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## *Editor's Desk*

In a dynamic world development of new ideas, fresh perspectives and innovation are important for an organization to expand, grow and be successful. Companies like Samsung Amazon and Paytm, are some examples of these entrepreneurial ideas that were put into practice through creativity. What are these ideas? How did they become successful? What lessons can be learnt from these companies? Primarily these companies related creativity with innovation. Every company should give its employees the freedom to be creative and to bring out new ideas. An idea is a seed, creativity is a thinking process and innovation is a productive process. Creativity implemented is called innovation. The Samsung story is one of the great business achievements of the last 20 years and in the 21<sup>st</sup> century. Chairman Lee declared the launch of "New Management" in Frankfurt in 1993. Since then Samsung has transformed itself from a mediocre manufacturer based on low cost advantages to a world class performer with a strong brand value and premium products. To compete globally, companies need to adopt innovative strategies carried out through creative ideas with an open management that removes all restrictive and discriminatory practices in institutions. The human resources, technology, finance, marketing manufacturing, and design departments are getting importance as competitive resources. Samsung has used some of these resources very effectively to become a successful and leading global company. The success of the company's change effort is largely attributed to leadership, standardization of management systems, commitment to innovative strategies and training, and partnership with value chain experts. It has stood in competition with Apple and Sony and still made a mark.

Amazon has become a leading e-tailing company through creative ideas and innovative solutions. It used its creativity to move from sales revenue model to advertising revenue model where companies pay for their products to be advertised as featured products. Then, it further used its creativity to include a subscription revenue model to sell magazine subscriptions. Finally it tied up with those companies as their partners which produced electronic products and clothes to sell their goods and take a commission from them. Paytm was started by Vijay after he suffered losses in his company called One97 Communication Ltd by thinking creatively and putting his ideas into practice. He wanted to make it easy for people to make their payments as e-commerce business had spurted and consumers found it difficult to make payments. He started from mobile recharge business and went on to making a mobile/Paytm wallet. The company is currently dealing in mobile and DTH recharge, bill payments, bus tickets, railway tickets, data card recharges, e-commerce marketplace, payment gateway, and about 100 million customers are using Paytm. Therefore innovation is about improving existing activities with creative new ideas through new products, new processes, new market positions and new business models. In the words of Edward de Bono "It is better to have enough ideas for some of them to be wrong, than to always be right by having no ideas at all".

**(Preeti Singh)**

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## ROLE AND SIGNIFICANCE OF CREDIT RATING WITH SPECIAL REFERENCE TO INDIAN RETAIL EQUITY INVESTOR: AN EMPIRICAL INVESTIGATION

S.Gurusamy★ C.Vengatesan★★ P.Hemavathy★★★

*Credit rating provides analytical assistance to the potential investors on the extent of risk involved in the appropriate repayment of principal and interest. Credit rating is a basis of reliable information for many users as rated instruments highlight the company's financial health. Rating gives advanced information about the rated product at low cost to the investor. This study highlights as to how the retail equity investors could enhance their participation in the stock market by relying on the information dished out by the credit rating agencies. The methodology of the study is based on primary data collected through well-structured questionnaire to elicit the perception of retail investors on the usefulness of credit rating. Factor analysis by principal component method, has been applied to reduce the number of usage related variables among the retail equity investor into four meaningful factors and benefit of ratings related variables into three meaningful factors. Multiple regression analysis has been employed to establish the influence of usage of the ratings among the retail equity investor on the benefit of rating by the retail equity investor. Results reveal that credit rating acts as the information gap-builder for investors besides serving the public good. The retail equity investors are indeed found to be highly benefited by the way of adequate disclosure of relevant information. Credit rating agencies play a significant part in providing one source of information that aids accuracy and market capability, thereby plummeting the imbalance of information among the stock market investors.*

*Keyword: Stock Market, Equity investors, Credit rating agencies, Benefit factor, Awareness Factor, Credit Protection*

Credit rating agencies act as drivers of the stock market volatility. Any rating news which has a positive externality reduces credit risk, and a negative externality, increases volatility risk. The volatility may depend on two sets of factors: the effect of regulations embodying such ratings, and the communication policies adopted by Credit Rating Agencies. Credit rating agencies play an important role in providing one source of information that aids exactitude and market competence thereby tumbling the imbalance of information that often exists among the stock market investors. Credit rating provides analytical assistance to the potential investors on the extent of risk involved in the appropriate repayment of principal and interest. Credit rating is a basis of reliable information for many users as rated instruments highlight the company's financial health. Rating gives advanced information about the rated product at low cost to the investor. Thus the investor can effortlessly identify the risk involved and obtain predictable benefit of the instrument by glancing at the symbols. The underlying principle of rating service is to refurbish investor's confidence. In fact, Ratings establish the link between risk and return along with the provision of a yardstick to assess the risk level and compare the offered rate of return that influences the composition of the investor's portfolio. Credit rating is used as decisive inputs in determining their portfolio by the investors. Credit rating agencies operate as one of

source to fulfill the information gap to the retail investors who are amateur in investment activities. Credit rating agencies help to perforate the haze of asymmetric information by offering judgments in the form of opinion about the credit quality of the instrument. Thus, the credit rating agencies have evolved to play an informational intermediary role. Financial market participants give greater importance to volatility as it is used as an effective risk barometer. Stock return volatility encumbers economic performance through consumer spending. The study reports a confirmation of time varying volatility, which demonstrates clustering, high persistence and certainty and responds asymmetrically for positive and negative shocks. This study endeavors to act show as to how the retail equity investors could enhance their participation in the Indian Capital market by relying on the information dished out by the credit rating agencies

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## I. Review of Literature

Ed DeHaan (2013) examined the credibility of rating agencies with regard to corporate credit rating of Structured Finance Product (SFP). The author identified that the inaccurate corporate ratings affected investor's participants in debt market due to information variation in the year 2007. Finally, he concludes that the credibility is primary determinant for market participants to rely for making investment decision.

John Hull, MirelaPredescu and Alan White (2004) examined the distinction between the credit default swap (CDS) spreads and bond yield in order to find out the negative ratings of Moody's investors Service. For that purpose, the authors tested the ratings announcements on credit spread levels and credit spread changes by the way of negative credit rating changes and finally concluded that the negative ratings of credit rating agencies (CRAs) strongly contributes to CDS spread and bond yield than the positive ratings announced by Moody's investor's service.

ShreekantIyengar (2012) argues that there should be similarities among the ratings issued by two or more rating agencies on one particular instrument. Further, the author compares rating relationship between Moody's and S&P on sovereign debt instruments during the period from 2007 to 2010. The author used regression analysis to find out the relationship between the two ratings. The researcher found that there is statistically a significant difference in sovereign ratings of Moody's and S&P even though they are using a common methodology to rate the instruments which leads misperception among the investors, about the rating agencies. This eventually leads to confusion among the investors on investment decision making.

### Statement of problem

The activity of credit rating agencies is one of the factors that add pressure to volatility. Rating related news such as publication of a rating or revision of the existing rating is linked with volatility. Credit rating agencies acts as information intermediary to the retail equity investors.

### Objectives of the study

- To study the perception of retail equity investors about their awareness about the credit rating agencies
- To study the perception of retail equity investors about the usage and benefits of credit rating agencies

### Data Collection

Data for this study was primarily collected through a survey in the form of a questionnaire as well as through research based published data concerning retail investor participation. Primary data refers to data, which is collected for specific purpose and which is required in order to complement secondary data (Wiedersheim- Paul & Eriksson,1997).

## II. Research Design & Methods

### Methodology

The sample of the study is limited to retail equity investors because individual investors constitute an important group in the financial market place and (De Bondt, 1998). It becomes even more pronounced taking into consideration that even an emerging economy like India already accommodates 2.02 million individual retail investors being largest in the world (PTI, Mumbai, Dec 2012) Further this research demonstrates that primary survey can contribute several important ways to increase the level of awareness among the retail equity investors in using credit rating services. The methodology of the study is based on primary data collected through well framed and structured questionnaire to elicit the perception of retail investors on the usefulness of credit rating agencies. Simple random sampling has been used to collect responses from the retail investors. The study has been conducted among the retail investors of different broking and sub broking firms having several branches in Chennai City.

### Questionnaire Design

The questionnaire contained one page covering letter signed by the researcher and pre-printed reply envelop. It outlined the intent of the research with an assurance that the information provided by the respondents would be used for academic research only and kept confidential. Studies indicate that factors such as estimation of the time needed to complete the questionnaire and signature of the most senior researcher were found to significantly increase response rates (Hornik, 1981; Brown and Coverly, 1999). Unlike earlier studies, ample time was given to the respondents in our data collection, but with a gentle reminder and frequent follow-up.

The questionnaire consisted of the following parts:

Part I Elicits the demographic profile of the respondents

Part II Deals with their Awareness of the Ratings

Part III Seeks details on their Usage and Benefit of ratings assigned by rating agencies

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Questionnaire was also administered to the retail investor participants in the meetings conducted by the Madras Stock Exchange, Bombay Stock exchange, National Stock exchange and Securities Exchange Board of India at Chennai City.

### III. Results & Discussion

#### Empirical Analysis and Discussion

Factor analysis by principal component method has been applied to reduce the number of awareness of rating among the retail equity investor related variables and usage of ratings related variables into four meaningful factors and benefit of rating related variable into three meaningful factors respectively

Multiple regression analysis has been employed to establish the influence of Awareness of the ratings among the retail equity investor with the usage of rating by the retail equity investor, and the influence of benefit of rating with the usage of rating among the retail equity investor.

#### Reliability Statistics for sample adequacy

Cronbach alpha test was used to determine the degree of consistency among the multiple measurements of each factor. It measures the inter-item reliability of a scale generated from a number of items. Ideally, the reliability coefficient above 0.5 is considered acceptable as a good indicator of construct reliability (Nunnally, 1976), above 0.6 is treated satisfactory (Robinson et.al., 1991), but alpha above 0.7 is considered sufficient (George and Mallery, 2001; Pallant, 2005). The questionnaire responses exhibited Cronbach-Alpha value of 0.800 for items relating to awareness of the rating among the retail equity investor, 0.611 for items relating to usage of the rating given by rating agencies to retail equity investor and .660 for items related to the benefit of ratings given by rating agencies. These alpha values are statistically significant to ensure a smooth normal distribution and to justify the sample statistics for the representation of population parameters.

Factor Analysis for Awareness about the ratings among the retail equity investor

Grouping the variables gives more clarity on the subject and also on the decision mechanism design. In view of this, the researcher grouped the items using Principal Component Analysis with Varimax and Kaiser Normalization. In this part of the analysis the researcher attempts to identify the factors responsible for awareness about the rating among the retail equity investor. There are 11 variables quoted in the Questionnaire therefore the data

reduction is done through the application of factor analysis by principal component method and the following results are obtained.

#### a. KMO and Bartlett's Test

It is found that KMO measure of sampling adequacy is .711, Bartlett's Test of Sphericity with approximate chi square value 170.568,  $p = .000$  are statistically significant at 5 percent level. Therefore, it can be concluded that the variables considered for Factor Analysis form the normal distribution less than 5% admissible error to represent the factors emerged. This implies that the sample size is adequate for data reduction process and creates a conducive situation to ascertain the latent factors responsible for awareness about the rating among the retail equity investor.

#### b. Communalities

It is found that the 11 variables exhibit the variances from .403 to.822. This implies that the range of variations defined "between" 40 percent to 82 percent, which is statistically significant to go ahead for the meaningful data reduction process. This is adequate for factor segmentation from the variables. This leads to the factor formation as stated in the table below

#### c. Total Variance Explained

It is found that the 11 variables are reduced into 4 predominant factors. It is found that 11 variables exhibit the total variance of 68.571 percent. It is also ascertained that the four factors individually possess the variances 19.903 percent, 18.514 percent, 17.572 percent, 12.582 percent respectively. This leads to variable loading of each factor that is responsible for the creating awareness about the ratings among the retail equity investor. This leads to factor segmentation through grouping of variables as shown in the rotated component matrix.

#### d. Rotated Component Matrix

The rotated Varimax with Kaiser Normalization (converged in 15 iterations) component matrix in the factor analysis grouped the variables as follows. The factor I consists of three variables having the variance of 19.903% which represents the Information equalizer, reliable ratings, financial information. The factor I is labeled as "Information Factor".

The factor II consists of three variables having the variance of 18.514% which represents the Investor confidence, Accurate Information, Portfolio Decision making. The factor II is labeled as "Integrity Factor".

The factor III consists of three variables having the variance of 17.574% which represents the Downgrade rating news, Significant at uncertain times, Recognition of unknown issuer. The factor III is labeled as “Accountability Factor”.

The factor IV consists of two variables having the variance of 12.582% which represents User friendly symbols, adequate information. The factor IV is labeled as “Knowledge Factor”.

Factor Analysis for Usage of the ratings among the retail equity investor

Grouping the variables gives more clarity on the subject and also on the decision mechanism design. In view of this, the researcher grouped the items using Principal Component Analysis with Varimax and Kaiser Normalization. In this part of the analysis the researcher attempts to identify the factors responsible for awareness about the rating among the retail equity investor. There are 10 variables quoted in the Questionnaire therefore the data reduction is done through the application of factor analysis by principal component method and the following results are obtained.

#### **a. KMO and Bartlett’s Test**

It is found that KMO measure of sampling adequacy is .526, Bartlett’s Test of Sphericity with approximate chi square value 146.402,  $p = .000$  are statistically significant at 5 percent level. Therefore, it can be concluded that the variables considered for Factor Analysis form the normal distribution to represent the factors emerged. This implies that the sample size is adequate for data reduction process and creates a conducive situation to ascertain the latent factors responsible for usage of the rating among the retail equity investor.

#### **b. Communalities**

It is found that the 10 variables exhibit the variances from .501 to .837. This implies that the range of variations defined “between” 50 percent to 83 percent, which is statistically significant to go ahead for the meaningful data reduction process. This is adequate for factor segmentation from the variables. This leads to the factor formation as stated in the table below

#### **c. Total Variance Explained**

It is found that the 10 variables are reduced into 4 predominant factors. It is found that 10 variables exhibit the total variance of 71.026 percent. It is also ascertained that the four factors individually possess the variances 24.604 percent, 17.057 percent, 15.239 percent, 14.126

percent. This leads to variable loading of each factor that is responsible for the usage of the ratings among the retail equity investor. This leads to factor segmentation through grouping of variables as shown in the rotated component matrix.

#### **d. Rotated Component Matrix**

The rotated Varimax with Kaiser Normalization (converged in 15 iterations) component matrix in the factor analysis grouped the variables as follows. The factor I consists of four variables having the variance of 24.604 % which represents Safety Investment indicator, Sign of credibility, Instrument Creditworthiness, Financial Instrument’s Credit Risk. The factor I is labeled as “Credit Protection Factor”.

The factor II consists of two variables having the variance of 17.057 % which represents the Unbiased Credit Opinions, Own Code of Conduct. The factor II is labeled as “Opinion Factor”.

The factor III consists of two variables having the variance of 15.239 % which represents Pressures from issuers, Performance benchmark. The factor III is labeled as “Company Factor”.

The factor IV consists of two variables having the variance of 14.126 % which represents Quality of Instrument, Question on Rating Accuracy. The factor IV is labeled as “Quality Factor”.

