it is declared to be. It is the process of verifying a claim made by a subject that it should be allowed to act on behalf of a given principal (person, computer, process, etc.).

The old methods of authentication were based on the realities of the physical world; basic human authentication was done by identifying unique physical characteristics of other human beings. The face recognition, voice recognition, general appearance, demeanor, style of dress, body language, or actions were the common authentication methods used in face-to-face transactions. In non–face-to-face transactions, other methods, like basic handwriting recognition or stylistic recognition (for example, a person's writing or painting style) were used to authenticate a person, their possessions, or their work.

However, the above authentication methods were not reliable. In some cases, such methods were insufficient, particularly when authentication must be accomplished by a person who does not personally know the person to be authenticated. The other authentication factors like face or voice were mutable and thus affected the permanence and reliability of successful authentication. Some sort of reliable, repeatable standard that establishes immutable uniqueness of individuals were required.

The humans have used authentication, and throughout history, they have used three methods. These methods are:

- Something you know (the password)

- Something you have (the token or seal)

- Something you are (your face, your voice, your fingerprints, or your DNA)

These methods are called the *three factors of authentication*.

Authentication Factors

Security research has determined that for a positive identification, elements from at least two, and preferably all three, factors be verified (Figure 1). The *three factors* (classes) and some of the elements of each factor are:

- **Knowledge Factor:** Something the user knows, for example, a password, pass phrase, or personal identification number (PIN), challenge response (the user must answer a question).

- **Ownership Factor:** Something the user has, for example, wrist band, ID card, security token, software token, phone, or cell phone.

- **Inherence Factor:** Something the user is or does, for example, fingerprint, retinal pattern, DNA sequence, signature, face, voice, unique bio-electric signals, or other biometric identifier.

Authentication Tools

Tokens

Some authentication systems commonly use tokens, which is any device or object that can authenticate a user.

The official seal or ring was used as authentication method during monarchy in the ancient world. The change in needs for authentication tools gave rise to modern tokens like physical keys, proximity cards, credit cards, ATM cards, etc. Physical keys, for example, are widely supported and cheap to produce and use. The needs for authentication methods again changed in computer era. The tokens like cryptographic keys were developed. These cryptographic keys were used for user authentication and message authentication.

The tokens have their own weaknesses, however. Because tokens are simple and cheap to produce, they are also simple and cheap to reproduce. This makes them vulnerable to being counterfeiting. Also, because they are typically a physical object or device, they can be stolen easily.
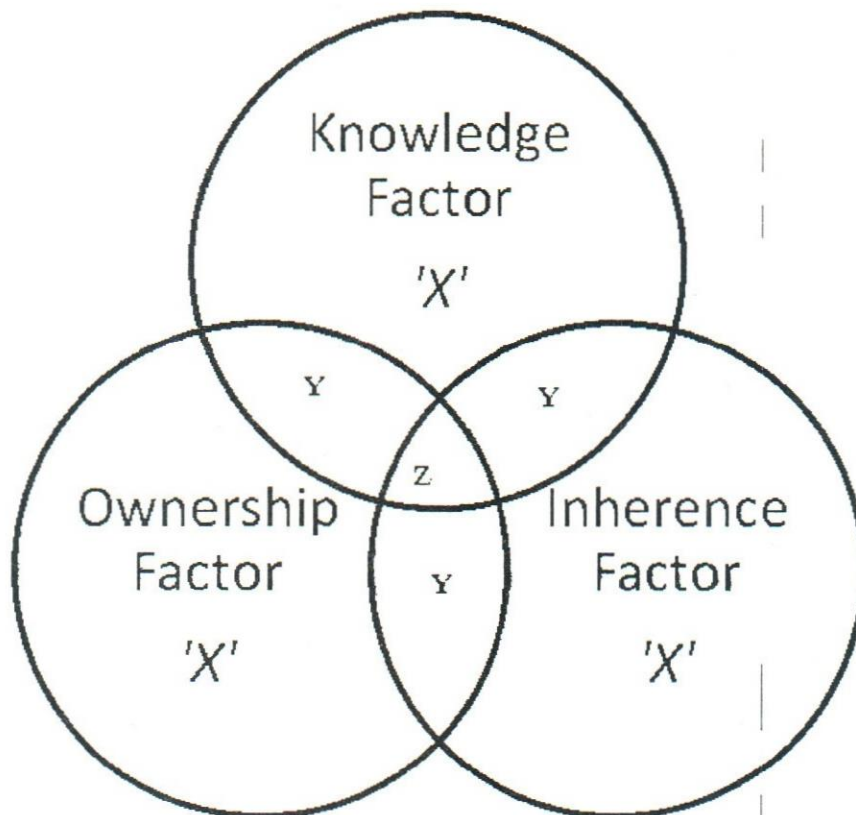

Figure1: X H" One-Factor Authentication; Y H" Two-Factor Authentication; Z H" Three-Factor Authentication

Password

In private and public computer networks (including the Internet), authentication is commonly done through the use of logon passwords. Knowledge of the password is assumed to guarantee that the user is authentic. Each user registers initially, using an assigned or self-declared password. On each subsequent use, the user must know and use the previously declared password. The weakness in this system for transactions that are significant (such as the exchange of money) is that passwords can often be stolen, accidentally revealed, or forgotten. For this reason, Internet business and many other transactions require a more stringent authentication process.

One-factor Authentication

The authentication system started with single-factor authentication. This system was based on knowledge factors like static password. Here the advantage was in its familiarity and ease to remember. However, when different systems have different passwords, they can be difficult to remember and may have to be written down, raising their vulnerability. Most often, they are short and based on subjects close to the user—birthdays, partner names, children's names—and they are typically only letters. Single static passwords are also vulnerable to social engineering, that is, people asking for passwords or guessing them correctly.

The alternate method of password management is "changing passwords regularly." Done correctly, this is inherently more secure than static passwords. A disadvantage of frequently changing passwords is that they can be forgotten, leading to high support and increased administration costs. This is particularly relevant for organizations with hundreds of applications.

Thus it was observed that one-factor authentication was not foolproof and prone to decipher. It was more significant to have a very strong password to authenticate online financial transactions where users are physically absent. The need gave rise to new authentication method called "one-time password." Here hardware tokens were used to generate one-time password that was valid for one-time use only. This reduced the chances of decipher.

Graphical Password

Alphanumeric password is the leading mechanism for verifying the identity of computer users, even though it is well known that people normally choose passwords that are vulnerable to different attacks. The shortcomings of alphanumeric password authentication are that users tend to choose passwords that are easy to remember. However, secure passwords should be random and should be hard to guess; they should be changed frequently, and should be different on different accounts of the same user; they should not be written down or stored in plain text. Satisfying these requirements is virtually impossible for users. Consequently, users ignore the requirements, leading to poor password practices. Moreover, passwords are susceptible to dictionary attack, brute-force attack and are easy to steal though spywares. Further, social engineering practices like phishing and snooping are emerging problems for alphanumeric password schemes. One such improvement is graphical passwords, that is, passwords that are based on pictures or images rather than simple alphanumeric strings. The primary reasoning is that, using images will lead to greater memorability and decrease the tendency to choose insecure passwords, as human being's ability of visual memory is much more powerful than the textual memory.

A graphical password is an authentication system that works by having the user select from images, in a specific order, presented in a graphical user interface (GUI). For this reason, the graphical-password approach is sometimes called graphical user authentication (GUA).

Biometrics

Humans have specific physical attributes that are unique to specific individuals. Humans are conditioned to recognize these characteristics and use them for authentication. However, it is more difficult for computers, which think in digital ones and zeros, to recognize "analog" characteristics such as faces or voices. However, in recent years, technology has made sufficient leaps to allow computer systems to process these characteristics. Such systems used for authentication of human beings based on their physiological or behavioral characteristic are called biometric systems.

Biometric systems come in many varieties, with each variety measuring a physical characteristic found to be relatively unique to a specific individual, within a reasonable scale of individuals. Common biometric systems include the following:

- Face recognition
- Fingerprints
- Hand geometry

- Keystroke dynamics
- Iris
- Retina
- Signature
- Voice
- DNA

These methods have varying degrees of accuracy, but all have been proven as relatively accurate and usable, particularly at the scale that most organizations require. When comparing the measured characteristics of a few hundred or even a few thousand people, rather than a few million, these characteristics provide reasonable, measurable uniqueness in the tolerance levels of each system

Two-factor Authentication

The two-factor authentication is a more secure means of authenticating users onto networks because it requires two separate security elements. It comprises something the user knows, like a password, and something he has, such as a token. Tokens are currently the most popular two-factor solution, due to their low cost, ease of deployment, ease of management, and the standard of security they provide.

Vasco, one of the market leaders, provides hardware tokens that generate one time passwords. Other two-factor options include soft tokens that can be sent to cell phones, swipe cards, USB authentication, and fingerprint recognition. Proximity authentication is another, which means that once authenticated and within wireless range, users will not need to re-authenticate. Similarly, for securing the entry, physical swipe card entry systems are used.