#### **Factor Analysis for Benefit of the ratings among the retail equity investor**

Grouping the variables gives more clarity on the subject and also on the decision mechanism design. In view of this, the researcher grouped the items using Principal Component Analysis with Varimax and Kaiser Normalization. In this part of the analysis the researcher attempts to identify the factors responsible for awareness about the rating among the retail equity investor. There are 10 variables quoted in the Questionnaire therefore the data reduction is done through the application of factor analysis by principal component method and the following results are obtained.

#### **a. KMO and Bartlett’s Test**

It is found that KMO measure of sampling adequacy is .632, Bartlett’s Test of Sphericity with approximate chi square value 132.577,  $p = .000$  are statistically significant at 5 percent level. Therefore, it can be concluded that the variables considered for Factor Analysis form the normal distribution to represent the factors emerged. This implies that the sample size is adequate for data reduction process

and creates a conducive situation to ascertain the latent factors responsible for benefit of the rating among the retail equity investor.

#### **b. Communalities**

It is found that the 10 variables exhibit the variances from .350 to .754. This implies that the range of variations defined “between” 35 percent to 75 percent, which is statistically significant to go ahead for the meaningful data reduction process. This is adequate for factor segmentation from the variables. This leads to the factor formation as stated in the table below

#### **c. Total Variance Explained**

It is found that the 10 variables are reduced into 3 predominant factors. It is found that 10 variables exhibit the total variance of 60.904 percent. It is also ascertained that the three factors individually possess the variances 22.638 percent, 19.545 percent, 18.721 percent. This leads to variable loading of each factor that is responsible for the benefit of the ratings among the retail equity investor. This leads to factor segmentation through grouping of variables as shown in the rotated component matrix.

#### **d. Rotated Component Matrix**

The rotated Varimax with Kaiser Normalization (converged in 15 iterations) component matrix in the factor analysis grouped the variables as follows. The factor I consists of four variables having the variance of 22.638% which represents Source of Credit Surveillance, Economical, Accurate ratings, Investor Protection. The factor I is labeled as “Credibility Factor”.

The factor II consists of four variables having the variance of 19.545% which represents Public good, Transparency, and Information gap builder. The factor II is labeled as “Disclosure Factor”.

The factor III consists of four variables having the variance of 19.545% which represents Unaware investors, Accountable rating agencies, Revised rating. The factor III is labeled as “Volatility factor”.

#### **3.6 Awareness and Usage of rating among the retail equity investors**

The researcher employs multiple regression analysis to examine the collective influence of awareness about the rating on the usage of the rating among the retail equity investor. Multiple regression analysis is used to predict the variance between the dependent variable and independent variables (Warne, R.T. (2011)). The multiple regression

analysis explores the interrelationship among variables and the contribution of each predictor to explain the variance in the dependent variable ((Cohen, J.,(2003)). In this regression approach factors responsible for creating awareness of rating among the retail equity investor are considered as independent variables and factors responsible for the usage of rating among the retail equity investor are expressed as dependent variable.

#### **a. Influence of awareness factor on usage of Credit Rating:**

The factor analysis Principal Component Analysis identified four factor of awareness namely Information, Integrity, Accountability and finally Knowledge and Four factor of usage namely Credit protection, Opinion, Company, and Quality. In this juncture, awareness factors are considered as an independent variable and Usage factors consider as a dependent variable.

The influence of inducted variable over the independent factor is estimated through Linear multiple Regression analyzed as follows:-

#### **a. Influence Usage of credit protection factor on Awareness factors**

From Table 1 (Appendix) It's found that  $R^2=.370$ ,  $F=7.051$ ,  $Beta (sig.) = .000$  are statistically significant at 5% level. This indicates the awareness factors create significant influence over one of the Usage factor namely “Credit protection”, among the four factors of awareness only two factors are statistically significant at 5% level namely Information ( $t=4.271$ ,  $Beta = .489$ ,  $B=.000$ ) and Integrity ( $t=2.104$ ,  $Beta = .241$ ,  $B=.041$ ). This indicates Awareness about the credit rating by providing appropriate information to the retail equity investors and integrity of Credit Rating play vital role in creating maximum Usage of rating by offering Credit Protection to the equity investor.

#### **b. Influence Usage of Quality factor on Awareness factors**

From Table 2 (Appendix) it's found that  $R^2=.406$ ,  $F=8.200$ ,  $Beta (sig.) = .000$  are statistically significant at 5% level. This indicates the awareness factor create significant influence over one the Usage factor namely “Quality”. Among the four factors of awareness only two factors namely Integrity and Accountability are statistically significant at 5% level (integrity ( $t=5.152$ ,  $Beta = .573$ ,  $B=.000$ ) and Integrity ( $t=-2.377$ ,  $Beta = -.264$ ,  $B=.021$ )). This indicates integrity of the credit rating agencies in delivering appropriate information enables the retail equity investors in formulating portfolio decisions. Ratings is highly important at the times of uncertainty and news of downgrade rating affects investment decisions. Thus rating

agencies must make themselves accountable in providing quality information.

### 3.7. Influence of usage factor on Benefit of the Credit Rating:

The factor analysis Principal Component method identified three factor of Benefit namely Credibility, Disclosure, and finally Volatility and Four factor of usage namely Credit protection, Opinion, Company, and Quality. In this juncture, Usage factors are consider as an independent variable and Benefit factors consider as a dependent variable.

The influence of inducted variable over the independent factor is estimated through Multiple Regression analyzed as follows:-

#### a. Influence Benefit of Credibility factor on Usage factors

From Table 3 (Appendix) It's found that  $R^2=.452$ ,  $F=9.900$ , Beta (sig.) = .000 are statistically significant at 5% level. This indicates the Usage factor create significant influence over one the benefit factor namely Credibility. Among the four factors of Usage only two factors are statistically high significant at 5% level namely Credit protection ( $t=3.882$ , Beta = .415,  $B=.000$ ) and Opinion ( $t=4.780$ , Beta =.511,  $B=.000$ ) Hence, Rating agencies acts as the source of credit surveillance for investors offering adequate investor protection through their opinion on default risk. The retail equity investors are highly benefited by the way of credibility.

#### b. Influence Benefit of Disclosure factor on Usage factors

From Table 4 (Appendix) It's found that  $R^2=.302$ ,  $F=5.199$ , Beta (sig.) = .001 are statistically significant at 5% level. This indicates the Usage factor create significant influence over one the benefit factor namely Disclosure. Among the four factors of Usage only two factors are statistically high significant at 5% level namely Credit protection ( $t=3.485$ , Beta = .420,  $B=.001$ ) and Quality ( $t=2.218$ , Beta =.267,  $B=.031$ ) Hence, Rating agencies acts as the information gap builder for investors whereby ratings serve the public good. The retail equity investors are highly benefited by the way of adequate disclosure of relevant information.

## IV. Conclusion

The reputation and reliability of Credit Rating Agencies (CRAs) have taken a knock since the US subprime crisis of September 2008. Investors have seen their lifetime savings wiped out and governments have been voted out of power. This vantage position of CRAs as setters of

investment flow has empowered them as makers or breakers of the fortunes of the countries or corporations, enabling them to turn king-makers in one sense and bureaucrats at best in another. This study throws light on knowing relevance and reliability of the ratings so that the confidence of investors is inspired. Rating a company to reflect an overall perception should be made mandatory as every industry has different risk profile. But CRAs gaze at them through the same lens. There is an urgent need therefore to improve the ethical practices adopted by credit rating agencies in order to improve their standards of practice from the point of view of investors, issuers and regulators both at national and at global level. In fact, there is an urgent need to create awareness about the relative importance of credit rating agencies so as to bring confidence in the investors.

It can be broadly made out from the study that retail investors are found to be moderate benefit by using the rating grades of credit rating agencies. It is therefore important that credit rating agencies are tone up there rating practice. So that they come out with reliable and workable rating grades which will benefit the retail investors in the most effective way.

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**Table 1: Influence of credit protection factor**

| Regression                      | R Square = .370           | F = 7.051 | Sig.= .000 |
|---------------------------------|---------------------------|-----------|------------|
| Awareness factors (independent) | Standardized Coefficients | T         | Sig.       |
|                                 | Beta                      | B         | Std. Error |
| Information                     | .489                      | 4.271     | .000       |
| Integrity                       | .241                      | 2.104     | .041       |
| Accountability                  | .198                      | 1.731     | .090       |
| Knowledge                       | .183                      | 1.593     | .118       |

**Table 2: Influence of Quality factor**

| Regression                      | R Square = .406           | F = 8.200 | Sig.= .000 |
|---------------------------------|---------------------------|-----------|------------|
| Awareness factors (independent) | Standardized Coefficients | T         | Sig.       |
|                                 | Beta                      | B         | Std. Error |
| Information                     | -.057                     | -.516     | .608       |
| Integrity                       | .573                      | 5.152     | .000       |
| Accountability                  | -.264                     | -2.377    | .021       |
| Knowledge                       | .065                      | .585      | .561       |

**Table 3: Influence of Credibility factor**

| Regression                  | R Square = .452           | F = 9.900 | Sig.= .000 |
|-----------------------------|---------------------------|-----------|------------|
| Usage factors (independent) | Standardized Coefficients | T         | Sig.       |
|                             | Beta                      | B         | Std. Error |
| Credit Protection           | .415                      | 3.882     | .000       |
| Opinion                     | .511                      | 4.780     | .000       |
| Company                     | .000                      | .002      | .999       |
| Quality                     | .139                      | 1.298     | .200       |

**Table 4: Influence of Disclosure factor**

| Regression                  | R Square = .302           | F = 5.199 | Sig.= .001 |
|-----------------------------|---------------------------|-----------|------------|
| Usage factors (independent) | Standardized Coefficients | T         | Sig.       |
|                             | Beta                      | B         | Std. Error |
| Credit Protection           | .420                      | 3.485     | .001       |
| Opinion                     | -.061                     | -.508     | .613       |
| Company                     | -.225                     | -1.863    | .069       |
| Quality                     | .267                      | 2.218     | .031       |

**Table 5: Influence of credit protection factor**

| Regression                      | R Square = .370           | F = 7.051 | Sig.= .000 |
|---------------------------------|---------------------------|-----------|------------|
| Awareness factors (independent) | Standardized Coefficients | t         | Sig.       |
|                                 | Beta                      | B         | Std. Error |
| Information                     | .489                      | 4.271     | .000       |
| Integrity                       | .241                      | 2.104     | .041       |
| Accountability                  | .198                      | 1.731     | .090       |
| Knowledge                       | .183                      | 1.593     | .118       |

**Table 6: Influence of Quality factor**

| Regression                      | R Square = .406           | F = 8.200 | Sig.= .000 |
|---------------------------------|---------------------------|-----------|------------|
| Awareness factors (independent) | Standardized Coefficients | T         | Sig.       |
|                                 | Beta                      | B         | Std. Error |
| Information                     | -.057                     | -.516     | .608       |
| Integrity                       | .573                      | 5.152     | .000       |
| Accountability                  | -.264                     | -2.377    | .021       |
| Knowledge                       | .065                      | .585      | .561       |

**Table 7: Influence of Credibility factor**

| Regression                  | R Square = .452           | F = 9.900 | Sig.= .000 |
|-----------------------------|---------------------------|-----------|------------|
| Usage factors (independent) | Standardized Coefficients | T         | Sig.       |
|                             | Beta                      | B         | Std. Error |
| Credit Protection           | .415                      | 3.882     | .000       |
| Opinion                     | .511                      | 4.780     | .000       |
| Company                     | .000                      | .002      | .999       |
| Quality                     | .139                      | 1.298     | .200       |

**Table 8: Influence of Disclosure factor**

| Regression                  | R Square = .302           | F = 5.199 | Sig.= .001 |
|-----------------------------|---------------------------|-----------|------------|
| Usage factors (independent) | Standardized Coefficients | t         | Sig.       |
|                             | Beta                      | B         | Std. Error |
| Credit Protection           | .420                      | 3.485     | .001       |
| Opinion                     | -.061                     | -.508     | .613       |
| Company                     | -.225                     | -1.863    | .069       |
| Quality                     | .267                      | 2.218     | .031       |

Table 5 to 8 are not required.

Add missing text attached separately.

# IMPACT OF GREEN BANKING INITIATIVES ADOPTED BY FOREIGN BANKS ON PROFITABILITY

M. Ramila★ S. Gurusamy★★

*Banks in India especially foreign sector banks are now concentrating to bring new technology in their operations. In that way, the foreign sector banks in India, are slowly introducing “Green banking” concept in their systems. Green banking has two dimensions. First, the way the banking business is being done whether it is paperless or not and second relates to where the bank puts its money viz, green financing. Its main aims are to adopt paperless practices in banking operations. This paper investigates to show as to how the green banking initiatives such as NEFT, RTGS, ATM, POS and Mobile banking, impact the profitability of the foreign sector banks. To achieve this objective, the hypotheses were framed and the study found that Mobile banking and ATM transactions create more impact on the profitability of foreign banks when compared to other green banking initiatives.*

*Keywords: Green Banking, Profitability, Foreign Banks, Mobile Banking, Paperless*

Today we are facing so many problems relating to the environment. The major problem is climate change. Climate change is occurring due to the effect of greenhouse gas; climate change creates global warming. To avoid such a problem now, most of the industries are taking some green initiatives such as the reduction of carbon footprint and energy consumption, investing in eco-friendly projects, etc. Particularly, banking industry plays an important role in promoting sustainable development of the world. In this respect the concept of green banking has emerged as an important subject and is recognized as a tool to address the issues confronting it and to create awareness among the people on the environmental responsibility.

The term Green Banking means offering banking products and services in paperless mode encouraging environment friendly investments and giving priority to those industries which are capable of restoring the natural environment.

According to Clark Schultz (2012), “Green Banking means promoting environmental - friendly practices and reducing your carbon footprint from your banking activities”

## **National Electronic Fund Transfer (NEFT)**

According to RBI, NEFT is a nation-wide payment system facilitating one-to-one funds transfer. Under this Scheme, individuals, firms and corporate organizations can electronically transfer funds from any bank branch to any individual, firm or corporate having an account with any other bank branch in the country participating in the Scheme.

## **Real Time Gross Settlement (RTGS)**

According to RBI, RTGS, is the continuous (real-time)

settlement of funds transfers individually on an order by order basis (without netting). ‘Real Time’ means the processing of instructions at the time they are received rather than at some later time; ‘Gross Settlement’ means the settlement of funds transfer instructions occurs individually (on an instruction by instruction basis). Considering that the funds settlement takes place in the books of the Reserve Bank of India, the payments are final and irrevocable.

## **Electronic Clearing Services (ECS)**

According to RBI, ECS is an electronic mode of payment / receipt for transactions that are repetitive and periodic in nature. ECS is used by institutions for making bulk payment of amounts towards distribution of dividend, interest, salary, pension, etc., or for bulk collection of amounts towards telephone / electricity / water dues, cess / tax collections, loan installment repayments, periodic investments in mutual funds, insurance premium etc. Essentially, ECS facilitates bulk transfer of monies from one bank account to many bank accounts or vice versa

## **Automatic Teller Machine (ATM)**

According to RBI, ATM is a computerized machine that provides the customers of banks the facility of accessing their account for dispensing cash and to carry out other

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financial & non-financial transactions without the need to actually visit their bank branch. The ATM/ATM cum debit cards, credit cards and open prepaid cards (that permit cash withdrawal) issued by banks can be used at ATMs/WLAs for various transactions such as account information, cash deposit, mini statement, PIN change, request for cheque book and balance enquiry.

### Mobile Banking

It is a system where the banking transactions can be done by customers at remote place with help of mobile device itself. For this purpose the customer has to get mobile application from the respective banks for using this facility. Through mobile banking the customer can check their account balance, monitor their term deposit, access a loan statement, mutual fund or equity statement and insurance policy management.

Mobile banking can be done with the help of mobile application and this service was initially introduced on 1999 by way on SMS banking with the introduction of Smart phone with WAP support but this was became famous in 2010 only.

### Point Of Sale (POS) Terminal

Point of sale is a time and place where the retail transaction is done. It is the point where the customers make payment to their merchant for the purchase of goods or services. The transactions can be done through debit card or credit card. At the point of sale, the merchant would prepare invoice for the transactions and it should be duly signed by the customers. Nowadays this facility is also available in all banks for with draw, transfer and deposit.

## I. Review of Literature

Odusina and Ayokunle Olumide (2014)<sup>1</sup>, conducted a study to know the Automated Teller Machine usage and customer satisfaction in Nigeria. For this study, the authors selected three banks in Ogun State, Metropolis of Nigeria such as First bank, Guranty Trust Bank and Skye Bank. They used chi-square analysis and found that there is a positive and significant relationship between ATM usage and customer satisfaction. Further, the authors emphasized that the ATM will make the life easier for customers and will also help save time and cost.

Umrez, Jyothi and Haseena D (2014)<sup>2</sup>, documented that the time, convenience and ease to use are the most important factors which made the customers to adopt mobile banking. The authors also found that most of the customers are aware about mobile banking but they did not know the

benefits of the term mobile banking; further, they found that the customers are using mobile banking only for bill payments and not for banking transactions. Finally, they concluded that the bankers have to conduct awareness program on mobile banking among the customers of different age group to enhance its operations.

Mark Schwanhausser (2008)<sup>3</sup>, emphasized that most of the customers want to do green banking activities in their operations but its processes are confusing or inconvenient thus they want to follow their traditional habit in banking. The author found that many customers are interested in adopting green banking behaviours. He identified that customers are moving to electronic statement to reduce their impact on environment, switch their business with those companies which are greener in their operations. He suggested the customers to switch over to online banking, mobile banking and direct deposits, thus reduce paper statement in their activities. Finally, the author concluded that the banking industry has to focus on products and promotional activities of green banking like green audit (compute the environmental impact of customers), paperless banking and green banking marketing campaign which reward customers for eco-friendly practices.

## II. Research Design & Methods

### Statement of the Problem

Indian economy faces many constraints relating to environment. One of the major problems is carbon footprint levels which are increasing drastically every year leading to environmental degradation. Under these circumstances, the green banking concept emerged. Green banking has two dimensions viz paperless banking and where the banks puts its money viz, green financing. This study considers only one dimension (paperless banking) and an attempt is made to identify how it impact the profitability of foreign sector banks.

### Need For The Study

The study is conducted to know how the green banking products (paperless banking) impact the profitability of foreign sector banks in India and how it effectively works in their banking operations.

### Objective

To study the impact of green banking products such as RTGS, NEFT, Mobile banking, ATM and POS terminal transactions on the profitability of Foreign Sector Banks

### Hypothesis

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Ho: There exists no impact of RTGS, NEFT, Mobile banking, ATM and POS terminal transactions on the profitability of Foreign Sector Banks.

H1: There exists impact of green banking products such as RTGS, NEFT, Mobile banking, ATM and POS terminal transactions on the profitability of Foreign Sector Banks

#### Source of Data

The study is based on secondary data accessed from RBI website.

The study is empirical in nature which attempt to analyze the impact of RTGS, NEFT ATM, POS Terminal and Mobile banking transactions on the profitability of Foreign Sector Banks. Sample period of 7 years is considered for RTGS, NEFT and Mobile banking products and 4 years for ATM and POS terminal. SPSS software has been used for the data analysis.

#### Scope of the Study

This study deals with foreign banks include Abu Dhabi Commercial Bank, Australia and New Zealand Banking Group Ltd, Bank International Indonesia, Bank of America, Bank of Bahrain and Kuwait, Bank of Ceylon, Bank of Nova Scotia, Bank of Tokyo Mitsubishi UFJ, Barclays Bank, BNP Paribas, Calyon Bank, China Trust Commercial Bank, Citibank, Common Wealth Bank of Australia, Credit Suisse, Credit Agricole Corporate and Investment Bank, DBS Bank, Deutsche Bank, FirstRand Bank, HSBC, Industrial and Commercial Bank of China, JPMorgan Chase Bank, Mashreq Bank, Mizuho Corporate Bank, National Australia Bank, Oman International Bank SAOG, Royal Bank of Scotland, Rabobank International, Shinhan Bank, Societe Generale, Standard Chartered Bank, State Bank of Mauritius, Sber Bank, Sumitomo Mitsui Banking, UBS AG, Woori Bank and Westpac Banking Corporation these banks are chosen based on the continuity of the transaction.

### III. Results & Analysis

In this section, the data collected from Reserve Bank of India, were analyzed and interpreted using regression analysis. The results of the analysis are presented in this section.

#### Impact of RTGS, NEFT and Mobile banking transaction on the profitability of Foreign Sector Banks

From table III.1, it is found that the  $R = 0.925$ ,  $R$  square value is 0.855 and adjusted  $R$  square = 0.637. This shows that the independent variable namely RTGS, NEFT and Mobile banking explain 85.5% variance over the profitability

of foreign sector banks. This leads to the subsequent verification of regression model fit in the following ANOVA table.

From table III.2, it is found that  $F = 3.925$ ,  $p = 0.010$  are statistically significant at 5 percent level. This shows that the independent variables namely RTGS, NEFT and Mobile Banking contributed significantly to the profitability of foreign sector banks. This leads to the shaper estimation of individual influences of the green banking products transactions such as RTGS, NEFT and Mobile Banking can be measured through co-efficient table.

From table III.3, it is found that RTGS ( $t = 2.754$ ,  $p = 0.051$ ), Mobile banking ( $t = 4.765$ ,  $p = 0.009$ ) and NEFT ( $t = 1.140$ ,  $p = 0.003$ ) are statistically significant at 5 percent level. Since the  $t$  value of Mobile Banking is more than the RTGS and NEFT, it can be concluded that Mobile Banking play a major role on the impact of the profitability of foreign sector banks.

#### Impact of ATM and POS terminal transactions on the profitability of Foreign Sector Banks

From table III.4, it is found that the  $R = 0.992$ ,  $R$  square value is 0.985 and adjusted  $R$  square = 0.954. This shows that the independent variable namely ATM and POS terminal explain 98.5% variance over the profitability of foreign sector banks. Green banking initiatives such as ATM and POS terminal adopted by the banker contributed to the great extent on the profitability of foreign sector banks. This leads to the subsequent verification of regression model fit in the following ANOVA table.

From table III.5, it is found that  $F = 32.112$ ,  $p = 0.024$  are statistically significant at 5 percent level. This shows that the independent variables namely ATM and POS terminal contributed significantly to the profitability of foreign sector banks. This leads to the shaper estimation of individual influences of the green banking products transactions such as ATM and POS terminal can be measured through co-efficient table.

From table III.6, it is found that ATM ( $t = 11.259$ ,  $p = 0.008$ ) and POS terminal ( $t = 5.011$ ,  $p = 0.038$ ) are statistically significant at 5 percent level. Since the  $t$  value of ATM is more than the POS terminal transactions, it can be concluded that ATM play a major role on the impact of the profitability of foreign sector banks.

### IV. Conclusion

The analysis presented above shows that the Mobile Banking and ATM transactions play a major role in impact on the

profitability of foreign sector banks. The other green banking initiatives such as RTGS, NEFT and POS terminal transactions also impact the profitability of the foreign sector banks but it is not effective when compared with Mobile Banking and ATM transactions. Thus, the green banking initiatives adopted by the foreign sector banks in India especially related to paperless banking is creating a major impact on the profitability.

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**Table: III.1 Model Summary**

| Model | R    | R square | Adjusted R Square | Std. Error of the Estimate |
|-------|------|----------|-------------------|----------------------------|
| 1     | .925 | .855     | .637              | .27097                     |

**Table: III.2 ANOVA**

| Model |            | Sum of Squares | df | Mean Square | F     | Sig. |
|-------|------------|----------------|----|-------------|-------|------|
| 1     | Regression | .864           | 3  | .288        | 3.925 | .010 |
|       | Residual   | .147           | 2  | .073        |       |      |
|       | Total      | 1.011          | 5  |             |       |      |

**Table: III.3 Coefficients**

| Model |                | Unstandardized Coefficients |           | Standardized Coefficients | t     | Sig. |
|-------|----------------|-----------------------------|-----------|---------------------------|-------|------|
|       |                | B                           | Std.Error | Beta                      |       |      |
| 1     | RTGS           | 3.252                       | 1.181     | .809                      | 2.754 | .051 |
|       | Mobile banking | .697                        | .146      | .922                      | 4.765 | .009 |
|       | NEFT           | .708                        | .621      | .495                      | 1.140 | .003 |

**Table: III.4 Model Summary**

| Model | R    | R square | Adjusted R Square | Std. Error of the Estimate |
|-------|------|----------|-------------------|----------------------------|
| 1     | .992 | .985     | .954              | .09466                     |

**Table: III.5 ANOVA**

| Model |            | Sum of Squares | Df | Mean Square | F      | Sig. |
|-------|------------|----------------|----|-------------|--------|------|
| 1     | Regression | .575           | 2  | .288        | 32.112 | .024 |
|       | Residual   | .009           | 1  | .009        |        |      |
|       | Total      | .584           | 3  |             |        |      |

**Table: III.6 Coefficients**

| Model |     | Unstandardized Coefficients |           | Standardized Coefficients | t      | Sig. |
|-------|-----|-----------------------------|-----------|---------------------------|--------|------|
|       |     | B                           | Std.Error | Beta                      |        |      |
| 1     | ATM | 3.667                       | .326      | .992                      | 11.259 | .008 |
|       | POS | 2.529                       | .505      | .962                      | 5.011  | .038 |

# DETERMINING THE CRITICAL SUCCESS FACTORS OF SPONGE IRON INDUSTRY: AN EMERGING ECONOMY PERSPECTIVE

Sarkar Sreemanta★ Biswas Aindrila★★ Das Sandipan ★★★ Roy Mousumi★★★★

*Sponge iron has become the preferred raw material for steel manufacturers due to uninterrupted domestic availability and relative stability in prices. The study aims to investigate the Performance Measurement Indices for sponge iron Industries through consideration and impact assessment of seven studied factors- Productivity Improvement, Overall Cost Reduction, Process Performance, Cooperative Business Results, New Technology Implementation, Understand the Market Trends and Strategy Diversification. The survey questions were designed to determine the impact of growth on small and medium scale firm. Data was analysed using reliability analysis, factor analysis and multiple regression analysis. The results of regression analysis suggest the significance of products and services, the way of doing business, technology development and external environment on performance of sponge iron industries. The findings suggest the urgency to lead functions of a sponge iron Industry in all levels to the same directions for achieving the success.*

*Keywords- Sponge iron industry, Performance Measurement Indices, critical success factor*

The unfavourable effects of globalization have resulted in increased competition amongst industries. The most successful Industries are those that are able to meet the customer expectations and as such managers are increasingly in search of dissimilar ways for accomplishing the organizational performance and competitive advantage. It is widely recognized that Small and Medium Sized Enterprises (SMEs) form the backbone of the private sector at all levels of developing countries. Sponge iron industry supplies the intermediate product used for the manufacture of steel. The Indian sponge iron industry is the largest in the world accounting for around 1/6<sup>th</sup> of the global production. The output sponge iron is produced using either coal or natural gas. Since fossil-fuel in the form of coal is in abundance in India, growth of this the sector is largely fossil fuel driven. About 98 per cent of the sponge iron producing units in the West Bengal are Medium and small scale entities (ANAN, 2007). The sector has experienced a steep growth of around 50 percent in its productive capacity between 2005-06 and 2011-12 (enviswb.gov.in, 2010). The key reasons for Mushrooming of Sponge Iron Industries in medium and small scale resorts to low capital investment, high profitability, governmental subsidies and ease in availability of raw material.

Eventually, a heft of studies have discussed the influences of a variety of organizational traits such as quality of human resources, top management commitment leadership skills, organizational support, organizational culture and organizational sizes as the effort factors leading to the success of the companies. Consequently, if these firms implement quality management the impact on different

industries performance and growth will be significant. Although quality management aspects practiced in different industries, the study of quality management practices and their impact on organizational performance is comparatively less explored.

The study intends to provide an understanding of how firm will be looking at all the factors affecting business sustainability in a competitive market scenario to reduce the risk in the context of sponge iron industries through prognostication of the critical success factors of performance measurement that affects the business efficiency of such industries.

## I. Review of Literature

### 1. Performance Measurement

Performance is a measure of how well a mechanism/process achieves its purpose. In the context of enterprise

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Please put only single \* against all author's name because they are from the same department/college.

management, an organization's performance refers to how well the organization is managed and the value the organization delivers for customers and other stakeholders (Moullin, 2003). On the contrary, performance measurement encompasses the process of collecting, analyzing and/or reporting information regarding the performance of an individual, group, organization, system or component. It can involve studying processes/strategies within organizations, or studying engineering processes/parameters/phenomena, to see whether output are in line with what was intended or should have been achieved. Performance measurement results for personnel evaluation, promotion and incentives (promotion prospects, salary, project participation, bonuses); resource allocation (project participation, forming/dissolving teams, assignment of new projects and of resources); control/correction (control, correction, reorganization) and learning/continuous improvement have been widely applied in research (Godener & Soderquist, 2004). Salaheldin (2008) contributed effectively in performance measurement in industrial sector (Doha) by finding out the effect of operational performance on the organizational performance of small & medium sized enterprises. Asika & Awolusi (2013) examine the effectiveness of the critical success factors (CSFs) of BPR on both primary (operational) and secondary (organizational) measures of business performance in Nigerian oil and gas industry. A study done by Gupta & Chaudhuri (2012) examines the contribution of the service elements to customer perceived value and explores the service gap model for delivering experiential value across restaurants. Talib, et. al., (2013) developed a conceptual framework of Quality management practices in relation to the organizational Performance of the SMEs in the Food Processing industry in Malaysia.

## 2. Critical Success Factors

Accountable factors for improving effectiveness in industries are the performance measurement factors or effectiveness factors. Usually there exists a relationship between CSF's (Critical Success Factors) and PMF's more specifically CSF's are the input factors or independent variables and PMF's are the output factors or dependent variables. Saraph, et. al., (1989), identified the eight Critical Success Factors in manufacturing Firms in U.S. and relates them with the factors such as Financial Performance, Quality performance which are the effectiveness factors or performance measurement factors. Omran., et., al., (2012) mentioned that Research on the critical success factors (CSFs) is considered to be a means to improve the effectiveness of the construction project and to achieve project objectives. A study done by Chittithaworn et. al.,

(2011) revealed that CSF's such as SMEs Characteristic, Customer and Markets, the way of doing Business & Cooperation, Resources and Finance and External Environment have significant positive effect on the Business Success of SMEs which is the Performance Measurement Factor. On the other hand according to Boidoun (2003), in the model of European Foundation for Quality Management the factors customer satisfaction employee satisfaction and a favourable impact on society are the results achieved through the enablers (leadership driving and strategy, people partnership, resources and Processes), which lead ultimately to excellence in business results.