One-time Password

A one-time password (OTP) is a password that is valid for only one login session or transaction. OTPs overcame the shortcomings of the traditional (static) passwords. This means that, if a potential intruder manages to record an OTP that was already used to log into a service or to conduct a transaction; he or she will not be able to abuse it since it will be no longer valid. On the downside, OTPs are difficult for human beings to memorize. Therefore they require additional technology in order to work.

The system of one-time password has also evolved. It started with challenge-response password, password list, time-synchronized password, and mathematical algorithm generated password.

A challenge-response token utilizes a central server to generate a challenge (such as a random string of numbers), which a user would then enter into the token. The token then calculates a response that serves as a one-time numeric password that is entered into the system. If the response from the user is the same as the response expected by the server, the user will be granted access to the system. In some implementations, the user must enter a PIN before the server will generate a challenge.

A time-synchronized token generates a unique value that changes at regular intervals (for example, once a minute). A central server keeps track of the token-generated passwords in order to compare the input against the expected value. To log onto a system, users enter a one-time password that consists of their PIN followed by the unique value generated by their token. The PIN helps the central server to identify the user and the password value that should be entered. If the number entered by the user and the one generated by the server are the same, the user will be granted access to the system. The one-time password values are generated so that it is very hard to calculate the next value from the previously presented values.

In mathematical algorithm based token, OTP generation starts with a seed alphanumeric string. OTP generation algorithms typically make use of randomness. This is necessary because otherwise it would be easy to predict future OTPs from observing previous ones. The mathematical algorithms token use the previous generated password as initial seed password and generate new passwords from this seed.

Other examples of two-factor authentication are: a bankcard (something the user has) and a PIN (something the user knows). Business networks may require users to provide a password (knowledge factor) and a random number from a security token (ownership factor).

Three-factor Authentication

Three-factor authentication is far superior to all other methods of authentication, involving something the user knows (a password), something he has (an authentication token), and something that is part of him (for example, fingerprints, retinas, facial features). Access to a very high security system might require a mantrap screening of

height, weight, facial, and fingerprint checks (several inherence factor elements) plus a PIN and a day code (knowledge factor elements).

Multi-factor Authentication

We have already discussed the three factors of authentication. Any single factor has its strengths and weaknesses. However, we can increase the reliability and security of the authentication mechanism by combining multiple authentication factors into a single model.

The smartcard is a token-based multi-factor authentication system. The smartcard stores a cryptographic key on the card, which is unlocked by the user using a special key pair. When the user authenticates, he puts his smartcard into a special reader attached to the system he is trying to log in to. The system reads the key from the smartcard and asks the user for his passphrase to unlock the key. After the user enters the passphrase, the system performs a cryptographic key exchange with the central server for verification of the key. If the key is verified, the user is authenticated.

Multi-factor authentication is not limited to tokens and passwords. Many high-security biometric systems will combine the biometric sample with a password or token.

Split Authentication

For the ultra–high-security applications, simply authenticating one user directly against the central authority is not enough, even if all three factors are used. It is too much for a single individual to hold control over the launch of a nuclear missile; should that individual decide to launch the missile without orders, there is no process or capability to prevent the launch. As a result, the authentication for the launch system is split to at least two individuals. Both individuals have to enter their part of the authentication for the launch to be authorized. In some cases, the authentications must take place simultaneously. In the missile example, the two individuals might have physical keys, which they insert into the keyhole and turn simultaneously to authorize the missile launch. Safe deposit boxes at banks use a similar system; the box lessee is authenticated by a bank employee, who inserts her key into the box. The lessee then inserts his own key in the box, and the box is opened.

Message Authentication

It is not always a user who must be authenticated in the computer world. Sometimes, a message must be authenticated, or at least verified that it has not been altered in transit. The digital signature authenticates electronic documents in a similar manner a handwritten signature authenticates printed documents. This signature cannot be forged and it asserts that a named person wrote or otherwise agreed to the document to which the signature is attached. The recipient of a digitally signed message can verify that the message originated from the person whose signature is attached to the document and that the message has not been altered either intentionally or accidentally since it was signed. Also, the signer of a document cannot later disown it by claiming that the signature was forged. In other words, digital signatures enable the "authentication" and "non-repudiation" of digital messages, assuring the recipient of a digital message of both the identity of the sender and the integrity of the message.

A digital signature is issued by a Certification Authority (CA) and is signed with the CA's private key. A digital signature typically contains the: Owner's public key, the Owner's name, Expiration date of the public key, the Name of the issuer (the CA that issued the Digital ID), Serial number of the digital signature, and the digital signature of the issuer. Digital signatures deploy the Public Key Infrastructure (PKI) technology.

Conclusion

The growth of the Internet, the increase in users requiring access to networks, and the move to remote working has fundamentally changed the requirements for authentication over the last few years. However, users are still lagging behind developments and relying on single static passwords, which are wholly inadequate.

The need for strong authentication is greater than ever, the cost of solutions such as single sign-on technologies like User Authority and strong two-factor authentication has come down, and these solutions are now easier to use. It is time for companies to improve their authentication procedures, if they want to remain secure and avoid potential business disruption, financial loss, and reputation damage.

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> *It takes vision and courage to create—*
> *it takes faith and courage to prove.*
>
> *—Owen D. Young*

Feature

Impact of Public Debt on Growth in Mizoram: An Empirical Analysis*

C. VANLALRAMSANGA

The article attempts to analyze linkages between fiscal policies (public debt) and economic growth by investigating the impact of public debt on economic growth (GSDP) in the State of Mizoram. To find out empirically the relationship between GSDP and Public Debt in Mizoram, the study analyzes annual time series data from 1987–88 to 2009–10 (BE) having 23 observations. The article first employed correlations to check the association and interdependent of variables. ADF test has been used to check normalcy and stationary of the series. The study also checked the assumptions of the CLRM and employed regression analysis to predict continuous dependent variables from a number of independent variables. Additionally, Vector autoregression (VAR) estimation has been conducted and the Cholesky decomposition and Variance Decomposition plotted from the VAR results. The study results indicated that public debt correlates negatively to GSDP during the study period. But the statistical evidence suggests that the causality runs from growth to debt, and not the reverse. The empirical evidence suggests that debt funded public expenditure does not contribute positively to growth in the state and the state government should preferably avoid accumulation of debt. Further, the debt dynamics indicated that persistent generation of public debt in the state is resulting in mounting debt service burden as debt funded investment does not result in generating assets for economic growth.

C. Vanlalramsanga is an IES Officer, currently working as Deputy Secretary in Department of Economic Affairs, Ministry of Finance, Government of India.

There has been a revival of interest among policymakers and researchers in understanding the linkages between fiscal policies and economic growth. However, literature, in particular, of the empirical analysis on the relationship between public debt and economic growth are rather scarce and they vary in terms of data sets, econometric techniques, and often produce conflicting results (Bose et al., 2007). In the Keynesian model, increase in government expenditure (on infrastructures) or public debt leads to higher economic growth. Contrary to this view, the neoclassical growth models argue that government fiscal policy does not have any effect on the growth of national output. However, it has been argued that government fiscal policy (intervention) helps to improve failure that might arise from the inefficiencies of the market (Nurudeen and Usman, 2010). Therefore, the relationship between fiscal policies (particularly public debt) and economic growth has continued to generate series of debate among scholars.

Higher government expenditure finance with borrowing may or may not contribute positively to the overall performance of the economy. For instance, if government increases borrowing in order to finance its expenditure, it will compete (crowds-out) away the private sector, thus reducing private investment or it may spend substantive amount on servicing its existing liabilities that can otherwise be used for investment. Furthermore, in a bid to score cheap popularity and ensure that they continue to remain in power, politicians and governments officials sometimes increase expenditure and investment in unproductive projects or in goods that the private sector can produce more efficiently. Thus, government activity

*Views are personal

sometimes produces misallocation of resources and impedes the growth of national output. In such cases, unfortunately, rising public debt for ever mounting public expenditure will not translated into meaningful growth and development. This article investigates the effect of public debt on economic growth in the state of Mizoram.

Analytical Framework

Large debt stocks are typically expected to lower growth through the channel of reduced investment/expenditure which is usually described by the debt overhang hypothesis where debt is translated into sluggish economic growth. In such case, outstanding debt ultimately becomes so large that investment/expenditure will be inefficiently low without sizable debt or debt service reduction.

To find out empirically the relationship between GSDP and Public Debt in Mizoram, the study analyzes annual time series data from 1987–88 to 2009–10 (RE) having 23 observations. The study first employed correlations analysis to check the association and interdependent of variables. Augmented Dickey–Fuller (ADF) test has been used to check the series whether it is normal and stationary. The study then conduct Pair-wise Granger Causality test to find out causal relationship between debt and growth. The study also checked the assumptions of the CLRM and employed regression analysis to predict continuous dependent variables from a number of independent variables. To check the robustness of the result, Breuch-Godfrey Serial Correlation LM Test, and ARCH LM test for Heteroscadasticity Test were used.

In the process of our investigation, the study used data of GSDP and public debt (outstanding liabilities) on annual time series (1987-88 to 2010-11). For each variable we have constructed returns based on the actual time series. The returns (relative change) of the series are calculated based on the formula $\left(\dfrac{x_t - x_{t-1}}{x_{t-1}} \right)$.

In the regression model, in order to see the relationship between public debt and growth (GSDP) or to find the impact of public debt to growth (GSDP), growth is defined as a function of public debt. To check the robustness of the result, Breuch-Godfrey Serial Correlation LM Test, and ARCH LM test for Heteroscadasticity Test were used. To determine the direction of causality when temporarily there is a lead lag relationship between the studied variables, Granger Causality test is employed. Further, VAR is used to resemble simultaneous equation modeling that we have considered all variables as endogenous variables. Each endogenous variable explained by its lagged or past values and the lagged values of all other endogenous variables in the model usually there is no exogenous variables in the model. The study also employed variance decomposition to determine how much of the forecast error variance of each of the variable can be explained by exogenous shocks to the other variables.

Results of the Empirical Analysis

Correlation Results

Correlations Result

	RGSDP	RDEBT
RGSDP	1.000000	−0.465211
RDEBT	−0.465211	1.000000

The correlation coefficient, r, quantifies the direction and magnitude of correlation. As per the simple correlation results, we can infer that the GSDP is having a negative correlation with public debt. However, the negative correlation between public debt and GSDP is not very strong (-0.47).

However, the cross-correlation results indicated that the growth (GSDP) and public debt are having a correlation with either signs consequently with negative in 0, 2, 4, 6, 8, and 9 lags. The cross correlations between the two series x and y are given by,

$$r_{xy}(l) = \frac{c_{xy}(l)}{\sqrt{c_{xx}(0)} . \sqrt{c_{yy}(0)}}$$

Descriptive Statistics

	RET_GSDP	RET_DEBT
Mean	0.148395	0.186129
Median	0.125858	0.167415
Maximum	0.363636	0.578947
Minimum	0.006993	-0.048485
Std. Dev.	0.091002	0.147581
Skewness	0.845957	0.945925
Kurtosis	3.166494	3.581988

Correlogram

RET_GSDP,RET_DEBT(-i)	RET_GSDP,RET_DEBT(+i)	i	lag	lead
*****| . |	*****| . |	0	−0.4652	−0.4652
. |** . |	.**| . |	1	0.2234	−0.2017
.***| . |	. | . |	2	−0.2634	−0.0388
. |**** |	. |* . |	3	0.4225	0.0896
****| . |	. |*** . |	4	−0.3947	0.3270
. |**** |	.**| . |	5	0.4108	−0.2269
. | . |	. |*** . |	6	−0.0195	0.2816
. | . |	. *| . |	7	0.0072	−0.0787
. *| . |	. |*** . |	8	−0.0770	0.3393
. *| . |	.**| . |	9	−0.1277	−0.1837
. |** . |	. |* . |	10	0.1995	0.1463
. | . |	. *| . |	11	0.0087	−0.1398
. |* . |	. |* . |	12	0.1068	0.1081

Note: ***, ** and * denote the results are significant at 1%, 5% and 10 % level

$$c_{xy}(l) = \begin{cases} \sum_{t=1}^{T-1} ((x_t - \overline{x})(y_{t+l} - \overline{y})/T \\ \sum_{t=1}^{T-1} ((y_t - \overline{y})(x_{t-l} - \overline{x})/T \end{cases}$$

Note that, unlike the autocorrelations, cross correlations are not necessarily symmetric around lag 0. The dotted lines in the cross-correlograms are the approximate two standard error bounds computed as

$$\pm 2/(\sqrt{T})$$

Causality

Even if a negative correlation between public and debt and growth (GSDP) was found, it still would not be a sound basis on which to draw policy conclusions as the result did not provides causality. Pair-wise Granger Causality[†] tests are performed on GSDP growth and public debt for the entire sample allowing the lag length to vary between 2 and 5 years. In every case we cannot reject the hypothesis that growth in public debt does not Granger cause GSDP growth. By contrast, we can reject the hypothesis that GSDP growth does not Granger causes a rise in public debt at 5th lag. In short, the statistical evidence suggests that the causality runs from growth to debt, and not the reverse but this evidence is clearly seen at 5th lag only. The result may have indicated five year plan periodicity. But our sample is not large enough to draw that conclusion. The result may also indicate that high debt does not necessarily slow down GSDP growth. But public debt does not positively contributed to growth in GSDP during the study period, which is clearly indicated by the result.

[†]The Granger causality test is a statistical hypothesis test for determining whether one time series is useful in forecasting the other. The test for Granger causality works by first doing a regression of ΔY on lagged values of ΔY. (Here ΔY is the first difference of the variable Y — that is, Y minus its one-period-prior value. The regressions are performed in terms of ΔY rather than Y if Y is not stationary but ΔY is.) Once the set of significant lagged values for ΔY is found (via t-statistics or p-values), the regression is augmented with lagged levels of ΔX. Any particular lagged value of ΔX is retained in the regression if (i) it is significant according to a t-test, and (ii) it and the other lagged values of ΔX jointly add explanatory power to the model according to an F-test. Then the null hypothesis of no Granger causality is retained if and only if no lagged values of ΔX have been retained in the regression. http://en.wikipedia.org/wiki/Augmented_Dickey%E2%80%93Fuller_test, accessed on 21 November 2011.

Pair-wise Granger Causality Test Summary Result

	Lag =2		Lags =3		Lags=4		Lags=5	
	F-Statistic	P-value	F-Statistic	P-value	F-Statistic	P-value	F-Statistic	P-value
RET. DEBT does not Granger Cause RET_GSDP	1.24983	0.314	1.19694	0.352	1.29822	0.3408	1.44868	0.329
RET_GSDP does not Granger Cause RET_DEBT	2.09674	0.157	1.29003	0.3226	2.63070	0.1050	3.63070	**0.0739**

Augmented Dickey Fuller Test*

The ADF test result summarized at the following table indicated that the series are in stationary at levels and first differenced series.

Unit Roots Test - ADF

Variable	ADF_Test_Stastistic	P_value (lag)
Ret_GSDP	−5.231264	0.0004 (0)
Change in Ret_Debt	−10.84719	0.0000 (0)

Regression Estimation

Since our data is stationary at levels and first difference, we have used the same for the regression to find the significance effect of the causal relationship exists between growth (GSDP) and public debt. A specification assumes a linear relationship between public debt and growth (GSDP):

$$rgsdp = \beta_0 + \beta_1 \Delta rdebt + \varepsilon_t$$

where *rgsdp* represent returns of Gross State Domestic product, *rdebt* represent returns of public debt and β_0 is the intercept. β_1 is the coefficient of returns of debt and ε_t is an error term.

The estimation result indicated that for the sample period (1987-88 to 2010-11), if public debt is fixed at zero,

the average rate of actual GSDP (nominal at current prices) would have been about 15%. The partial regression coefficient of -0.14 means that the actual GSDP on the average increased (decreased) by about 14% for every one unit decrease (increase) in the previous relative change of public debt over the study period.

Regression Estimation Result

Variable	Coefficient	Std.Error	t-Statistic
C	0.153095	0.018017	8.497304***
D (RET_DEBT)	−0.148808	0.079306	−1.876379**

Note: *** and ** denotes the results are significant at 1 % and 5% level

Robustness

The Durbin-Watson test is a widely used method of testing for autocorrelation. The first-order Durbin-Watson statistic printed by default in Eviews. This statistic can be used to test for first-order autocorrelation. The D-W statistic is 2.19 is suspicious and with the help of Breusch-Godfrey. Test for autocorrelation and ARCH-LM test for Heteroscadasticity, we found that there is no autocorrelation and hetroscadestiricity exists in the regression model.

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[1] An augmented Dickey–Fuller test (ADF) is a test for a unit root in a time series sample. The augmented Dickey–Fuller (ADF) statistic, used in the test, is a negative number. The more negative it is, the stronger the rejection of the hypothesis that there is a unit roots at some level of confidence. The testing procedure applied to the model $\Delta y_t = \alpha + \beta t + \gamma y_{t-1} + \delta \Delta y_{t-1} + ... + \delta_{p-1} \Delta y_{-p+1}$ where α is a constant, β the coefficient on a time trend and *p* the lag order of the autoregressive process. Imposing the constraints α = 0 and β = 0corresponds to modelling a random walk and using the constraint β = 0 corresponds to modelling a random walk with a drift. The unit root test is carried out under the null hypothesis γ = 0 against the alternative hypothesis of γ < 0. Once a value for the test statistic $DF_\tau = \frac{\hat{\gamma}}{SE(\hat{\gamma})}$ is computed it can be compared to the relevant critical value for the Dickey–Fuller Test. If the test statistic is less (this test is non symmetrical so we do not consider an absolute value) than (a larger negative) the critical value, then the null hypothesis of γ = 0 is rejected and no unit root is present. http://en.wikipedia.org/wiki/Augmented_Dickey%E2%80%93Fuller_test accessed on 21st November 2011

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.967030	Prob. F(2,17)	0.4002
Obs*R-squared	2.145089	Prob. Chi-Square(2)	0.3421

Heteroskedasticity Test: ARCH			
F-statistic	0.042075	Prob. F(1,18)	0.8398
Obs*R-squared	0.046641	Prob. Chi-Square(1)	0.8290