## II. Research Design & Methods

### 1. Sampling and data collection

The sample comprised of 50 respondents from sponge iron industries in different parts of the State of West Bengal. Data for analysis was collected from manufacturer center and estate office through personal interview and structured questionnaires. Exploratory factor analysis, regression analysis and reliability testing was done for identification of the critical success factors and assess the relative and most significant impact of the same on business performance in the context of sponge iron industries.

## III. Results & Analysis

The dependent variable for the study is overall firm performance through substantive consideration of 29 items (Table 1) as independent variables. An exploratory factor analysis was conducted to derive the underlying dimensions or constructs for the explanatory variables for a more comprehensive regression analysis. Seven factors were derived through conduction of principal component analysis and formation of rotated component matrix (Table2). The total variance explained by the seven factors concurrently accounts to 73.54 per cent. The cronbach's alpha coefficient supports reliability of the scale.

A multiple regression analysis was performed with critical success factors as the independent variables to measure overall impact on firm performance. The  $R^2$  value of 0.85 suggests the high explanatory power of the critical success factors in assessing firm performance (Table 3). The Variance inflation factor value for all the constructs is less than 2 which suggests the absence of multi-collinearity. Improvement in productivity (0.29); upgradation in quality of technology (0.26), improvement in process/ product design (0.24) and cost reduction strategies (0.23) have the highest significant positive impact on the performance of sponge iron industries.

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## IV. Conclusion

Sponge iron is a rapidly growing industry in India. Undoubtedly, it has brought economic enrichment to the private entrepreneurs; but at the same time it has also brought the curse of environmental degradation in the form of air pollution, pressure on local resources, degradation of land and adverse health impact. The situation is worsened due to non-installation or non-operation of pollution control equipment. Medium and small-scale plants dominate the sector and these do not have sufficient technical competence or the financial capacity to install pollution control equipment or they will fully do not operate them and as a result emit significant quantities of pollutants. Even if they install the pollution control equipment, they don't meet the standard or they don't run it during night. Occupational health and safety aspects in the areas of sponge iron clusters are poor as no one uses hard hats, boots or dust filters. Workers are covered with black dust as are the leaves in the area. The air quality is poor and smells acid. People in the nearby villages complain of deposition of dust on homes and on water. This is a pointer towards inadequate or non-operational pollution control equipment by industries in the cluster. Ash is dumped in ditches near the highway and char is dumped on land belonging to the Asansol Durgapur Development Authority. Thus the environmental sustainability and compliance measures of the sponge iron industries are weak. Most of the sponge iron industries suffer from low technology base, know-how and governmental regulation. These industries typically produce their new product which is irrelevant to the market's requirement, before that they did not measure the quality of the product outside of the Market. However, optimality in performance of these industrial units can be augmented through effective determination, evaluation and implementation of the critical success factors. Improvement in production, product and process diversification, effective design, cost-management, competitive strategies and incorporation of sophisticated clean and green technology in the operational plant design mechanism will help the sponge industries mostly organised in MSME structure to sustain market competition through effective claim and utilisation of governmental subsidies.

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**Table 1: The Critical Success Variables**

| : Independent Variables : |                                  |    |  |    |  |
|---------------------------|----------------------------------|----|--|----|--|
| 1                         | Capital Available                | 10 | Flexible to adopt new technologies     | 20 | Process changes according to Market requirements |
| 2                         | Cost of Production               | 11 | Competitive Position                   | 21 | Production and operational process               |
| 3                         | Expertise in Product Development | 12 | Competitors information                | 22 | Key support process                              |
| 4                         | Government Subsidy               | 13 | Size and growth of Enterprise          | 23 | Supplier's performance                           |
| 5                         | Consumer Service Provider        | 14 | Government Regulation                  | 24 | Strategy translation                             |
| 6                         | Distribution Channels            | 15 | Specified Strategy                     | 25 | Labour Skills                                    |
| 7                         | Manage people and resources      | 16 | Strategies Based on Market environment | 26 | Key Financial and non-financial performance      |
| 8                         | Understand the Market Trends     | 17 | Innovative Idea by Employee            | 27 | Return on sales                                  |
| 9                         | New System Improvement           | 18 | New product in exist Market            | 28 | Growth in net profit                             |
|                           |                                  | 19 | Established product in exist Market    | 29 | Investment in new product                        |

**Table 2: Factor loadings, variance explained and reliability analysis**

| <b>Variables</b>                            | <b>Loadings</b> | <b>Variance explained</b> | <b>Cronbach's alpha</b> |
|---|-----------------|---------------------------|-------------------------|
| <b><i>Productivity Improvement</i></b>      |                 | <b>14.25</b>              | <b>0.89</b>             |
| PI1   | 0.79            |                           |                         |
| PI2   | 0.75            |                           |                         |
| PI3   | 0.68            |                           |                         |
| PI4   | 0.66            |                           |                         |
| PI5   | 0.64            |                           |                         |
| PI6   | 0.54            |                           |                         |
| <b><i>Overall Cost Reduction</i></b>        |                 | <b>13.39</b>              | <b>0.84</b>             |
| OCR1  | 0.80            |                           |                         |
| OCR2  | 0.77            |                           |                         |
| OCR3  | 0.76            |                           |                         |
| OCR4  | 0.63            |                           |                         |
| OCR5  | 0.60            |                           |                         |
| OCR6  | 0.55            |                           |                         |
| <b><i>Process Performance</i></b>           |                 | <b>11.70</b>              | <b>0.89</b>             |
| PP1   | 0.87            |                           |                         |
| PP2   | 0.85            |                           |                         |
| PP3   | 0.78            |                           |                         |
| <b><i>Comparative Business Results</i></b>  |                 | <b>9.72</b>               | <b>0.77</b>             |
| CBR1  | 0.83            |                           |                         |
| CBR2  | 0.79            |                           |                         |
| CBR3  | 0.75            |                           |                         |
| CBR4  | 0.55            |                           |                         |
| <b><i>New Technology Implementation</i></b> |                 | <b>9.64</b>               | <b>0.83</b>             |
| NTI1  | 0.83            |                           |                         |
| NTI2  | 0.78            |                           |                         |
| NTI3  | 0.77            |                           |                         |
| <b><i>Understand the Market Trends</i></b>  |                 | <b>7.86</b>               | <b>0.66</b>             |
| UMT1  | 0.76            |                           |                         |
| UMT2  | 0.75            |                           |                         |
| <b><i>Strategy Diversification</i></b>      |                 | <b>7.00</b>               | <b>0.60</b>             |
| SD1   | 0.89            |                           |                         |
| SD2   | 0.76            |                           |                         |

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**Table 3: Results of Regression analysis**

| <b>Critical success factors</b> | <b>Standardized co-efficient</b> | <b>t-value</b> | <b>VIF</b> |
|---------------------------------|----------------------------------|----------------|------------|
| Productivity Improvement        | 0.289                            | 3.565***       | 1.866      |
| Overall Cost Reduction          | 0.231                            | 3.163**        | 1.508      |
| Process Performance             | 0.241                            | 3.483**        | 1.360      |
| Comparative Business Results    | 0.247                            | 3.728**        | 1.244      |
| New Technology Implementation   | 0.256                            | 3.580**        | 1.443      |
| Understand the Market Trends    | 0.075                            | 1.123          | 1.256      |
| Strategy Diversification        | -0.053                           | -.860          | 1.094      |
| R2                              | 0.85                             |                |            |
| F-value                         | 34.45                            |                |            |

All Sub heading should be bold

# EVALUATING SUPERIORITY OF MODERN VIS-A-VIS TRADITIONAL FINANCIAL PERFORMANCE MEASURES: EVIDENCES FROM INDIAN PHARMACEUTICAL INDUSTRY

Jitender Kumar★

The purpose of this paper is to look into the claim of economic value added (EVA) proponents regarding superiority of EVA over eight popular traditional financial performance measures with reference to the Indian pharmaceutical industry from 2002-03 to 2013-14 for 888 firm-year observations. The present research is primarily based on secondary financial data acquired from the prowest database. Multiple regression model (OLS) is used to select the best predictor out of select independent variables to predict the dependent variable and it is found that PAT is having more explanatory power than other independent variables in relationship with MVA. Further, Discriminant analysis is also applied on the average data of twelve years to advise the potential investors to set up a function to screen value creating companies from value destroying companies of the Indian pharmaceutical industry. Results of Discriminant analysis reveals that 9 (30%) pharmaceutical companies out of the grouped 30 sample pharmaceutical companies are scoring less than the average MVA of the industry that means these companies may be considered as value destroying companies.

Keywords: EVA, MVA, Traditional Performance Measures, Multiple Regression analysis, Discriminant Analysis.

Please draw line properly

Corporate financial performance measurement is one of the sought after areas of research in finance for the analysts all over the world. Several studies are being carried to find out what affects the share market prices of a company. No doubt corporate performance is influenced by various factors like company specific, industry related and economic variables collectively known as fundamental analysis. Financial information is used by the stakeholders to review firm's current performance and to forecast the future performance as well (Sharma & Kumar, 2010). The primary objective of any business firm is shareholders' value or wealth maximization. Value or wealth is measured in terms of returns which investors receive on their investments. This return may be in the form of dividends or in the form of capital appreciation or both. Capital appreciation is influenced by the changes in the market value of the stocks. Similarly, the amount of dividend is decided by the companies after considering different factors like availability of funds, dividend distributed in the preceding years, industry practice regarding dividend etc. Riemann (1989) observes that shareholders interest has been recognized as important objective for a long time, but performance measures rarely show that objective is achieved. He argues that it is so because managers do not know how to measure the performance of the company correctly.

Traditional measures of shareholders value creation have used parameters based on earnings, market capitalization, discounting cash flows by estimating present value of future

cash flows. Some studies revealed that traditional financial performance measures have long been criticized for their inadequacy in guiding strategic decisions. On the other hand, some studies are advocating the superiority of traditional measures over value added measures of performance evaluation. But, nowadays, value added measures of financial performance i.e. EVA has been attracting attention of Indian leading companies. It is interesting that the empirical evidences about superiority of EVA over traditional measures of financial performance are mixed. However, the aim of study is to open a new window for modern performance measures and investigate its explanatory power in companion with traditional performance measures in case of NSE listed pharmaceutical companies.

## Indian pharmaceutical industry and its importance

The Pharmaceutical Industry in India is one of the largest and it ranks 4<sup>th</sup> in the world, relevant to the volume of sales. The probable worth of the Indian pharmaceutical industry is US\$ 6 billion and growth rate is 13% per year. Almost 70% of the domestic demand for bulk drugs is catered by the Indian pharmaceutical industry and produces about 20% to 24% of the global generic drugs. The Indian pharmaceutical industry leads the science-based industries

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in the country and has the capacity and technology pertaining to complex drug manufacturing. Around 40% of the total pharmaceutical produce is exported and 55% of the total exports comprise of formulations and the other 45% comprises of bulk drugs. The Indian pharmaceutical industry comprises small scaled, medium scaled and large scaled players which totals nearly 300 different companies. Pharmaceutical industry is swiftly growing and health has been treated as basic need for the human being that is why considered for the present study.

## I. Review of Literature

Several studies have been conducted during the last two decades, firstly in the developed countries like US and later in the other countries to know whether it is really better to use modern value added measures such as MVA, EVA, CVA, NPV and other cash flows based measures than traditional financial performance measures to gauge the corporate financial performance. The results are quite mixed and contradictory. The present prominent studies about the effectiveness of various corporate performance measures have been classified in two sections:

Section A: Studies claiming superiority of EVA and MVA over other measures

Stewart (1991) provided evidence of correlation between EVA and MVA. By using a sample of 613 US companies over the period 1987-1988 and examining both constant and changes in EVA and MVA, he found that there is a relationship between both the levels of EVA and MVA.

Stern (1995) suggests that the accounting measures such as earnings, earnings growth, dividends, dividend growth, ROE, or even cash flow are not key measures of corporate performance, but in fact EVA. The changes in the market value of a sample group of companies (specifically their MVAs) have been shown to keep a relatively low correlation with accounting measures.

Milunovich & Tsuei (1996) investigated the correlation between frequently used financial measures including EVA and MVA of companies in the US computer technology industry. The results of the study reveal that the correlation of different measures was EVA; 42%, EPS growth; 34%, ROE; 29%, Free cash growth; 25% and FCF; 18% for the period from 1990 to 1995.

Lehn & Makhija (1997) studied the relationship between six performance measures and stock returns. They used data of 452 US companies from 1985 to 1994. The results revealed that EVA and MVA appeared to be somewhat better

long-run performance measures than traditional performance measures.

Pablo (2003) analysed 582 companies with respect to correlations between increase in the MVA and EVA, NOPAT and WACC for successive ten years. The results revealed that the average correlations between the increase in the MVA and EVA, NOPAT and WACC was 21%, 16% and -21%, thereby revealing that EVA is better correlated with market value of the company.

Hall & Geys (2004) examined the EVA metric for four years of cooperative financial data to determine whether it provides additional information about wealth creation and profitability than results revealed by the other ratios. The correlation of ROA was relatively higher to EVA than that of ROE to EVA. This indicates that two biggest traditional performance indicators, ROA and ROE are not good indicators of financial performance in the sense of value creating actions.

Kukreja & Giridhar (2005) evaluated the financial performance of select companies in the pharmaceutical industry by using a variety of new breed value-based performance measures. They have calculated correlation of 115 Indian firms to see which metric is more correlated with MVA. In this study, they have proved that companies perform well on appropriate value based performance metrics are sufficiently rewarded by the capital markets.

Irala (2007) examines whether EVA has got a better predictive power relative to the traditional accounting measures such as EPS, ROCE, RONW, Kp and Lp. Analysis of 1000 companies across 6 years (6000 company years), very much supports the claim that the EVA is the better predictor of market value compared to other accounting measures. Similarly, Misra & Kanwal (2007) revealed that EVA is the most significant determinant of MVA as it explains the variations in share value better than the other selected measures of firms' financial performance.

Ptetravicius & Tamosiuniene (2008) compared the four measures (MVA, EVA, CVA and CFROI) and found that value based methods promote the maximization of the economic worth of an organization by allocating its assets to their finest use. Subsequently, Fountaine et al. (2008) concluded that EVA does offer economically useful information that can be used to forecast portfolio separation.

Kanthakrishana & Jeyaraj (2010) carried out a study on the performance of EVA by taking 20 Indian companies from different industries. This study reveals that all select companies have positive EVA. Because EVA were in absolute

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figures, comparison had been made keeping EVA to CE ratio as external benchmark. Further, they have concluded that EVA has the advantage of being conceptually simple and easy to explain to non-financial managers.

Sakthivel (2011) analyzed the trend and growth of shareholders' value in terms of EVA and MVA of Indian pharmaceutical industry. On the basis of his study of 15 Indian pharmaceutical companies, he concluded that Indian pharmaceutical industry has been succeeded to meet public expectation in terms of shareholders' value creation through EVA either by increasing operating income from assets in place through reducing cost of production or increasing sales, or reducing the cost of capital by changing the financial mix in capital structure.

Paragh (2012) concludes that EVA is a practical tool which induces the firm to use its capital as efficiently as possible, enhancing the value of the firm. Management incentives which are based upon EVA will increase when the value of the firm increases.

Kangarlouei et al. (2013) investigated the explanatory power of performance evaluation criteria in determining the value of acquired companies in Tehran stock exchange (TSE). Finally, concluded that modern performance evaluation has more predictive power than traditional ones.

Panahi et al. (2014) examined correlation between stock price behavior of companies and EVA-MVA and concluded that value based measures of performance could be used to understand the stock price behavior. Similarly, Jain (2014) reveals the comparison between EVA and other traditional measures of corporate performance, taking a real life case study of Hindustan Unilever Limited, a FMCG major in the Indian corporate sector. It concludes that EVA is superior to traditional measures of corporate performance in terms of shareholders' value creation.

#### Section B: Studies rejecting superiority of EVA and MVA over other measures

In contrast to results reported in section A, Biddle et al. (1997) checked the statements that EVA is highly associated with stock returns and firm's value than accrual earnings, and evaluated which constituent of EVA, if any, contributed to these associations. The results indicated that earnings ( $R^2 = 12.8\%$ ) were considerably associated with market adjusted annual returns than either residual income ( $R^2 = 7.3\%$ ) or EVA ( $R^2 = 6.5\%$ ) and that all three of these measures control cash from operations ( $R^2 = 2.8\%$ ). The empirical results do not support the conclusion that EVA dominates earnings in relative information content. Similar

results were revealed by Kramer & Pushner (1997) by analysing the strength of the relationship between EVA and MVA, using the Stern Stewart 1000 companies for the period between 1982 and 1992. They found that although MVA and NOPAT were positive on an average, the average EVA over the period was negative. No clear evidence was found to support the contention that EVA is the best internal measure of corporate success in adding value to shareholders' investment.

Goetzmann & Garstka (1999) found that long-term survival of companies may be related to accounting earnings and more, simple EPS does as well or better than EVA at explaining differences across companies and at predicting future performance.

Salmi & Virtanen (2001) evaluated and compared the EVA with traditional profitability measures with in a controlled simulation structure it was observed that even under regular economic circumstances (the relative); EVA is much more unbalanced than the traditional ROI measure. Furthermore, there is one-to-one correspondence between (the relative) EVA and the traditional ROE. These findings are subject to doubt the potential claims on EVA's supremacy over the traditional accounting measures. Subsequently, Chen & Dodd (2001) empirically examined the value-relevance of three profitability measures i.e. operating income, residual income and EVA, and concluded that the market may place higher reliance on audited accounting earnings than the unaudited EVA metric. Their findings failed to support the assertion that EVA is the best measure for valuation purposes.

Copeland (2002) provided evidence that earnings, EPS growth, EVA, and EVA growth are all uncorrelated with total shareholders' returns (TSR). It prompted to investigate the correlation between TSR and the difference between expected and actual performance, called 'Expectation-based Management' (EBM). Since he found a significant correlation, he suggested the EBM as a better tool for performance measurement.

Bhattacharyya & Phani (2004) explained the increasing popularity of EVA in India. They propose that the EVA computation involves significant subjectivity which reduces its informative value. They state that EVA fails to reflect a positive signal to the markets as compared to other stock performance indicators.

DeWet (2005) investigated the strength of the relationship between EVA and other traditional accounting measures relative to MVA, and to compare the findings with these of studies already published elsewhere. The data from South

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African listed companies for a period of ten years (1995-2004) was used for this purpose. He found that EVA did not show the strong correlation with MVA.

Kim (2006) offers empirical evidence on the relative and incremental information content of EVA and traditional performance measures, earnings, and cash flow. Regression analysis tests the information content of EVA and indicates that earnings are more useful than cash flow in explaining the market value of hospitality firms. Afterward, Maditinos et al. (2006) disapproved the hypothesis that earnings level and earnings changes are associated with stock returns and do better than EVA in explaining stock returns. The results of this study do not support the claims of Stewart (1991) and other advocates of EVA that EVA alone is the best performance measure.

Anastassis & Kyriazis (2007) investigated the relative explanatory power of the EVA model with respect to stock returns and firms' market value. They compared EVA to established accounting variables (e.g. net income, operating income), in the context of a small European developing market, namely the Athens stock exchange, in its first market-wide application of the EVA measure. The relative information content tests reveal that net and operating income appears to be more relevant than EVA.

Ismail (2008) provides evidences regarding EVA and company performance in Malaysia. The study sought to explain the ability of EVA, compared to traditional tools, in measuring performance under various economic conditions; pre-economic crisis, during economic crisis and post-economic crisis period. This study found that traditional tools particularly EPS is able to correlate and had a relationship with stock returns.

Abdoli et al. (2012) studied relationship between each independent variable including economic value added (EVA) and residual income (RI) as the representatives of economic models with the created shareholders value (CSV). The results indicate that both EVA and RI have significant relationship with the shareholders' created wealth. However, the RI criterion is more significant than the EVA in relation with the created shareholders value. The general findings of the study described that EVA does not emerge as a good firm performance measure as it was thought of.

Parvaei & Farhadi (2013) found that EVA has low predictability for performance and FCF has slightly superior predictability as compared to EVA. Similarly, Bhasin (2013) examined the value creation strategies of the select Indian companies by analyzing whether the EVA better symbolizes the market value of companies in comparison to

conventional performance measures. The study shows that there is no strong evidence to support Stern Stewart's claim that EVA is superior to the traditional performance measures in its association with MVA.

Sanningammanavara et al. (2014) checked whether the higher EVA translates to the maximization of shareholders value over a long period of time. The study revealed that there is no strong pattern of EVA for selected Indian IT companies during the period.

## II. Research Design & Methods

### Objectives of the study

1. To examine whether the average data of select financial variables used for sample pharmaceutical companies is symmetrical.
2. To analyse the explanatory power of average Economic Value Added (EVA) and the average of select traditional financial performance measures in relation with MVA of sample pharmaceutical companies.
3. To identify the value destroying pharmaceutical companies from select pharmaceutical companies.

### Hypothesis of the study

In harmonization with the above objectives, the study intends to test the following null-hypothesis ( $H_{0s}$ ):

$H_{01}$ : The average data (variable wise) is symmetrical for study variables under consideration (MVA, EVA, EPS, Kp, Lp, NPV, PBIT, PBDITA, PAT and ROCE) for sample pharmaceutical companies.

$H_{02}$ : There is no significant difference between the explanatory power of traditional and modern financial performance measures in relation with MVA of sample pharmaceutical companies.

$H_{03}$ : The sample pharmaceutical companies are value creating companies for their shareholders.

### Sampling procedure

The data for the study is obtained primarily from PROWESS database, from 1<sup>st</sup> April 2002 to 31<sup>st</sup> March 2014 in the raw form. After calculating all ten financial variables considered in this paper, simple arithmetic mean was calculated horizontally. At initial stage 77 pharmaceuticals companies listed on national stock exchange (NSE) were taken for the purpose of analysis. Further, due to non-availability of complete financial information of the three companies could not be undertaken. At last, a final sample of 74 pharmaceutical companies with full data forming 888 firm-year observations selected

for the further study.

#### Specification of statistical tools and models

Keeping in mind the major objectives and research hypothesis, the two level of analysis is used:

- (1) Multiple regression analysis (OLS)
- (2) Discriminant analysis

The stepwise method of multiple regression analysis (OLS) has been considered appropriate to select the best predictor. The following multiple regression equation is used:

$$MVA_{it} = \hat{\alpha}_0 + \hat{\alpha}_1 EVA_{it} + \hat{\alpha}_2 EPS_{it} + \hat{\alpha}_3 Kp_{it} + \hat{\alpha}_4 Lp_{it} + \hat{\alpha}_5 NPV_{it} + \hat{\alpha}_6 PBIT_{it} + \hat{\alpha}_7 PBDITA_{it} + \hat{\alpha}_8 PAT_{it} + \hat{\alpha}_9 ROCE_{it} + \hat{\alpha}_{it} \quad (1)$$

Where,  $MVA_{it}$  is a measure of wealth that firm  $i$  has created for its investors in time period  $t$ ,  $EVA_{it}$  is the amount of economic value added for firm  $i$  in time period  $t$ ,  $EPS_{it}$  is earning per share for firm  $i$  in time period  $t$ ,  $Kp_{it}$  is the capital productivity for firm  $i$  in time period  $t$ ,  $Lp_{it}$  is the labour productivity for firm  $i$  in time period  $t$ ,  $NPV_{it}$  is net present value for firm  $i$  in time period  $t$  that frankly recognises the time value of money,  $PBIT_{it}$  is profit before interest and taxes for firm  $i$  in time period  $t$ ,  $PBDITA_{it}$  is the amount of profit before depreciation, interest, taxes and amortization for firm  $i$  in period  $t$ ,  $PAT_{it}$  is the amount of profit after tax for firm  $i$  in period  $t$ ,  $ROCE_{it}$  is the ratio of earnings before taxes to capital employed firm  $i$  in period  $t$  and  $\hat{\alpha}_{it}$  is a stochastic error term for firm  $i$  at time  $t$ ,  $i=1, \dots, 74$  and  $t=1, \dots, 12$ .

Discriminant analysis unites a nominally scaled criterion or dependent variable with one or more independent variables that are interval or ratio scaled. Once the Discriminant equation is found, it can be used to forecast the classification of a new observation. This is done by calculating a linear function that is given below:

$$D_i = d_0 + d_1 X_1 + d_2 X_2 + \dots + d_p X_p \quad (2)$$

Where in equation (2):

$D_i$  is the score of Discriminant function  $i$ .

The  $d_i$ 's are weighting coefficients;  $d_0$  is constant.

The  $X_s$ 's are the values of the discriminating variables used in the analysis.

### III. Results & Analysis

#### 1. Descriptive statistics of sample pharmaceutical companies (average data)

Table I put forward the descriptive statistics based on average data of sample pharmaceutical companies and depicts that  $Lp$  (4.94),  $NPV$  (9.54),  $ROCE$  (13.27) have the lowest values of standard deviation. Skewness values are greater than one for dependent and independent study variables (except  $EVA$  and  $ROCE$ ), indicates that distribution significantly differs from a normal symmetric distribution. Similarly, all kurtosis values are greater than 3 means that curve is more peaked than the normal curve. Negative average  $EVA$  value points out that some of the pharmaceutical companies are destroying wealth of the shareholders. In total, it is evident from the table I that data is abnormal. To make the abnormal distribution as normal distribution data transformation has been done with the help of Logarithmic (Log xi base i.e.10).

#### 2. Kolmogorov-Smirnov test of sample pharmaceutical companies (average data)

After transforming the data, normality has been checked by Kolmogorov-Smirnov one sample test. The results of KS statistics of all the select financial variables of sample pharmaceutical companies are presented in table II. It may be observed that p-values are moving in between of 0.076 to 0.972 and these values are greater than 0.05. Large significance values ( $>.05$ ) related with sample pharmaceutical companies supports that the null hypothesis ( $H_{01}$ ) that the average data of select financial variables of sample pharmaceutical companies is asymmetrical may be rejected.

#### Multiple regression (average data)

##### 1. Multiple regression of sample pharmaceutical companies (taking MVA as dependent variable)

It may be observed from the table III that the value of  $R$  is 0.907 and  $R^2$  is 0.829. This table shows that  $PAT$  is the best determinant of MVA. The value of Durbin-Watson is 1.603, it indicates towards significant positive auto-correlation between the residuals. The value of standard error is 0.35421, indicating the limits within which the estimated value of the dependent variable is expected to be found. The significant value of F-statistics finds the association between the dependent and independent variables in this model.

VIF value of sample pharmaceutical companies is 1.000. When VIF value is equal to 1 then explanatory variables are uncorrelated.

It is obvious from table IV that the value of beta is 0.907 and it provides an alternative approach to test the linear relationship; t-test values of the independent variables

offered in this table are significant at 5% level of significance. The result indicates that PAT is having most explanatory power over other independent variables with rejection of ( $H_{02}$ ) hypothesis that no significant difference between the explanatory power of independent financial variables like average of EVA, EPS, Kp, Lp, NPV, PBIT, PBDITA, PAT and ROCE. The sample MVA intercept constant is -0.195. This indicates expected MVA when the contribution of select independent financial variables is equal to zero. The positive sign of the coefficient (PAT) indicates corresponding relationship between the dependent variable and the independent variable; it means that an increase in the value of PAT will also increase the value of MVA.

Hence, present findings are consistent with the findings of several prior studies like Biddle et al. (1997), Copeland (2002) and Ismail (2008) etc. in which the claims regarding superiority of EVA over traditional financial performance measures has been rejected.

## 2. Discriminant analysis of sample pharmaceutical companies

Discriminant analysis is also performed on the average data of sample pharmaceutical companies for twelve financial years to advise the potential investors to set up a function to screen value creating companies from value destroying companies of the pharmaceutical industry. In particular, an effort has been made to build a Discriminant function (model) and find out:

- (a) The percentage of companies that is classified by the model correctly.
- (b) Statistical significance of the Discriminant function.
- (c) Which variable/variables (EVA, EPS, Kp, Lp, NPV, PBIT, PBDITA, PAT or ROCE) is/are relatively better in discriminating value creating company from value destroying company?
- (d) Classification criteria for a new company belonging to an industry into one of the two groups- 'value creating' or 'value destroying' by building a decision rule and cut off score.
- (e) Calculations of Discriminant score for pharmaceutical industry (Pria, 2009).

The dependent variable is a categorical variable having two categories with codes as follows:

- Ø Value creating -1 (one): where MVA of the particular pharmaceutical company is greater than the average MVA

of pharmaceutical industry.

- Ø Value destroying - 0 (zero): where MVA of the particular pharmaceutical company is less than the average MVA of pharmaceutical industry.

Tables V to XI bring out the output of the Discriminant analysis:

- (a) How good is the model?

The output of table V is called the classification matrix and it shows that the Discriminant function obtained for pharmaceutical industry. It is able to classify 28 (93.33%) companies correctly. It is pointer towards the model being a good one.

It can be seen from table VI that total processed companies are 74 but due to the, at least one missing discriminating variable only 33 companies used in this output table. Further, it can also be observed from table V that 9 companies out of 30 grouped companies from the sample pharmaceutical companies are scoring less than average MVA of the industry (value destroying -zero), these may be categorised under the value destroying companies. Hence on the basis of findings the null hypothesis ( $H_{03}$ ) that sample pharmaceutical companies are value creating companies for their shareholders is being rejected.

- (b) Statistical significance of the model

To check the statistical significance of the model, tables VII and VIII shows the canonical correlation, Eigen and Wilks' lambda values. A canonical correlation of 0.860 suggests the model explains 73.96% ( $0.860^2$ ) of the variation in the grouping variable i.e. whether a pharmaceutical company is value creating or value destroying company. The Eigen value is 2.842 with 100% variance representing the high spread among the group means. The value of Wilks' lambda is 0.260 that is in between of 0 and 1 (closer to zero) indicates better discrimination power of the model. The probability value of F-test shows that the discrimination between the two groups is highly significant. This is because the significance value is 0.000 which specifies that the F-test would be significant at a confidence level of up to  $(1-0.000)*100$  or 100%.

- (c) Predictor

The larger the absolute value of the standardised coefficient, result in the improvement of predictive power of the variable. It may be observed from the table IX that PAT is the best predictor with the coefficient of 0.634 followed by PBIT with a coefficient value 0.624, PBDITA (0.604),

EVA (0.604), NPV (0.412), ROCE (0.320), EPS (0.256), Kp (0.199) and Lp having lowest coefficient of -0.168.