VAR Estimations

A recursive Vector autoregression (VAR)* constructs the error terms in each regression equation to be uncorrelated with the error in the preceding equations. This is done by judiciously including some contemporaneous values as repressors[5]. In this study we have only two variables returns on GSDP (rgsdp) and returns on public debt (rdebt). In the equation of the corresponding recursive VAR, rgsdp is the dependent variable, and the regressor is lagged value of rdebt and vice versa:

$$\begin{bmatrix} rgsdp \\ rdebt \end{bmatrix} = \begin{bmatrix} c1 \\ c2 \end{bmatrix} + \sum_{s=1}^{2} \begin{bmatrix} \beta_{11} & \beta_{12} \\ \beta_{21} & \beta_{22} \end{bmatrix} \begin{bmatrix} rgsdp_{t-s} \\ rdebt_{t-s} \end{bmatrix} + \begin{bmatrix} u_{1t} \\ u_{2t} \end{bmatrix}$$

Vector Autoregression Estimates
Date: 11/20/11 Time: 16:24
Sample (adjusted): 1991 2010
Included observations: 20 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	RET_GSDP	RET_DEBT
RET_GSDP(-1)	-0.001768	-0.823189
	(0.25530)	(0.40225)
	[-0.00692]	[-2.04648]
RET_GSDP(-2)	0.343713	-0.152038
	(0.26491)	(0.41739)
	[1.29746]	[-0.36426]
RET_DEBT(-1)	0.238079	-0.403797
	(0.16726)	(0.26353)
	[1.42341]	[-1.53226]
RET_DEBT(-2)	-0.017417	0.271680
	(0.16254)	(0.25610)
	[-0.10715]	[1.06085]
C	0.071276	0.340674
	(0.09711)	(0.15300)
	[0.73400]	[2.22665]
R-squared	0.242744	0.315253
Adj. R-squared	0.040809	0.132654
Sum sq. resids	0.111734	0.277373
S.E. equation	0.086307	0.135984
F-statistic	1.202088	1.726477
Log likelihood	23.49487	14.40247
Akaike AIC	-1.849487	-0.940247
Schwarz SC	-1.600554	-0.691314
Mean dependent	0.158718	0.175889
S.D. dependent	0.088124	0.146013

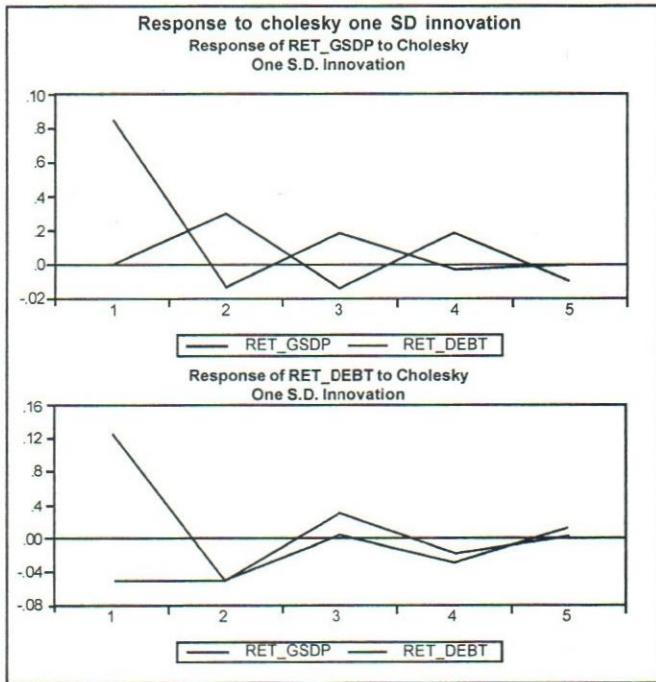|	
Determinant resid covariance (dof adj.)	0.000118
Determinant resid covariance	6.64E-05
Log likelihood	39.43732
Akaike information criterion	-2.943732
Schwarz criterion	-2.445866

Standard errors in ( ) & t-statistics in [ ]

The impulse responses are investigated using impulse-response functions, which describe the response of a variable to a one-time shock to one of the elements of u_t. This study uses a *Cholesky decomposition* to identify the disturbances u_t. The impulse responses trace out the response of current and future values of each of the variables to a one-unit increase in the current value of one of the VAR errors, assuming that this error returns to zero in subsequent periods and that all other errors are equal to zero.

The impulse responses for the VAT are plotted. The result indicated that response of GSDP to public debt is positive in 2 and 4 years and negative in the consecutive years. However, response of public debt to GSDP is positive and increasing.

Variance Decompositions

Variance decomposition or forecast error variance decomposition indicates the amount of information each variable contributes to the other variables in a vector auto regression (VAR) models. Variance decomposition determines how much of the forecast error variance of each of the variable can be explained by exogenous shocks to the other variables. The method posits a sort

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*VAR is a statistical model used to capture the linear interdependencies among multiple time series. All the variables in a VAR are treated symmetrically; each variable has an equation explaining its evolution based on its own lags and the lags of all the other variables in the model. VAR model provides a theory-free method to estimate economic relationships, thus being an alternative to the "incredible identification restrictions" in structural models http://en.wikipedia.org/wiki/Vector_autoregression access on 21st November 2011

[2]James H. Stock and Watson, Mark W. (2001), "Vector Autoregressions", Journal of Economic Perspectives – Volume 15, Number 4 – Fall 2011, pg. 101-115

Response to cholesky one SD innovation

Response of RET_GSDP to Cholesky One S.D. Innovation

Legend: RET_GSDP — RET_DEBT

Response of RET_DEBT to Cholesky One S.D. Innovation

Legend: RET_GSDP — RET_DEBT

Cholesky and Variance Decomposition Results

Variance Decomposition of RET_GSDP: Period	S.E.	RET_GSDP	RET_DEBT
1	0.086307	100.0000	0.000000
2	0.092200	89.43007	10.56993
3	0.095147	87.80004	12.19996
4	0.096939	84.65570	15.34430
5	0.097448	83.77534	16.22466

Variance Decomposition of RET_DEBT. Period	S.E.	RET_GSDP	RET_DEBT
1	0.135984	14.27258	85.72742
2	0.153645	21.89887	78.10113
3	0.156595	21.12933	78.87067
4	0.160259	23.33323	76.66677
5	0.160712	23.73551	76.26449

Cholesky Ordering: RET_GSDP RET_DEBT
Response of RET_GSDP:

Period	RET_GSDP	RET_DEBT
1	0.086307	0.000000
	(0.01365)	(0.00000)
2	-0.012383	0.029976
	(0.02151)	(0.02159)
3	0.018606	-0.014350
	(0.02064)	(0.02012)
4	-0.002597	0.018370
	(0.01701)	(0.01473)
5	-0.000441	-0.009939
	(0.01307)	(0.01219)

of "causal chain" of shocks. The first shock affects all of the variables at time t. The second only affects two of them at time t, and the last shock only affects the last variable at time t. The reasoning usually relies on arguments such as "certain variables are sticky and don't respond immediately to some shocks." The variance decomposition is plotted below and it indicates that both GSDP and public dent are moving inverse relationship and relative change in growth will have opposite effect of debt and visa-versa.

Various Decomposition

Various Decomposition of RET_GSDP

Legend: RET_GSDP — RET_DEBT

Various Decomposition of RET_GSDP

Legend: RET_GSDP — RET_DEBT

Response of RET_DEBT: Period	RET_GSDP	RET_DEBT
1	-0.051373	0.125906
	(0.02930)	(0.01991)
2	-0.050303	-0.050841
	(0.03493)	(0.03414)
3	0.003427	0.030060
	(0.03456)	(0.03391)
4	-0.028483	-0.018695
	(0.02847)	(0.02511)
5	0.011742	0.002775
	(0.02205)	(0.02046)

Cholesky Ordering: RET_GSDP RET_DEBT
Standard Errors: Analytic

Conclusion

The article analyzes linkages between fiscal policies (public debt) and economic growth. Attempt has been made in particularly to investigate the effect of public debt on economic growth (GSDP) in Mizoram. To find out empirically the relationship between GSDP and Public Debt in Mizoram, the study analyzes annual time series data from 1987–88 to 2010–11 (BE) having 23 observations. The paper first employed correlations to check the association and interdependent of variables. ADF test has been used to check normalcy and stationary of the series. The study also checked the assumptions of the CLRM and employed regression analysis to predict continuous dependent variables from a number of independent variables.

The simple correlation results indicated that the GSDP is having a negative correlation with public debt. However, the negative correlation between public debt and GSDP is not very strong (-0.47). Further, the cross-correlation result indicated that the growth (GSDP) and public debt are having a correlation with either signs consequently during the study period with negative correlation in the 0, 2nd ,4th, 6th, 8th, and 9th lags.

A closer look at the causality between public debt and GSDP indicated that in every case we cannot reject the hypothesis that growth in public debt does not Granger causes GSDP growth. By contrast, we can reject the hypothesis that GSDP growth does not Granger causes a rise in public debt at 5th lag. In short, the statistical evidence suggests that the causality runs from growth to debt, and not the reverse but this evidence is clearly seen at 5th lag only. The result may have indicated five year plan periodicity. But our sample is not large enough to draw that conclusion. The result may also indicate that high debt does not necessarily slow down GSDP growth. But it is clearly seen from the result that public debt does not positively contribute to growth in GSDP.