(d) Classification of a new company

Table X explains the new mean for group 1 (value creating) is 1.152 and new mean for group 2 (value destroying) is -2.303. Thus, the decision rule for classifying the case is, if the Discriminant score of a company is more than the midpoint -0.575 (average of -2.303 and 1.152), then it will be termed as 'value creating' company and if the Discriminant score of a company is less than the midpoint -0.575, then as 'value destroying' company.

(e) Discriminant score for pharmaceutical industry

With the help of table XI Discriminant score for Indian pharmaceutical industry may be calculated like:

$$\text{MVA} = -14.711 + (1.224 * \text{EVA}) + (-2.160 * \text{EPS}) + (-0.967 * \text{Kp}) + (-4.677 * \text{Lp}) + 0.081 * \text{NPV} + (22.327 * \text{PBIT}) + (-6.465 * \text{PBDITA}) + (-12.832 * \text{PAT}) + (-0.005 * \text{ROCE})$$

Probably, these findings will help out the investors for better decision making regarding their investments and may protect from fraudulent proposals. Ultimately, the results of Discriminant analysis indicate towards poor financial position of pharmaceutical industry of India. Government should make suitable policies for the revival of Indian pharmaceutical industry because 30% of sample pharmaceutical companies are categorised under the category of 'value destroying' company.

#### IV. Conclusion

The regression results indicate that PAT is having most explanatory power than other independent variables in relation with MVA. Results confirm that there is no strong evidence to support Stern Stewart claim that EVA is superior to the traditional financial performance measures in its relationship with MVA. Subsequently, the results of Discriminant analysis reveals that 9 (30%) pharmaceutical companies out of the grouped 30 sample pharmaceutical companies are scoring less than average MVA of the industry means these may be called as value destroying companies. The results confirm that investors should not rely only on financial statements because profit figures shown in the income statements may not always true and sometime mislead the investors.

The findings are not only consistent with several prior studies but also consistent internally. It may be observed that regression results (see table II and IV) and Discriminant output (see table IX) both are supporting PAT as most

explanatory variable. Thus, modern value added measures are seems to be unjustified and expensive for Indian pharmaceutical industry. In other words, one can carry on using the traditional financial performance measures for evaluation. The study obviously demonstrates that market responds to the accounting numbers more than that with the numbers which are generated using some adjustments so one should be careful in overusing the EVA as a proxy for MVA. Thus there is no apparent proof to support the claim that the shareholders stand to gain by looking at EVA.

Note

1. EVA is a registered trademark of Stern Stewart & Co.
2. A single Discriminant equation is needed if the categorisation calls for two groups.

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**Table I: Descriptive statistics of sample pharmaceutical companies (average data)**

| Statistics         | MVA      | EVA        | EPS    | Kp     | Lp    | NPV   | PBIT   | PBDITA | PAT    | ROCE   |
|--------------------|----------|------------|--------|--------|-------|-------|--------|--------|--------|--------|
| Minimum            | -62.38   | -349230.08 | -18.09 | 0.04   | 0.29  | -0.34 | -10.00 | -6.84  | -31.45 | -40.98 |
| Maximum            | 11011.09 | 32633.30   | 151.55 | 250.03 | 37.31 | 60.12 | 562.64 | 629.70 | 457.76 | 36.28  |
| Mean               | 924.88   | -4065.52   | 16.63  | 5.19   | 7.57  | 4.39  | 85.79  | 100.67 | 58.93  | 10.21  |
| Skewness           | 3.35010  | -8.18      | 3.97   | 8.52   | 3.50  | 3.70  | 2.31   | 2.26   | 2.64   | -1.84  |
| Kurtosis           | 11.8917  | 69.32      | 24.71  | 73.06  | 17.88 | 16.53 | 5.11   | 4.85   | 7.19   | 5.24   |
| Standard deviation | 2144.39  | 41318.37   | 20.61  | 28.94  | 4.94  | 9.54  | 124.03 | 139.75 | 99.62  | 13.27  |

**Table II: Kolmogorov-Smirnov one-sample test of sample pharmaceutical companies**

| N                        |                | MVA    | EVA    | EPS     | Kp      | Lp      | NPV     | PBIT    | PBDITA  | PAT     | ROCE    |
|--------------------------|----------------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|
|                          |                | 58     | 35     | 69      | 73      | 74      | 73      | 71      | 73      | 67      | 67      |
| Normal Parameters        | Mean           | 2.36   | 3.208  | 1.0399  | 0.0945  | 0.8137  | -0.0171 | 1.6066  | 1.6559  | 1.3695  | 1.0201  |
|                          | Std. Deviation | 0.9009 | 0.7138 | 0.53030 | 0.49655 | 0.25274 | 0.80293 | 0.57608 | 0.66027 | 0.69564 | 0.42565 |
| Most Extreme Differences | Absolute       | 0.089  | 0.083  | 0.136   | 0.136   | 0.128   | 0.062   | 0.089   | 0.094   | 0.076   | 0.157   |
|                          | Positive       | 0.087  | 0.074  | 0.098   | 0.136   | 0.121   | 0.062   | 0.089   | 0.042   | 0.042   | 0.137   |
|                          | Negative       | -0.072 | -0.083 | -0.136  | -0.099  | -0.128  | -0.056  | -0.055  | -0.094  | -0.076  | -0.157  |
| Kolmogorov-Smirnov Z     |                | 0.678  | 0.487  | 1.122   | 1.174   | 1.097   | 0.523   | 0.748   | 0.797   | 0.616   | 1.279   |
| Asymp. Sig. (2-tailed)   |                | 0.747  | 0.972  | 0.161   | 0.127   | 0.180   | 0.948   | 0.631   | 0.550   | 0.843   | 0.076   |

**Table III: Model summary and f-ratio of sample pharmaceutical companies**

| Predictor (constant) | Model | R     | R <sup>2</sup> | Adjusted R <sup>2</sup> | Std. error of the estimate | R <sup>2</sup> Change | Durbin Watson | F-value | p-value |
|----------------------|-------|-------|----------------|-------------------------|----------------------------|-----------------------|---------------|---------|---------|
| PAT                  | 1     | 0.907 | 0.829          | 0.821                   | 0.35421                    | 0.822                 | 1.603         | 129.430 | 0.000   |

**Table IV: Regression coefficients of finally selected models of sample pharmaceutical companies**

| Model | Variables  | Unstandardized Coefficients |            | Standardized Coefficients | t-value | p-value | VIF   |
|-------|------------|-----------------------------|------------|---------------------------|---------|---------|-------|
|       |            | B                           | Std. error | Beta                      |         |         |       |
| 1     | (constant) | -0.195                      | 0.260      | 0.907                     | -0.753  | 0.458   | 1.000 |
|       | PAT        | 1.569                       | 0.138      |                           | 11.377  | 0.000   |       |

**Table V: Classification results of sample pharmaceutical companies**

|          |       | Value destroying/<br>value creating | Predicted group membership |      | Total |
|----------|-------|-------------------------------------|----------------------------|------|-------|
|          |       |                                     | 0                          | 1    |       |
| Original | Count | 0                                   | 9                          | 1    | 10    |
|          |       | 1                                   | 1                          | 19   | 20    |
|          |       | Ungrouped cases                     | 3                          | 0    | 3     |
| -        | %     | 0                                   | 90.0                       | 10.0 | 100.0 |
|          |       | 1                                   | 5.0                        | 95.0 | 100.0 |
|          |       | Ungrouped cases                     | 100.0                      | 0    | 100.0 |

\* 93.33% (9+19/30) of original grouped cases correctly classifiedss

**Table VI: Classification processing summary of sample pharmaceutical companies**

|  |    |
|--|----|
| Processed                                      | 74 |
| Excluded (missing or out-of-range group codes) | 0  |
| Table  | 41 |
| At least one missing discriminating variable   |    |
| Used in output                                 | 33 |

**Table VII: Eigen values of sample pharmaceutical companies**

| Function | Eigen Value | % of Ariance | Cumulative % | Canonical correlation |
|----------|-------------|--------------|--------------|-----------------------|
| 1        | 2.842*      | 100.0        | 100.0        | 0.860                 |

**Table VIII: Wilks' Lambda of sample pharmaceutical companies**

| Test of function(s) | Wilks' Lambda | Chi-square | Df | Sig.  |
|---------------------|---------------|------------|----|-------|
| 1                   | 0.260         | 31.628     | 9  | 0.000 |

**Table IX: Structure matrix of sample pharmaceutical companies**

| Variables | Function |
|-----------|----------|
| PAT       | 0.634    |
| PBIT      | 0.624    |
| PBDITA    | 0.604    |
| EVA       | 0.604    |
| NPV       | 0.412    |
| ROCE      | 0.320    |
| EPS       | 0.256    |
| Kp        | 0.199    |
| Lp        | -0.168   |

**Table X: Functions at group centroids of sample pharmaceutical companies**

| Value destroying/<br>value creating | Function |
|-------------------------------------|----------|
| 0                                   | -2.303   |
| 1                                   | 1.152    |

**Table XI: Canonical Discriminant function coefficients of sample pharmaceutical companies**

| Variables  | Function |
|------------|----------|
| EVA        | 1.224    |
| EPS        | -2.160   |
| Kp         | -0.967   |
| Lp         | -4.677   |
| NPV        | -0.081   |
| PBIT       | 22.327   |
| PBDITA     | -6.465   |
| PAT        | -12.832  |
| ROCE       | 8.120    |
| (Constant) | -14.711  |

## OCCUPATIONAL HAZARDS IMPACT AMONG MEDICAL LABORATORY TECHNICIANS

D. Rajan ★

*This descriptive research aims at examining the impact of occupational hazards of medical laboratory technicians. The study has sampled 60 medical laboratory technicians by simple random sampling technique from private multi speciality hospitals in Tirunelveli city, Tamilnadu. The study has examined 24 factors to understand the effect of occupational hazards. Mean and standard deviation which has examined the impact of occupational hazards shows that the factors pain in neck, shoulder, upper and lower back, waist and leg and joints, eye problem, tiredness, fatigue, weight loss, stomach ulcer and loss of appetite or changes in appetite are the foremost impact of occupational hazards of medical laboratory technicians. The extent of perception of the respondents towards these factors is at medium level.*

**Key Words:** Medical laboratory technicians, impact, occupational hazards, health, private hospitals, Tirunelveli city.

Medical laboratory, the paramedical department has occupied major role in health care sector. The medical laboratory technicians involves in diagnosing body fluids such as blood, urine and sputum so as to find nature of diseases and infections. They seem very prone to occupational hazards comparatively other paramedical departments such as nursing, pharmacy, radiography and central sterile and supply department as their nature of job involves long standing, prolonged neck bending, looking into microscope and dealing with various infectious patients. Besides these, they handle number of equipments which are functioning on electricity such as microscope, auto analyzer, microscope, thyroid machine, arterial blood gas and complete blood count machines and centrifuge along with syringes and various solutions. The study area in which the research is undertaken has attained profound development in health care sector. Despite the number of hospitals and medical diagnostic centres has increased at a marked level, still infrastructure facilities (space in the department, arrangement of chair, welfare facilities) and HR practice in terms of training and development, professionalism stand behind when compared to other cities of Tamilnadu such as Madurai, Coimbatore and Chennai. Hence, this study aims at analysing impact of occupational hazards on general health of medical laboratory technicians.

### Statement of the Problem

It is vital for medical laboratory technicians to have good health as they are involved in round the clock service. There are number of factors in medical laboratory occupations producing hazards. Dealing with infectious patients, handling needles and chemicals at frequent intervals, long standing, focused concentration on microscope and computer, operating electrical equipments, lack of safety devices are some of the factors causing occupational

hazards among them. In the study area, long working hours, two shift work system with twelve hours duty, poor infrastructure, inadequate training on handling procedures of equipments and inadequate safety guidelines are found almost in all hospitals. These factors affect health of the medical laboratory technicians in a number of ways. They are as follows: pain in neck, shoulder, knee, leg, back, and other joints, eye dryness, infectious diseases such as tuberculosis, HIV, cervical spondylosis, headache and migraine, constipation, varicose vein and needle stick injuries and so on. Therefore, it is important to analyse impact of occupational hazards among medical laboratory technicians and educate them to safeguard them from these effects.

### Scope of the Study

The present research has been undertaken in Tirunelveli city which is the capital of Tirunelveli District which is located in south end of Tamilnadu state, India. The study has focused the medical laboratory technicians qualified with DMLT (Diploma in Medical Laboratory Technology) 1 year and 2 year courses and working in leading private multi specialty hospitals. The research has covered the variables which are related to impact of occupational hazards on general health of medical laboratory technicians.

### Significance of the Study

The findings of the study will be helpful for hospital management and similar organizations which offer same services to know various effects of occupational hazards on general health of medical laboratory technicians and take necessary steps such as modifying the infrastructure

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in the department, arranging training and development programmes, preparing guidelines to make awareness about occupational hazards and execute them. The suggestions given by the researchers will be useful for medical laboratory technicians to improve their knowledge to safeguard them from occupational hazards. The study will be the base and sources of secondary data for future research scholars.

#### Objectives of the Study

The objectives of the study are to analyse the impact of occupational hazards on general health of medical laboratory technicians and to offer suitable suggestions to safeguard them from these effects.

#### Limitations of the Study

The present study has been limited to Tirunelveli city only and it has not focused entire district. The study has included medical laboratory technicians who have been qualified with Diploma in Medical Laboratory Technology 1 year and 2 years courses and working in private multi speciality hospitals. The study has not focused laboratory technicians working in single speciality hospitals, government hospitals and diagnostic centres. The other limitation of this study is its small size of sample. The research has focused only limited number of variables and it has analysed only the impact of occupational hazards and it has not examined causes and awareness of occupational hazards. As a result of these limitations, there should be a caution in generalising the results of the study to entire district, other districts all other hospitals and other types of hospitals such as single speciality hospitals, government hospitals and diagnostic centres as the nature and practice of the hospital vary from organization to organization.

## I. Review of Literature

Occupational hazard is the risk to the health of a person usually arising out of employment. It can also refer to work, material, substance, process or situation that predisposes or itself causes accidents or disease at work place. It is defined as a risk accepted as a consequence of a particular occupation (Oxford Dictionary). World Health Organization (1948) defined, "Health is a state of complete physical, mental and social well being and not merely an absence of disease or infirmity" (Park K 2000).

Rajan D (2014) identified the sources of occupational hazards of medical laboratory technicians working in private multi speciality hospitals under nine dimensions namely organization structure and policy, ergonomics, fear and safety, resources, work load and work shift,

environment and hygiene, interruption, patient and communication and training related factors. The study identified that rigid leadership style and strict supervision by higher authorities, long sitting in front of computer, inadequate safety in the work place, shortage of laboratory technicians and supporting staffs in accordance with volume of patients, two shift work system which are irregular, inadequate space in the work place, receiving multiple instructions from many authorities, dealing with emotionally unstable, angry, urgency and blaming nature of the patients and their relatives and inadequate information about occupational hazards related to job were the major sources of occupational hazards of medical laboratory technicians. The analysis of the study also proved that all factors of occupational hazards are perceived at medium level by majority of the respondents.

Awosile B, Oseni O and Omoshaba E (2013), examined hazards exposures of workers of animal related occupations in Abeokuta South Western, Nigeria. Zoonotic diseases, animal bites, animal kicks, bird pecking and scratching and dog bites were the commonest occupational hazards of exposure. Majority of the workers were known of the term occupational hazards and various hazards associated with their job. Physical stress due to work or body fatigue and back and or waist pain was the commonest physical hazards. Dust and animal dung were the allergic hazards of exposure and allergic rhinitis and conjunctivitis were the most common allergic conditions. Fumigants, insecticides and pesticides were the common chemical hazards and respiratory irritation was the most commonly reported clinical condition. Skin diseases and respiratory diseases were the most common occupational diseases. Tuberculosis, avian influenza and brucellosis were the most common zoonotic diseases. Diseases, infections and death were the common possible implications of zoonoses perceived by the workers. Less than 50% of the workers were aware of various preventive measures against work related zoonotic diseases. Use of protective coverings, good hygienic practices, washing of hand after work period were the most common preventive measures against work related zoonotic diseases noted by workers.

Pooja Dwivedi and UV Kiran, (2013) studied occupational health hazards of farm women and found that they had mild pain in neck, shoulder, upper arms, upper back, buttock, lower arms, lower back and upper back. They had severe pain in neck, legs, thighs and shoulder and moderate pain in shoulders, legs, thighs and neck.

Rajan D (2013) analysed the awareness of medical laboratory technicians working in multi speciality hospitals in Tirunelveli city, Tamilnadu, about safety measures of

occupational hazards. The study showed that majority of the respondents have replied that they do not know anything at all about the safety measures of occupational hazards discussed in this research. From the total score of the table it could be known that the respondents have awareness about some safety measures such as use of hand gloves and face mask when collecting fluids from the patient, washing hand with bactericidal soap, use of foot wears to cope up with chillness of the floor, vaccination as they have occupied the high scores. The respondents have poor knowledge about the safety measures such as breathing exercises, cleaning eye with cold water at frequent interval, regular break and physical exercises as they have occupied less total score.

Miguel Angel MA, Susana Garcia Herrero, Javier Garcia, Rodriguez and Dale Ritzel (2012) in their study reported that majority of agricultural and construction sector employees had musculoskeletal complaints and suffered with stress. They had symptoms in three or more parts of the body such as lower part of the back, nape, neck and the upper part of the back. Construction and manufacturing companies had higher rates of work related to accidents and injuries.

Hafiz O Ahmed and Mark S Newson Smith, (2010) highlighted that dust, heat, machines such as milling machine, falling materials, chemicals and smoke were the common hazards of cement workers. Besides, respiratory symptoms, allergy, eye problem, liver, stomach and heart problems were their common health related problem.

Fasunloro Adebola and Foluso John Owotade (2004) assessed the level of awareness of occupational hazards among clinical dental staff. Back ache an injury from sharp instruments were the common impact of occupational hazards. Use of eye goggles, proper waste disposal, wash hands with bactericidal soap, wear gloves routinely, change gloves between patients, use of face mask, wash hands before gloving and ensure instrumental sterilization were the mechanism followed by employees to control the cross infection.

It could be noted from the above literature that the study undertaken in the study area has analysed the sources of occupational hazards of medical laboratory technicians and their level of awareness about safety measures of occupational hazards. It has not studied about the impact of medical laboratory technicians working in private multi speciality hospitals. Therefore, there is a scope for studying the impact of occupational hazards of medical laboratory technicians working in private multi speciality hospitals. Hence, the present study is undertaken focusing impact of occupational hazards among medical laboratory

technicians.

## II. Research Design & Methods

This survey based research work is descriptive in nature. The sample of this research is medical laboratory technicians working in private multi speciality hospitals. A total of 60 medical laboratory technicians have been sampled from private multi speciality hospitals by simple random sampling technique. The primary data have been collected using structured questionnaire constructed by the researchers. It consists of two sections, section 'A' which contains demographic variables of the respondents and section 'B' deal with about impact of occupational hazards on general health. The questionnaire has been made with five point scale namely Strongly Agree, Agree, No opinion, Disagree and Strongly Disagree and these scales have been allocated the points as follows: 5,4,3,2 and 1 respectively. The researchers have made personal discussion with medical laboratory technicians also to collect primary data. The secondary data have been collected from journals, books and websites. Percentage analysis has been administered to analyse demographic variables of the respondents and mean and standard deviation has been employed to examine impact and extent of perception of occupational hazards.

## III. Results & Analysis

It could be highlighted from Table 1 that majority of the respondents were females (73.33%) and married (63.33%). Most of the respondents were in the age group between 20 and 25 years (32%) and more number of respondents had been qualified with Diploma in Medical Laboratory Technology 1 year course (76.67%). Majority of the respondents (36.67%) were between the working experiences of 2 and 4 years and more number of respondents were receiving salary between Rs.5000 and Rs.7000 (43.33%).

It could be indicated from Table 2 that pain in neck, shoulder, upper and lower back, waist and leg and joints, eye problem, tiredness, fatigue, weight loss, stomach ulcer and loss of appetite or changes in appetite are the foremost impact of occupational hazards of medical laboratory technicians. The most importance given to these factors may be due to poor infrastructure such as seat arrangement, absence or lack of ergonomics related training, high work load and inability to take food in time. In light of the preference given to these factors it could be understood that they are in need of well equipped infrastructure, health education in terms of ergonomics aspect and balanced diet. Stress and irritation, minute injuries, sleep disorder, menstrual irregularities and low spirit are some of other

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impact of occupational hazards. The reasons may be due to long working hours and unhealthy shift work system. In view of the importance it may be indicated that they are in need of health education with regard to stress relieving techniques, modification of working hours and shift system. From the table it could also be revealed that all factors are perceived at medium level.

#### Suggestions

The researcher presents the following suggestions based on the findings of the research in order to safeguard them from occupational hazards.

- i. Awareness should be created through health education and training and development programme about causes and impact of occupational hazards and the precautionary measures to be followed to safeguard from them. Guidelines about safety precautions such as use of handling infectious patients, handling of needles, operating procedures of equipments which are functioning on electricity should be provided and it should be marked in notice board in written form also. Guidelines should also consist of safety devices such as face masks, shoes, and hand gloves used during working hours.
- ii. Ergonomics training with regard to bending, sitting and standing activities accompanied with relaxation exercises such as breathing exercises, stretching exercises which can be done for neck, knee joints, hip joints, shoulder, elbow, wrist and trunk. Education about the importance of balanced diet, self hygiene, cleanness, adequate sleeping, yoga, rest, way of taking care of eyes (e.g., washing eyes with cold water at frequent exercises) and physical exercise should be provided.
- iii. They should be vaccinated by Hepatitis B and TT injections as per schedule and they should also be instructed to avail these facilities without fail. Moreover, the hospital management should concentrate on infrastructure facilities such as sufficient space, comfort chair and enrich ventilation and lighting facilities. Functioning of equipments, electrical wirings and sterilization of the instruments should be ensured at frequent intervals.

#### IV. Conclusion

The study has examined the impact of occupational hazards of medical laboratory technicians from the samples of 60 respondents from private multi speciality hospitals in Tirunelveli city, Tamilnadu. The study has examined 24 factors to understand the effect of occupational hazards. Mean and standard deviation which has examined the

impact of occupational hazards shows that the factors pain in neck, shoulder, upper and lower back, waist and leg and joints, eye problem, tiredness, fatigue, weight loss, stomach ulcer and loss of appetite or changes in appetite have been found as the foremost impact of occupational hazards of medical laboratory technicians. It is important for medical laboratory technicians to know about occupational hazards in their occupation in order to safeguard their health. It is also important for hospital management to take necessary steps to eliminate and control the factors in terms of occupational hazards affecting their health. By eliminating and controlling factors related to occupational hazards, quality service can be given for the patients and also retain the talent employees in the organization for long period.

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**Table 1: Demographic Variables**

| S.No. | Measure                     | Item                    | Frequency | Percentage |
|-------|-----------------------------|-------------------------|-----------|------------|
| 1     | Sex                         | Male                    | 16        | 26.67      |
|       |                             | Female                  | 44        | 73.33      |
| 3     | Age                         | Below 20 years          | 07        | 11.67      |
|       |                             | Between 20 and 25 years | 14        | 23.33      |
|       |                             | Between 25 and 30 years | 27        | 45.00      |
|       |                             | Above 30 years          | 12        | 20.00      |
| 3     | Marital Status              | Married                 | 38        | 63.33      |
|       |                             | Unmarried               | 22        | 36.67      |
| 4     | Educational Qualification   | DMLT (1 year)           | 46        | 76.67      |
|       |                             | DMLT (2 year)           | 14        | 23.33      |
| 5     | Years of working experience | Below 2 year            | 09        | 15.00      |
|       |                             | Between 2 and 4 years   | 22        | 36.67      |
|       |                             | Between 4 and 6 years   | 17        | 28.33      |
|       |                             | Above 6 years           | 12        | 20.00      |
| 6     | Salary                      | Below 5000              | 12        | 20.00      |
|       |                             | Between 5000 and 7000   | 26        | 43.33      |
|       |                             | Between 7000 and 9000   | 13        | 21.67      |
|       |                             | Above 9000              | 09        | 15.00      |

**Table 2: Impact of Occupational Hazards on General Health**

| S.No. | Impact  | Mean  | SD   | Extent of Perception (%) |        |       |
|-------|---|-------|------|--------------------------|--------|-------|
|       |   |       |      | Low                      | Medium | High  |
| 1     | Neck, shoulder, upper and lower back, waist and leg and joint pain  | 27.64 | 3.58 | 15.00                    | 68.33  | 16.67 |
| 2     | Eye problem (e.g. dry eye, eye trauma and irritation due to high level of concentration and use of chemicals) | 26.67 | 3.55 | 23.33                    | 55.00  | 21.67 |
| 3     | Tiredness   | 26.13 | 3.02 | 18.33                    | 61.67  | 20.00 |
| 4     | Fatigue   | 25.67 | 4.71 | 13.33                    | 68.33  | 18.33 |
| 5     | Weight loss (due to night shift and long working hours)   | 25.56 | 4.83 | 15.00                    | 70.00  | 15.00 |
| 6     | Stomach ulcer   | 25.49 | 4.54 | 13.33                    | 70.00  | 16.67 |
| 7     | Loss of appetite or changes in appetite   | 15.19 | 4.27 | 18.33                    | 70.00  | 11.67 |
| 8     | Anxiety and depression  | 19.06 | 4.23 | 11.67                    | 68.33  | 20.00 |
| 9     | Digestive problem (constipation)  | 19.01 | 4.21 | 09.67                    | 71.00  | 19.33 |
| 10    | Hair loss (due to stress)   | 19.40 | 3.57 | 16.33                    | 67.67  | 16.00 |
| 11    | Lack of energy  | 23.04 | 4.73 | 14.67                    | 66.00  | 19.33 |
| 12    | Difficulty paying attention   | 20.13 | 3.60 | 21.67                    | 61.33  | 17.00 |
| 13    | Stress and irritation   | 21.52 | 4.85 | 14.67                    | 67.67  | 17.67 |
| 14    | Minute injuries (e.g. Needle stick injuries)  | 24.67 | 3.17 | 13.00                    | 71.00  | 16.00 |
| 15    | Skin allergy e.g. irritation (due to use of chemicals)  | 21.74 | 4.96 | 12.67                    | 67.33  | 20.00 |
| 16    | Ear pain due to prolonged exposure to air condition   | 21.69 | 6.03 | 18.33                    | 70.00  | 11.67 |
| 17    | Breathing difficulties due to excessive cold (air-conditioning)   | 22.07 | 2.21 | 13.33                    | 67.33  | 19.33 |
| 18    | Sleep disorder (due to long working hours and shift work)   | 20.40 | 3.57 | 16.00                    | 67.33  | 16.67 |
| 19    | Menstrual irregularities (due to long working hours and irregular shift work)                                 | 22.04 | 4.73 | 23.33                    | 55.00  | 21.67 |
| 20    | Low spirit  | 19.17 | 3.17 | 17.33                    | 62.67  | 20.00 |
| 21    | Appendicitis  | 22.74 | 4.96 | 11.33                    | 71.00  | 17.67 |
| 22    | Tuberculosis and other respiratory infection  | 20.37 | 3.60 | 17.67                    | 63.33  | 17.00 |
| 23    | Hepatitis B   | 08.52 | 1.85 | 14.00                    | 73.67  | 12.33 |
| 24    | Varicose vein   | 06.04 | 0.73 | 12.33                    | 68.33  | 17.33 |

## AN ANALYSIS OF FINANCIAL EFFICIENCY IN INDIAN MANUFACTURING: ROLE OF INPUT AND OUTPUT VARIABLES

Shaik Saleem ★ M. Srinivasa Reddy★★

*Financial performance evaluation is a central focus for any entity, such that areas needed to improve can be identified and necessary measures can be taken to avoid huge losses. Global competition is making businesses to go for advanced measures of performance rather than depending on traditional performance measurements like financial ratios. Data envelopment analysis is the widely used technique to assess the efficiency level. The major purpose of this paper is to analyze the influence of input and output variables on the efficiency score. Overall technical, pure technical, scale and super efficiency has been determined for the ten sub-sectors in Indian manufacturing based on financial information for the period 2009-10 to 2013-14. Study incorporates two different set of input and output variables to determine various efficiency score. It is found in the study that there is a significant difference in the efficiency score for some sub-sectors measured using these two different set of input and output variables throughout the period of study. Further, study also highlights that ranking order of sub-sectors based on efficiency score differ significantly for these two set of input and output variables. Thus, this study highlights the role and importance of selection of input and output variables for the determination of efficiency using data envelopment analysis.*

In the initial developmental stage of any country, agricultural sector plays an important and crucial role; with the passage of the time it is necessary to shift from agricultural activities to other to seek the status of developed nation. For any country to become a developed nation there is no substitution to the development of the manufacturing sector (Kaldor, 1967). It has been argued these days that service sector contributes more for the economic growth than the manufacturing sector. There is no doubt in that and as it is evident that the growth in GDP of service sector is higher than the growth in the GDP of manufacturing sector in India. Because service sector shares the major contribution to GDP in India, hence it has been considered as the engine of growth for Indian economy. No doubt service sector plays an important role in growth of an economy but considering it as engine of growth for an economy is not appropriate. The rationale behind it is the establishment of services is much easier and can be easily shifted from one place to another, but this is not that easy with manufacturing sector. Today the political and other factors are good in India making easy for service sector to operate, if conditions get changed then these service companies may shift their business from India to some other countries specifically IT and ITES. Further, manufacturing sector is force multiplier in nature, as it creates demand for the products and services of agricultural and service sector. Keeping this in view it can be justified that it is manufacturing sector the real engine of growth of any

economy. There is a need to boost the manufacturing sector of India, which is possible by permitting many foreign players and encouraging domestic players to establish their manufacturing unit in India. Corporate decision are mostly affected by the industry specific factor, it is only for few dominant players the firm-specific factors matter more than the industry specific factors, or it is believed that organizational performance is purely dependent on firm-specific factor. But for most of the non-dominant players, the industry effect turns out to be more important for performance than firm-specific factors (Hawawini et.al., 2000). Thus, assessing financial performance of manufacturing sector of India assumes importance for corporate decision.

Financial performance evaluation is a central focus for any entity, such that areas needed to improve can be identified and necessary measures can be taken to avoid huge losses. Further, it helps in developing various strategies to be more competitive. Financial performance can be measured in many ways; financial ratios are the common and widely used tool to assess the financial performance of any entity. With the developments and increased competition, there is **demand for more comprehensive measures of financial**

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performance making decision-makers to incorporate more of econometric and mathematical models. Nowadays, determination of efficiency level is the prime concern in measurement of financial performance.