The regression estimation result indicated rather strong result, for the sample period (1987–88 to 2010–11), if public debt is fixed at zero, the average rate of actual GSDP would have been about 15%. The partial regression coefficient indicated that the actual GSDP on the average increased (decreased) by about 14% for every one unit decrease (increase) in the previous relative change of public debt over the study period. Additionally, Vector autoregression (VAR) estimation has been conducted. The Cholesky decomposition and Variance Decomposition plotted from the VAR results has further confirmed negative response of GSDP to public debt.

Based on the empirical results, we can be safely concluded that public debt has not positively contributed to GSDP growth in Mizoram and there is enough empirical evidence to suggest that public debt is rather contributing negatively to long-term growth in Mizoram. The empirical evidence has clearly shown important policy implications both from the angles of fiscal as well as development strategy for policy makers in the state government. Firstly, debt funded public expenditure does not contribute positively to growth in the State and the state government should preferably avoid accumulation of debt. Secondly, debt funded public expenditure create mounting debt service burden as debt funded investment does not result in generating assets for economic growth. It is therefore, important that the state government policymakers sufficiently aware of the debt dynamics in the state while crafting a development strategy for the State.

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> *Nothing great was ever achieved without enthusiasm.*
>
> —*Ralph Waldo Emerson*

Annexure

Mizoram: GSDP (at current prices) and Outstanding Liabilities / Public Debt during 1987 to 2011

Year	Outstanding Liabilities / Public Debt (in Rs Crore)	Gross State Domestic Product (GSDP) at current prices (in Rs Crore)	Public Debt as % of GSDP
1987– 1988	127	286	44.4
1988 – 1989	179	288	62.2
1989 – 1990	209	312	67.0
1990 – 1991	330	341	96.8
1991 – 1992	314	465	67.5
1992 – 1993	322	533	60.4
1993 – 1994	378	711	53.2
1994 – 1995	444	739	60.1
1995 – 1996	538	937	57.4
1996 – 1997	574	1072	53.5
1997 – 1998	771	1123	68.7
1998 – 1999	842	1246	67.6
1999 – 2000	1178	1409	83.6
2000 – 2001	1375	1737	79.2
2001 – 2002	1713	1947	88.0
2002 – 2003	1967	2166	90.8
2003 – 2004	2606	2325	112.1
2004 – 2005	2922	2682	108.9
2005 – 2006	3154	2971	106.2
2006 – 2007	3354	3290	101.9
2007– 2008	3951	3816	103.5
2008 – 2009	4147	4577	90.6
2009–2010 (RE)	4655	5633	82.6
2010–11 (BE)	4688	NA	NA

Source: RBI Handbook of Statistics of State Government Finances 2010, and State Finances: A Study of Budgets of 2010–11

Corporate Social Responsibility: Relevance in Indian SMEs

SHAVETA GUPTA, SUKHMANI AND NEHA KALRA

Corporate Social Responsibility is not a new concept; companies have always to some extent tried to acknowledge the responsibility towards the community. Corporate Social Responsibility today is seen as something more far reaching, engaging at a much wider level with business' operations and relations with communities. It is essentially about business' contribution to sustainable development and how best to maximize that contribution. In order to study the growing impact of corporate social responsibility in business organizations, the present study has been undertaken on 100 SME manufacturing units operating in the state of Punjab. The data has been analysed using descriptive statistics, Friedman's two-way ANOVA, Kruskal-Wallis test and Factor analytic approach. The study revealed that, very few SMEs are there that are consciously engaged in implementing CSR initiatives. The reason can be attributed to lack of financial resources, no support from the side of government like incentives and schemes, no important impact on the image of the company and lack of awareness in the society. Further, "Good relations with Stakeholders" emerged as the most important factor underlying the perception of respondent SMEs towards the impact of implementing CSR practices. The results also revealed that there is no relation between CSR activities and performance of the organization.

Shaveta Gupta is Assistant Professor, Apeejay Institute of Management, Jalandhar; Sukhmani is Assistant Professor, Apeejay Institute of Management, Jalandhar; and Neha Kalra is Assistant Professor, Apeejay Institute of Management, Jalandhar.

Most companies make charitable donations, but few approach their contributions as brand-builder. Those that do take such an approach commit talent and know-how to a carefully chosen social need and then tell the world about it. Increasingly, philanthropy is used as a form of public relations or advertising, promoting a company's image through high-profile sponsorships. Corporations can use their charitable efforts to improve their competitive context-the quality of the business environment in the locations where they operate. Using philanthropy to enhance competitive context aligns social and economic goals and improves a company's long-term business prospects. Still, corporate social responsibility (CSR) was always intended to be more about how companies conduct themselves in relation to "stakeholders" than about charity. Never before have companies been under such critical scrutiny of the way in which they conduct business. There has been a significant increase in the expectations of a wide range of stakeholders in regard to their companies' commitment to socially responsible business practices. As a result, corporate social responsibility is becoming a progressively more important component of good business practice.

Both academics and practitioners have come to agree on the strategic relevance of corporate philanthropy. They find common ground around the view that companies can and should make strategic use of their charitable activities while also creating benefits for themselves. It would be a challenge to find a recent annual report of any big international company that justifies the firm's existence merely in terms of profit, rather than "service to the community". Big firms nowadays are called upon to be good corporate citizens, and they all want to show that they are. Most multinationals now have a senior executive, explicitly charged with developing and co-ordinating the CSR function. In India, the initiatives of Dabur India Limited, for example, which commenced 'Sundesh' in 1993, a non-profit organization, with an aim to promote research and welfare activities in rural areas are appreciable. Bharat Petroleum Corporation Limited has adopted 37 villages

as their responsibility to develop in all walks of life. It has made efforts to make them self-reliant, provided them fresh drinking water, sanitation facilities, medical facilities, vocational training and literacy camps. Tata Group has created towns and cities like Jamshedpur, Mithapur, Babrala for the benefit of its employees. Cadbury India, Glaxo and Richardson Hindustan are some of the companies which are helping farmers to grow crops which in turn shall serve as raw materials for them.

But what does it amount to? Firms are still mainly interested in making money, whatever the CEO may say in the annual report. When commercial interests and broader social welfare collide, profit comes first. The tangible and intangible benefits associated with for organization are immense. A powerful tool like CSR not only enhances the brand image and reputation of the business but also leads to improvement in sales and customer loyalty, and increased ability to attract and retain employees.

CSR takes many different forms and is driven by many different motives. But the short answer must be yes: for most companies, CSR does not go very deep. There are many interesting exceptions—companies that have modelled themselves in ways different from the norm particular practices that work well enough in business terms to be genuinely embraced; charitable endeavours that happen to be doing real good, and on a meaningful scale. Under pressure, big multinationals ask their critics to judge them by CSR criteria, and then, as the critics charge, mostly fail to follow through. Their efforts may be enough to convince the public that what they see is pretty, and in many cases this may be all they are ever intended to achieve.

SMEs and Corporate Social Responsibility

SMEs always represented the model of socio-economic policies of Government of India which emphasized judicious use of foreign exchange for import of capital goods and inputs; labour intensive mode of production; employment generation; non concentration of diffusion of economic power in the hands of few; discouraging monopolistic practices of production and marketing; and finally effective contribution to foreign exchange earning of the nation with low import-intensive operations. In the last decade, the Government is actively promoting cluster development as a strategy to grow SMEs. Despite its commendable contribution to the Nation's economy, SME sector does not get the required support from the concerned Government Departments, Banks, Financial Institutions and Corporate, which is a

handicap in becoming more competitive in the National and International Markets. SMEs faces a number of problems - absence of adequate and timely banking finance, limited capital and knowledge, non-availability of suitable technology, low production capacity, ineffective marketing strategy, identification of new markets, constraints on modernisation & expansions, non availability of highly skilled labour at affordable cost, follow-up with various government agencies to resolve problems etc.

The evolution and growth of CSR in large corporations in India has been well documented. However, with the phenomenal growth of the SMEs in recent times, there has been an increased awareness of CSR in SMEs. Corporate philanthropy is widely prevalent in the SME sector in India. Their significant contributions to the health, education, religious institutions and temples cannot be undermined. Most SME owners significantly complement the work of the Government and the NGOs in the towns/villages/cities they operate in. A lot of SMEs are of the opinion that philanthropy and CSR are one and the same. Since many of the SMEs are at a stage where they are struggling to establish themselves and do not have the manpower or resources to address these issues, they tend to ignore them. One of the unique characteristics of SMEs is that their functioning is centered on the role of the owner who in most cases heads the organisation and their CSR policies are centered around his/her knowledge, values and interests. Many the SMEs are unable to see any clear benefits by following or practicing CSR. Very few companies had social reports, code of conduct or stated ethical practices. Apart from following prescribed government norms, very few of them followed ethical codes as they did not have the resources to follow or implement them. Moreover, they did not give much priority for CSR or ethical code of conduct at they were tied down by various constraints ranging from finance, counseling, information technology and marketing. The study drives home the point that there is a need to popularize the concept of CSR among SMEs and the benefits it can bring for them.

Review of Literature

CSR is a widely researched area at international level but in Indian context, not many contributions are there.

Khan and Atkinson (1987) concluded that corporate social responsibility (CSR) in the past few decades has intrigued not only the scholars but the practitioners as well. It is essentially a concept whereby companies decide voluntarily to contribute to a better society and a cleaner environment.

Wood (1991) concluded that the basic idea of corporate social responsibility is that business and society are interwoven rather than distinct entities; therefore, society has certain expectations for appropriate business behavior and outcomes. To assess whether a corporation meets society's expectations

Bagnoli and Watts (2003) concluded that the first motive we consider is the belief that socially responsible companies will perform better financially. Prior research has examined how corporate social responsibility (CSR) can benefit companies by attracting the socially responsible consumers.

Rupp, et. al (2006) concluded that the implementation of the CSR policy has also traditionally been in the hands of 'management' and 'employees' as the non-management workforce have been less likely to be involved in developing and implementing a policy on business responsibility towards society. There are large variations in the understanding of CSR in the head office and the local plant or sales office of an organization.

Aggarwal (2007) concluded that with the adoption of HR policies, such as, periodic review of employee performance, adequate training for the workforce and career advancement norms for its personnel, creating motivation, and commitment in the workforce the organization can reap the full business benefits and become successful to the great satisfaction of all its stakeholders.

Perrini, Russo and Tencati (2007) concluded that firms with a high value for social responsibility are much more likely to engage in traditional kinds of plans for social strategy. The use of social strategy depends upon the presence of specific configurations of industry environment, resources and values.

Sacconi (2007) concluded that when firms fulfill their fiduciary duties to their stakeholders, they benefit from reputation and the positioning of the firm with respect to social issues is clearly a way to differentiate the firm and its products and services in ways that creates value.

Silberhorn and Warren (2007) concluded that it is not only used for fulfilling legal expectations but also for investing more into human capital, the environment and the relations with stakeholders. Companies facing the challenges of globalization are aware that CSR can be of direct economic value.

Fenwick and Bierema (2008) concluded that HR department, which has the potential to play a significant role in developing CSR activities within the organization, found to be marginally involved or interested in CSR.

Murray (2008) concluded that on the basis of survey stated that more than one-third of respondents pointed that working for a caring and responsible employer was more important than the salary they earned and nearly half would turn away from an employer that lacked good corporate social responsibility policies.

The perusal of the literature revealed that organizations are increasingly realizing that Corporate Social Responsibility is no longer a collection of discreet practices or occasional gestures motivated by marketing or public relations. It is rather a comprehensive set of practices and policies that should be integrated into the organizations operations and activities.

Objectives and Hypothesis of the Study

The present study depicts the growing impact of corporate social responsibility in business organizations. The upcoming concept of corporate social responsibility helps enterprises to grow in a profitable manner with increase in reputation of firms and their market share. Many studies have been conducted on the concept of corporate social responsibility but no study has been conducted on corporate social responsibility in small medium enterprises. Thus, in order to fill this gap the need of the study has arisen. The study was limited to 50 small and medium enterprises in Punjab. The current study was undertaken with a primary objective of exploring the CSR practices in SMEs operating in the state of Punjab. The specific objectives of the study were:

1. To study the awareness among respondent SMEs regarding the concept of corporate social responsibility.

2. To explore the effects of strategic corporate social responsibility— its benefits and its costs.

3. To measure the impact of corporate social responsibility strategies on the bottom line by incorporating them into business performance analytics.

4. To study how respondents follow corporate social responsibility activities in their organization.

5. To study the reasons for not implementing Corporate Social Responsibility by respondents in their organization

In light of the above objectives, few assumptions have been framed in the form of null hypotheses.

Ho: There is no significant difference in the performance of the organizations as a result of CSR activities

Data Base and Methodology

Data Base

This article focuses on exploring the implementation of CSR practices and their impact on the concerned decision by SMEs. For accomplishing the objective, the survey was carried out through a non-disguised structured questionnaire having open-ended, close-ended, and dichotomous and likert scale based questions that was prepared in a multi-stage process. First, prior studies on CSR were reviewed to identify its various facets along with the interrelationships that exist between various such facets. Secondly, based on the identified facets of CSR, some factors were identified, on the basis of which questionnaire was framed. Third, to ensure the content validity of the questionnaire, it was pretested in two stages. In stage one, three professors from the field of financial management and research studies evaluated the questionnaire. Based on their feedback, some modifications were made in the questionnaire. In stage two, a 'pilot survey' was conducted in case of twenty respondents. After the pilot survey, certain modifications again were introduced in the questionnaire and finally modified questionnaire was used for the detailed study.

Finally, the questionnaire was sent to 150 SME manufacturing units operating in the state of Punjab. The SME manufacturing units were identified on the basis of non-probabilistic convenience sampling. The SME manufacturing units were chosen irrespective of the type of industry, that is, the sample constituted the sports good unit, hosiery units, hand tools and handloom units. During editing stage of the responses, it was found that some of the questions in the questionnaire were incomplete and in some cases, there was no response and thus was not included in the study and finally only 100 manufacturing unit respondents were retained for the purpose of analysis.

Statistical Tools & Techniques

The present study had been analyzed by using various statistical tools like Friedman ANOVA, Factor analysis and Kruskal-Wallis test. The results and analysis had been shown with the help of tables. For analyzing the questionnaire, simple as well as cross tabulation has been used. In the present study, in order to apply various methodological tools, SPSS was meticulously used.

Results and Findings

In the present study, data has been analysed and interpreted in the following sub-heads:

Description of the sample

The sample for the current study demonstrated the following demographics concerning type of enterprise, years of experience and growth stage of SME units.

Table 1: Profile of the Survey Respondents

Demographic Factors	Number of Respondents	Percentage of Respondents
Age of the Company		
Less than 10 years	10	10
10-20 years	38	38
20-30 years	46	46
More than 30 years	6	6
Total	100	100
Type of Company		
Small Scale Industry	60	60
Medium Scale Industry	40	40
Large Scale Industry	0	0
Total	100	100
Industry Sector of Company		
Sports Good Industry	20	20
Hand Tools Industry	26	26
Auto Parts Industry	6	6
Rubber Goods Industry	6	6
Surgical Instruments	6	6
Tanning Industry	0	0
Others	36	36
Total	100	100
Stage of Company		
Introduction Stage	18	18
Growth Stage	68	68
Maturity Stage	12	12
Decline Stage	2	2
Total	100	100
Level of Investment		
Less than 20 lakhs	42	42
20 lakhs – 40 lakhs	56	56
More than 40 lakhs	2	2
Total	100	100
Number of Employees		
Less than 100	42	42
100 – 200	36	36
More than 200	22	22
Total	100	100
Annual Turnover		
Less than 20 lakhs	64	64
20 lakhs – 40 lakhs	36	36
More than 40 lakhs	0	0
Total	100	100

Perusal of the above table reveals that of the total respondent SMEs, majority of the companies under study i.e., 46% are of age between 20 – 30 years, that majority of industries that is 60% are Small Scale Industries, that majority of the companies that is 36% have other industry sector while 26% are Hand Tool Industries, that majority of the companies are at Growth Stage, majority of the entrepreneurs made investment in their enterprises upto 20 lakhs – 40 lakhs, majority of the enterprises are having employees less than 100 and majority of the companies are having annual turnover less than 20 lakhs.

Table 2: Awareness regarding Corporate Social Responsibility

Awareness Level	Number of Respondents	Percentage of Respondents
Fully Aware	58	58
Partially Aware	32	32
Not Aware	10	10
Total	100	100

Awareness regarding Corporate Social Responsibility

Scrutinizing the results in table 2 revealed that majority of the respondents that is 58% are fully aware about the concept of Corporate Social Responsibility and 32% of the respondents are partially aware while 10% are not aware about the concept of Corporate Social Responsibility.

Various Sources of Learning about Corporate Social Responsibility

In order to know about the various sources from which SMEs get to know about the increasing need for adopting corporate social responsibility, this question was framed.

The results in table 3 indicated that majority of the respondents (31.78%) learned about Corporate Social

Table 3: Various Sources of Learning about Corporate Social Responsibility

Various Sources of Learning about Corporate Social Responsibility	Number of Respondents	Percentage of Respondents
UN Global Compact	0	0
Local NGOs	15	14.02
Business Associations	34	31.78
Chamber of Commerce	2	1.87
Media	31	28.97
Other Companies	25	23.36
Total	107*	100

(* The total is more than sample size because of multiple responses.)

Responsibility for the first time from various Business Associations.

Association of Respondents with Any Non Governmental Organization

The literature reviews indicated that majority of the SMEs face dearth of finance and thus express their inability to go ahead with CSR initiatives. In such a situation, they fulfill their responsibility towards society by forming coalition with NGOs operating in their region. In order to know, the possibility of such associations, this question was included in the survey.

Table 4: Association with Non-Governmental Organization

Association of Respondents with NGO	Number of Respondents	Percentage of Respondents
Yes	28	36.84
No	48	63.16
Total	76*	100

(* The Total is less than sample size because few respondents don't follow Corporate Social Responsibility)

Analysing the results in table 4 indicated that majority of respondents (63.16%) are not having an association with any Non Governmental Organization while 36.84% have any association with any Non Governmental Organizations (NGO) like Psycho Educational Society, Society for Child Development, Can Support, Child Survival India, Gram Seva Trust, Abhiyan and Disha.

Reasons for not Implementing CSR in Organization

Very few SMEs are there that are consciously engaged in implementing CSR initiatives. The reason can be attributed to lack of financial resources, no support from the side of government like incentives and schemes, no important impact on the image of the company and lack of awareness in the society. In order to know the reasons for not implementing CSR initiatives, this question was included in the study.

The scrutiny of table 5 revealed that majority of the respondents (31.58%) are not implementing Corporate Social Responsibility in organization because they think that CSR is important for companies located in developed countries rather than developing, while least respondents (10.52%) giving any other reason like lack of funds and no added advantage for not implementing Corporate Social Responsibility in organization.

Table 5: Reasons for not Implementing CSR in Organization

Reasons for not implementing CSR in Organizaion	Number of Respondents	Percentage of Respondents
CSR is a costly concept	20	26.32
CSR can be only implemented in SMEs with the help of external advisors	14	18.42
Lack of resources provided by Government and other institutions	10	13.16
CSR is important for companies located in developed countries rather than developing	24	31.58
Any other reasons	8	10.52
Total	76*	100

(* The total is less than sample size as few respondents are not following Corporate Social Responsibility and because of multiple responses)

Reasons for Implementing CSR in Organization

Literature review also revealed that in developed countries, society and corporate world are more aware regarding CSR practices and its added advantage. In order to find out the application of same in India, the respondents were asked to indicate the reasons as to why their companies undertake CSR initiatives.

Table 6: Reasons for Implementation of CSR in Organization

Reasons for implementing CSR in Organizaion	Number of Respondents	Percentage of Respondents
CSR is implemented to be a socially responsible citizen	33	45.83
CSR is implemented due to competitor's pressure institutions	15	20.84
CSR is followed due to increased consumer awareness	19	26.39
CSR is implemented in just for a formality	5	6.94
Total	72*	100

(* The total is less than sample size as other respondents are not following Corporate Social Responsibility)

Studying the results of table 6 indicated that majority of the respondents (45.83%) are implementing Corporate Social Responsibility as they consider their company as a socially responsible citizen.

Stakeholders that the Company Wants to Address through CSR Initiatives

After getting the idea regarding why the SMEs implement CSR practices, the next aspect that was covered was to know that by implementing CSR practices, which stakeholders they address.

Table 7: Addressing Various Stakeholders through CSR Initiatives

Addressing Various Stakeholders through CSR Initiatives	Number of Respondents	Percentage of Respondents
Government	12	7.79
Regulatory Bodies	6	3.89
Competitors	16	10.39
Industry associations	8	5.19
Customers	34	22.08
Employees	32	20.79
Shareholders	21	13.64
Suppliers	10	6.49
Non Governmental Organizations	15 *	9.74
Total	154*	100

(* The total is more than sample size because of multiple responses.)

The results in table 7 revealed that majority of the respondents (22%) are addressing Customers through Corporate Social Responsibility Initiatives while 21% are addressing Employees and least of the respondents that is 4% are addressing Regulatory Bodies through Corporate Social Responsibility initiatives. Thus, it has been revealed that the SMEs carry out CSR initiatives in order to indicate to the customers that they consider society's upliftment as a part of their agenda and along with that they also undertake the same in order to do something for the well-being of the employees realising them as human capital.

Thematic Focus of CSR Activity in Various Indicators

The organizations adopt CSR practices considering in mind the impact it will have on increasing the customer base as the customers consider such organizations as valuable to the society, thus, increasing the financial performance and also focusing on the employees' well-being so as to increase their productivity which, in turn, again will influence the financial performance of the companies. In an attempt to explore the focus of CSR initiatives, this aspect was included in the survey instrument.

Analysing the results in table 8 revealed that majority of the respondents (38.89%) are having thematic focus of

Table 8: Thematic Focus of CSR Activity in Various Indicators

Thematic Focus of CSR Activity in Various Indicators	Number of Respondents	Percentage of Respondents
Social Indicators	26	36.11
Economic Indicators	28	38.89
Environment Indicators	18	25
Total	72*	100

Notes: The total is more than sample size because of multiple responses.

Corporate Social Responsibility activities towards Economic indicators in terms of Performance and Marketplace activities, while 36.11% respondents have their thematic focus towards Social indicators in terms of Workplace and Community activities.

Social indicators in which you have applied CSR practices

The focus of CSR initiatives with respect to social indicators has been shown in Table 9. Scores are significantly different on the Friedman two-way ANOVA test (p<0.001).

Table 9: Focus on Social Indicators while Applying CSR

Social Indicators	Rank	Mean
Management of charity	1	1.87
Employee satisfaction and motivation	2	2.47
Management of workplace safety	3	3.16
Management of community engagement	4	4.39
Communication & reporting of social performance	5	4.50
Management of stakeholder engagement	6	4.61

Notes: The mean is the average on a scale of 1=Most Important and 6= Least Important; SD=Standard Deviation; scores are significantly different on Friedman two-way ANOVA test (p<0.001); N=72

Table 9 revealed that for the group of six social indicators, the first group is "Management of charity" (1.87). The second group includes "Employee satisfaction and motivation" (2.47) and "Management of workplace safety" (3.16). The third and the lowest rank group include "Management of community arrangement" (4.39), "Communication and reporting of social performance (4.50) and "Management of stakeholder engagement" (4.61).

Economic indicators in which CSR practices are implemented

The focus of CSR initiatives with respect to economic indicators has been shown in Table 10. Scores are significantly different on the Friedman two-way ANOVA test (p<0.001).

Table 10: Focus on Economic Indicators while Applying CSR

Economic Indicators	Rank	Mean
Enhancement of product & process quality	1	2.00
Enhancement of corporate governance	2	3.34
Managing Issues and risk management	3	3.42
Business expansion and investor attraction	4	3.45
Improvement of customer relations	5	3.58
Improvement of supplier relations	6	5.21

Notes: The mean is the average on a scale of 1=Most Important and 6= Least Important; SD=Standard Deviation; scores are significantly different on Friedman two-way ANOVA test (p<0.001); N=72

Table 10 revealed that for the group of six economic indicators, the first group is "Enhancement of product and process quality" (2.00). The second group includes "Enhancement of corporate governance" (3.34), "Managing issues and risk management" (3.42), "Business Expansion and investor attraction" (3.45) and "Improvement of customer relations" (3.58). The third and the lowest rank group include "Improvement of supplier relations" (5.21).

Environmental indicators in which CSR practices are implemented in organization

The focus of CSR initiatives with respect to environmental indicators has been shown in Table 11. Scores are significantly different on the Friedman two-way ANOVA test (p<0.001).

Table 11: Focus on Environmental Indicators while Applying CSR

Economic Indicators	Rank	Mean
Water management	1	3.05
Management of environmental impact	2	3.37
Management of hazardous material	3	3.68
Communication & reporting of environmental performance	4	5.00
Resource and waste management	5	5.11
Support for an environmental management system	5	5.11
Environmental risk management	6	6.00
Energy management	8	6.74
Management of greenhouse gas emissions	9	6.95

Notes: The mean is the average on a scale of 1=Most Important and 6= Least Important; SD=Standard Deviation; scores are significantly different on Friedman two-way ANOVA test (p<0.001); N=72

Table 11 revealed that for the group of nine environmental indicators, the first group is "Water management" (3.05), "Management of environmental impact" (3.37) and "Management of hazardous material" (3.68). The second group includes "Communication and reporting of environmental performance" (5.00), "Resource and waste management" (5.11) and "Support for environmental management system" (5.11). The third and the lowest rank group include "Environment risk management" (6.00), "Energy management" (6.74) and "Management of greenhouse gas emission" (6.95).

Impact of Implementing CSR Practices: Result of Factor Analysis

Further, in order to identify the important factors underlying the perception of respondent SMEs towards the impact of implementing CSR practices, factor analysis was undertaken. The scales of measurement were tested using Cronbach α reliability test. Cronbach α was 0.79, which is satisfactory level of construct validity. The correlations between the factors were then examined which revealed the existence of correlation between certain factors. This perusal suggested the use of factor analysis to investigate any distinct underlying factors and to reduce the redundancy of certain barriers indicated in the correlation matrices. Principal Component Analysis was chosen as the method of extraction in order to account for maximum variance in the data using minimum number of factors. The default solution (eigen values>1) resulted in extraction of three factors. These three factors accounted for 74.13 percent of total variance. Table 12 summarizes the orthogonal solution resulting from a varimax rotation of the measures.

Table 12: Impact of Implementing CSR Practices: Result of Factor Analysis

Factor	Factor Label	Factor Loading	Variables
F1	Good Relations with Stakeholders	.904	(V8) CSR maintains good relations with Government and Communities
		.890	(V9) CSR leads to good ethical conduct by superiors which leads to improved productivity
		.885	(V7) CSR leads to better risk and crisis management
		.737	(V6) Good company CSR leads to easier recruitment of high flyers and young people
F2	Social Upliftment	.880	(V2) CSR helps companies to fight social exclusion and build more inclusive societies
		.877	(V3) CSR leads to long-term sustainability for organization and society
		.857	(V1) CSR helps in environment protection
F3	Financial Benefits	.818	(V10) CSR can lead to an increase in profits
		.803	(V4) CSR leads to long-term return on investments for shareholders
		.612	(V11) CSR leads to brand recognition
		.606	(V5) CSR leads to enhanced goodwill for firms

The factor 1 variables good relations with government, good ethical conduct and productivity, better risk management and better recruitment prospects has been labeled as "Good relations with Stakeholders". Factor 2 was named as "Social upliftment" including: build more inclusive societies, long-term sustainability for organization and contribution in environment protection. Factor 3 was named as "Financial benefits" including: increase in profits, return on investment, goodwill and brand recognition.

Biggest obstacle to integrate CSR in business operations

The biggest obstacle faced by respondent SMEs to integrate CSR in business operations has been shown in Table 13. Scores are significantly different on the Friedman two-way ANOVA test (p<0.001).

Table 13 revealed that for the group of seven obstacles in integrating CSR in business operations of

Table 13: Biggest obstacle to Integrate CSR in Business Operations

Biggest Obstacle	Rank	Mean
Water management	1	3.05
Lack of Employee Motivation	1	3.32
Lack of Time	2	3.45
Unavailability of Technology	3	3.63
Lack of Know-How	4	4.03
Lack of Human Resources	5	4.45
Lack of Funds	6	4.55
No Benefits Expected from CSR	7	4.58

Notes: The mean is the average on a scale of 1=Most Important and 7= Least Important; SD=Standard Deviation; scores are significantly different on Friedman two-way ANOVA test (p<0.001); N=100

respondent SMEs, the first group is "lack of employee motivation" (3.32), "Lack of time" (3.45) and "Unavailability of technology" (3.63). The second group includes "Lack of know-how" (4.03), "Lack of human resources" (4.45), "Lack of funds" (4.55) and "No benefits from CSR" (4.58).

Reasons that would encourage the company to implement CSR practices

The reasons why respondent SMEs would be encouraged to implement CSR have been shown in Table 14. Scores are significantly different on the Friedman two-way ANOVA test (p<0.001).

Table 14: Reasons for Implementing CSR

Reasons	Rank	Mean
Linkages with Larger Firms	1	2.66
Concessional Schemes	2	3.08
Government Financial Incentives	3	3.34
Sponsored Participation in Fairs	4	4.16
Participation in Business Networks	5	4.42
Free/Subsidized Counseling	6	4.53
Award Schemes	7	5.82

Notes: The mean is the average on a scale of 1=Most Important and 7=Least Important; SD=Standard Deviation; scores are significantly different on Friedman two-way ANOVA test (p<0.001); N=100

Table 14 revealed that for the group of seven reasons for implementing CSR in business by respondent SMEs, the first group is "linkages with larger firms(2.66), "Concessional schemes" (3.08) and "Financial incentives from government" (3.34). The second group includes "Sponsored participation in fairs" (4.16), "Participation in

business networks" (4.42) and "Free or subsidized counseling" (4.53). The last group is "award schemes" (5.82).

Impact of CSR and Performance Indicators of Firm

In order to see whether CSR initiatives have any impact on the performance of the firms or not, Kruskal Wallis has been applied. This test is a non parametric test which investigates the equality of population medians among groups. It is the extension of Mann Whitney test to 3 or more groups. The total sample of the firms is divided based on various issues after implementing CSR activities taken as a grouping variable and the impact on firms performance is taken as the test variable. The table 15 a shows the organizations with good performance have mean rank of

Table 15a: Performance Ranks

	Performance of Firm	N	Mean Rank
Operational Costs	Good	42	20.15
	Neutral	30	18.50
	Total	72	
Productivity	Good	42	20.09
	Neutral	30	18.60
	Total	72	
Sales	Good	42	21.20
	Neutral	30	16.90
	Total	72	
Revenues	Good	42	21.00
	Neutral	30	17.20
	Total	72	
Customer Satisfaction	Good	42	15.93
	Neutral	30	24.97
	Total	72	
Employee Turnover	Good	42	21.26
	Neutral	30	16.80
	Total	72	
Absenteeism Rate	Good	42	20.02
	Neutral	30	18.70
	Total	72	
Market Share	Good	42	17.04
	Neutral	30	23.27
	Total	72	
Market Image of the Firm	Good	42	14.50
	Neutral	30	27.17
	Total	72	
Brand Awareness	Good	42	21.46
	Neutral	30	16.50
	Total	72	

Notes: 5 % level of significance, ** 10 % level of significance

Table 15b: Test Statistics[a,b]

	Operational Costs	Productivity	Sales	Revenues	Customer Satisfaction	Employee Turnover	Absenteeism Rate	Market Share	Market Image	Brand Awareness
Chi-Square	1.341	.358	2.330	1.703	8.195	2.165	.196	3.822	20.262	4.524
Df	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	.247	.549	.127	.192	.004	.141	.658	.051	.000	.033

Notes: a. Kruskal Wallis Test
    b. Grouping Variable: Performance of Firm

20.15 in case of operating cost, which depicts that operating cost incurred in CSR activities does not result in increased performance of the organization as the first rank has been given to the respondents who are in favour of neutral impact on the performance of the firm. It is followed by level of productivity, sales, revenues and brand awareness as a result of CSR activities also result in good performance. The variables that have indicated positive impact of CSR is in case of customer satisfaction, market share and market image.

The p-value of significance for the various issues after implementing CSR activities has been given along with the calculated chi square value in table. The p- value for operating cost, productivity, sales, revenues, absenteeism, employee turnover and brand awareness exceed 0.05 and hence, the overall results are in acceptance of null hypothesis at 5% level of significance i.e. there is no significant difference in the performance of the organizations as a result of CSR activities. The p- value for customer satisfaction and market image is significant at 5 % level of significance, and is thus in rejection of null hypothesis i.e. there is a significant difference in the performance of organizations as a result of CSR activities.

Overall Performance Ranking

In order to see whether CSR initiatives have any impact on the performance of the firms or not, Kruskal Wallis has been applied. This test is a non parametric test which investigates the equality of population medians among groups. It is the extension of Mann Whitney test to 3 or more groups. The total sample of the firms is divided in three groups, based on the extent to which they follow Corporate Social Responsibility in their organization, used as a grouping variable and the overall performance of the enterprise after implementing CSR activities is taken as the test variable.

The rank table 16 a and b shows that the organizations which follow CSR have a mean rank of 29.08

Table 16a: Ranking the Performance of the Firm

Extent to which firms follow CSR		N	Mean Rank
Performance of Firm			
	Large Extent	28	29.08
	Small Extent	24	25.21
	Do not Follow	20	23.88
	Total	72	

Table 16b: Test Statistics[a,b]

	Performance
Chi-Square	1.391
Df	2
Asymp. Sig.	.499

Notes: a. Kruskal Wallis Test
    b. Grouping Variable: CSR

in case of performance of the firm which depicts that firms which follow CSR result in good performance of their firm. The p- value of significance for the extent to which organizations follow CSR has been given along with the calculated chi square value in table. The p- value for performance exceeds 0.05 and hence, the results are in acceptance of null hypothesis at 5% level of significance i.e. there is no significant difference in the performance of the organizations as a result of CSR activities.

Analysing the results in tables 15(a and b) and 16(a and b) indicated that there is no impact of CSR activities on the various performance indicators and thus, no impact on the overall performance of the firm.

Conclusion

The study concluded that Corporate Social Responsibility is not a new concept; companies have always to some extent tried to acknowledge the responsibility towards the community. Corporate Social Responsibility today is seen as something more far reaching, engaging at a much wider level with business' operations and relations with

communities. It is essentially about business' contribution to sustainable development and how best to maximize that contribution. But in order to move from theory to concrete action, many obstacles need to be overcome. A key challenge facing business is the need for more reliable indicators of progress in the field of Corporate Social Responsibility, along with the dissemination of Corporate Social Responsibility strategies. Transparency and dialogue can help to make a business appear more trustworthy, and push up the standards of other organizations at the same time. Thus, companies have increasingly felt the need to co-ordinate their Corporate Social Responsibility activities and demonstrate their commitment to social responsibility. As a part of Corporate Social Responsibility business should embrace responsibility for the impact of its activities on the environment, consumers, employees, communities and all other members of the public sphere.

Implications for the Future

There is a clear and evident trend of an increased emphasis of expectations of CSR from SMEs in India. Instances of enlightened SMEs and owners appear to be by far very few. However, in future the pressure from the local community, government and the industry associations may force SMEs to act responsibly in areas related to the environment. CSR education has been undertaken by the industry associations and this could result in more SMEs engaging in CSR activities related to the environment. From the view point of practice, it appears that a number of initiatives related to CSR have been launched in the last few years. From a theory building point of view, there may be opportunities for researchers to engage in meaningful action research.

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