Data envelopment analysis is the popular mathematical method of determining the relative efficiency and widely used tool in many fields of study like engineering, economics, biology etc. DEA is a non-parametric and linear programming based tool for measuring efficiency among various Decision Making Units (DMUs) introduced by Charnes, Cooper and Rhodes in the year 1978. The major reason for widely using the DEA as tool of measuring efficiency is that it generates the efficiency score for DMU based on the multiple inputs and outputs. The efficiency score differentiates the efficient DMUs from the inefficient ones. The efficiency score is generated based on the inputs and output variables considered. Thus, input and output variables affect the efficiency score and proper care is to be taken while selecting the input and output variables. In this context an attempt is made to understand the role of input and output variable in measuring financial efficiency of various sub-sectors in Indian manufacturing sector.

## I. Review of Literature

There are many studies carried on assessing financial performance of manufacturing companies' ratios at national and international level. Further, most of the studies are carried out for particular industry like automobile, iron and steel, cement etc. Many studies used financial ratios as tool of analysis and compared the performance of manufacturing companies in terms of liquidity, efficiency, solvency and profitability. Ray (2011) assessed the profitability, operational efficiency, current assets efficiency and liquidity position of Indian Paper and Paper Products companies for the period 2000-01 to 2008-09. Meenakshi Anand (2014) assessed the financial performance of textile companies in India using financial ratios and found that financial position of textiles companies is sound in terms of liquidity and solvency. Kumar and Bhatia (2014) measured the financial performance of two major automobile companies of Indian origin through financial ratios and found significant difference in their performance for solvency and efficacy of utilizing the assets. S.Vanitha and Dr.M.Selvam (2007) made a study on financial performance of Indian manufacturing companies during pre and post merges. In their study they highlighted corporate restructuring, financial performance and ratio analysis. Especially corporate restructuring has become a major component in the financial and economic environment all over the world. Indian manufacturing

companies have competition from both domestic and also at international level. Lot of Indian manufacturing companies which have undergone mergers and acquisitions clearly indicate that the overall financial performance of merged companies were not significantly different. It was possible for the merged firms to turn around successfully in due course. T.S.Devaraja (2009) analyzed the financial performance of the sugar industry in Karnataka and also provided up-to-date information in a comprehensive way, dealing with all practical aspects and describes as briefly as possible with the help of financial data.

Some studies used advanced statistical tools in relation to financial ratios, Chandrasekeran et.al., (2013) classified companies of various industries into three groups namely H-Class (High performance), M-Class (Moderate performance) and L-Class (Low performance) in terms of financial ratios using data mining and perceptual map techniques.

However, there are few studies assessed the financial performance of manufacturing companies using data envelopment analysis. Uday Kumar (2013) assessed the performance in terms of efficiency for loomsheds in Indian Weaving industry. It is found in their study that overall efficiency in weaving is affected by technical inefficiency. Further, power and fuel is the major cause of inefficiency. Izah Mohd Tahir and Mehran Ali Memon (2011) assessed efficiency of top manufacturing companies in Pakistan and found that overall technical efficiency varies from 0.64 to 0.99 and only one company found efficient under CCR method.

There are only few studies carried out at sectoral level based on aggregated financial data for various manufacturing industries. Dilip (2013) used financial ratios and classified Indian manufacturing industries into four groups with respect to profitability, operating management efficiency, liquidity etc. Saleem and Reddy (2015a) assessed and ranked ten sub-sectors of Indian manufacturing sector using data envelopment analysis and cross efficiency. Saleem & Reddy (2015b) classified 52 manufacturing industries into four groups stars, cash cows, question marks and dogs based on the scale efficiency and profitability.

From the above review it is clear that there are good numbers of studies assessing the financial performance using either financial ratios or data envelopment analysis or both. However, there is dearth of study comparing the financial performance based in terms of efficiency with respect to the change in the input and output model. There are limited studies at international level and national level which

highlights the discrepancy in the results due to the model adopted, in particular at sectoral level. Thus, the present study is taken to compare the differences in the results obtained using two different model of assessing the financial efficiency.

### Research Objectives

The major purpose of this study is to examine the effect of the changes in the input and output variables on the efficiency score. Following are the specific objectives of the study.

1. To compare the efficiency score of sub-sectors obtained using two different combinations of input and output variables.
2. To rank the sub-sectors in accordance to their efficiency obtained based on two different combinations of input and output variables.
3. To investigate the difference in the ranking of sub-sectors for the two different combinations of input and output variables.

### Research Hypothesis

$H_{o1}$ : The efficiency scores obtained do not differ significantly for both the combination of input and output variables.

$H_{o2}$ : There is no difference in the ranking pattern of sub-sectors for the two different combinations of input and output variables.

## II. Research Design & Methods

### Data Source:

The purpose of the present study is to examine the efficiency in the manufacturing sector of India based on financial information. For this purpose financial statements of ten sub-sectors in manufacturing namely, food & agro products, textiles industry, chemicals & chemical products, consumer goods, construction materials, metals & metal products, machinery, transport equipment, miscellaneous manufacturing and diversified industry from 2009-10 to 2013-14 were obtained from CMIE Industry Outlook database.

### Mathematical Models:

Charnes, Cooper, and Rhodes (1978) were the first to propose the DEA methodology as an evaluation tool for decision units. DEA has been applied successfully as a performance evaluation tool in many fields including

manufacturing, school, banks, pharmacies, small business development centers, and nursing home chains. DEA has been recognized as an excellent method for analyzing performance and modeling organizations. It measures the relative efficiency of peer units when multiple inputs and outputs are present and generates an efficiency score for each unit, relative to a reference technology based on the sample of efficient units.

The present study incorporated output-oriented CCR (Charnes, Cooper and Rhodes) Constant Returns to Scale Model and BCC (Banker, Charnes, and Cooper) Variable Returns to Scale Model to determine overall technical, pure technical and scale efficiency.

| Envelopment model  |  |
|--|--|
| $\max \phi + \varepsilon \left( \sum_{i=1}^m s_i^- + \sum_{r=1}^s s_r^+ \right)$ |  |
| subject to   |  |
| $\sum_{j=1}^n x_{ij} \lambda_j + s_i^- = x_{io} \quad i = 1, 2, \dots, m;$       |  |
| $\sum_{j=1}^n y_{rj} \lambda_j - s_r^+ = \phi y_{ro} \quad r = 1, 2, \dots, s;$  |  |
| $\lambda_j \geq 0 \quad j = 1, 2, \dots, n.$                                     |  |

If the constraint  $\sum_{j=1}^n \lambda_j = 1$  is adjoined, they are known as BCC (Banker, Charnes, Cooper, 1984) models.

To determine the most efficient sector Super-Efficiency model developed by Andersen and Petersen (1993) was adopted. Super-efficiency refers to a situation when the DMU under evaluation is removed from the reference set. In general, the super-efficiency models work well under the assumption of constant returns to scale (CRS), but become infeasible for certain DMUs under the assumption of variable returns to scale (VRS).

Maximize:  $E_j = \sum_{a=1}^n v_{aj} Y_{aj}$

Subject to the constraints:  $\sum_{b=1}^m u_{bj} X_{bj}$

$$\sum_{a=1}^n v_{as} Y_{as} \leq \sum_{b=1}^m u_{bs} X_{bs}$$

$v_{aj}, u_{bj} > 0$  for all a, b, and j.

Input and Output Variables to Determine Efficiency Score:

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In all envelopment analysis, careful attention should be paid to the choice of inputs and outputs. The estimation of technical efficiency requires the careful choice of the sample size as well as the number of factors (number of inputs plus the number of outputs). Any DEA study requires the careful selection of inputs and outputs. This is due to the fact that the distribution of efficiency is likely to be affected by the definition of outputs and the number of inputs and outputs included (Magnussen, 1996). However, the fact that DEA operates more powerfully when the number of DMUs exceeds the number of the combined total of inputs and outputs by at least twice (Drake and Howcroft, 1994). Based on the review of past studies, in the present study two different combinations of input and output variables were used. Table 1 shows the combination of input and output variables.

Statistical Tools:

In the present study statistical tool like Rank correlation and t-test were used to examine the difference in the ranking of sub-sectors and efficiency scores.

### III. Results and Analysis

Principle of efficiency; where the best possible economic effects (outputs) are attained with as little economic sacrifices as possible (inputs) (Milan et. al., 2009) is the order of the day. An entity is most efficient when it is able to generate greater output with the given inputs. Moreover, an entity can also be called as most efficient when it gives desired output with fewer inputs. Measuring the efficiency of any entity becomes more difficult with its multidimensional structure of inputs and outputs. Data Envelopment Analysis (DEA) is a non-parametric technique for efficiency measurement with multiple outputs and multiple inputs stated in different measurement units. Output-oriented CCR and BCC DEA models are incorporated to determine the overall technical efficiency (OTE), pure technical efficiency (PTE) and scale efficiency (SE) of sub-sectors.

Overall technical efficiency (OTE) is determined based on the CCR model under the assumption of constant returns to scale. Table-2 shows the overall technical efficiency scores of sub sectors from 2009-10 to 2013-14 for the first and second combination of input and output variables. Consumer goods, construction materials and machinery are the three sub-sectors found efficient consistently with the relative OTE score of 1 throughout the period of study for the first combination. Whereas, food and agro products, chemicals and chemical products and construction material are the three sub-sectors found efficient consistently with

the relative OTE score of 1 throughout the period of study for the second combination. Consumer goods and machinery which were found efficient with the first combination of input and output variables were found to be inefficient with the second combination. This shows that changes in the variables will cause changes in the efficiency score. Further, it is evident from the study that food & agro, textile, chemicals & chemical products, consumer goods and miscellaneous manufacturing efficiency score differs for the two different combination of input and output variables at 5 per cent level of significance.

The CRS assumption is only appropriate when all entities operate at an optimal scale. Constraints in the operating environment, for instance, imperfect competition, financial and human resource constraints, amongst other factors, may cause an entity to operate at non-optimal scale. Banker et.al. (1984) suggest an extension of the CRS DEA model to provide for Variable Returns to Scale (VRS) situations. The use of the CRS specification when all sectors are not operating at the optimal scale will result in a measure of technical efficiency which is confounded by scale efficiency. The use of the VRS DEA specification permits the calculation of technical efficiency (TE) devoid of these scale efficiency (SE) effects.

Data envelopment analysis BCC output oriented model under the assumption variable returns to scale used to determine the pure technical efficiency (PTE) of the sub-sectors. In comparison to OTE in Table-2 some more sub-sectors found efficient consistently from 2009-10 to 2013-14 with relative PTE score of 1 for both the combinations. Table-3 shows that food & agro products found inefficient consistently through the period of the study for the first combination of input and output variables. Consumer goods found inefficient for the years 2009-10, 2011-12 and 2013-14 for the second combination. Machinery sector found inefficient for the years 2009-10, 2010-11 and 2013-14 for the second combination of input and output variables. Textiles found inefficient consistently throughout the period of the study for both the combinations. Only two sub-sectors namely food & agro products and textiles efficiency score differ significantly for the both the combinations at 5 per cent level of efficiency.

If there is a difference in the two technical efficiency scores (OTE and PTE) for a particular DMU, then this indicates that the DMU has scale inefficiency, and that the scale inefficiency can be calculated from the difference between VRS technical efficiency score and the CRS technical efficiency score. The scale efficiency measures the

divergence between the efficiency rating under CRS and VRS technology assumptions. SE is ratio OTE to PTE scores. The SE analysis shows how optimal individual DMUs use their scales. SE score of one indicates the DMU is operating at optimal scale and less than one indicates DMU is either too small or too big relative to its optimum size.

Table-4 shows the relative scale efficiency of the sub-sectors from 2009-10 to 2013-14. Consumer goods, construction materials and machinery are the three sub-sectors found efficient consistently throughout the period of study for the first combination of input and output variables. Food & agro products, chemicals & chemical products and construction materials found efficient consistently throughout the period of the study for the second combination. Metals & metal products found efficient for all the years except 2013-14 for the second combination. Scale efficiency score for food & agro products, chemicals & chemical products, consumer goods, and miscellaneous manufacturing differ significantly for the both the combinations at 5 per cent level of significance.

Data Envelopment Analysis classifies the DMUs into efficient and inefficient groups. It is possible to rank the DMUs of inefficient groups but more difficult to rank the DMUs of efficient group as the efficiency score for all the efficient DMUs is same i.e., 1. There are different methods to rank the efficient DMUs in DEA, in practice, decision makers often need to confirm a most effective and complete efficiency ranking in a given a group of DMUs, in order to make more clear and accurate judgment and choice. Super-efficiency is the most well known, most widely applied and researched ranking method in DEA.

Table-5 shows the super efficiency scores of sub-sectors from 2009-10 to 2013-14 and table-6 shows the ranking of sub-sectors based on super efficiency score for both the combinations. Construction materials has the highest efficiency score and most efficient sub-sector for 2009-10 and 2010-11 for the first combination, and has highest efficiency score and most efficient sub-sector for the all the years except 2011-12 for the second combination. Consumer goods has highest efficiency scores and is the most efficient sub-sector for 2012-13 and 2013-14 for the first combinations and for the second combination is comparatively low, even witnessed the least efficiency score for the year 2011-12. The super efficiency scores differ significantly at 5 per cent level of significance for food & agro products, textiles, chemicals & chemical products, consumer goods, machinery and miscellaneous

manufacturing.

Sub-sectors can be ranked based on the super efficiency score, highest the super efficiency score sub-sector is ranked as first and lowest the score sub-sector is ranked last. However, it is clear from the table-7 that ranking of sub-sectors is different for both the combinations. Further, table-7 shows the Spearman rank correlation between the year wise ranking orders of sub-sectors for both the combination and it was found that ranking pattern differs for both the combinations as the correlation values are less and significant at 5 per cent level of significance. Thus, the changes in the input and output variables significantly affect the efficiency score of sub-sectors.

#### IV. Conclusion

Manufacturing sector plays an important role in the economic development of the nation. Private and foreign players only can contribute for the significant growth of manufacturing sector in any nation like India. Thus, overall assessment of manufacturing sector based on financial information may help these players to strategic decision. However, the method or tools used for measuring the performance is important and affects the strategic decisions. This study focuses particularly on determination of efficiency based on financial information for the aggregated data at sectoral level for Indian manufacturing. Study takes into consideration two set of input and output variables to see the impact of the changes in the input and output variable over the efficiency. Study highlights that there is a significant change in the efficiency score due to changes in input and output variables i.e., the efficient entity may turned out to be inefficient. Further, ranking order of most efficient to least efficient may also get change. Thus, it is essential to understand that efficiency score obtained through data envelopment analysis is purely affected by the selection of input and output variables. Therefore, proper care is to be taken while selecting the input and output variables to determine the efficiency.

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**Table 1: Input and Output Variables**

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**Table 2: Overall Technical Efficiency Score from 2009-10 to 2013-14**

| Sub-Sector                    | First Combination |         |         |         |         | Second Combination |         |         |         |         | t-value | Result |
|-------------------------------|-------------------|---------|---------|---------|---------|--------------------|---------|---------|---------|---------|---------|--------|
|                               | 2009-10           | 2010-11 | 2011-12 | 2012-13 | 2013-14 | 2009-10            | 2010-11 | 2011-12 | 2012-13 | 2013-14 |         |        |
| Food and Agro Products        | 0.950             | 0.938   | 0.944   | 0.955   | 0.972   | 1.000              | 1.000   | 1.000   | 1.000   | 1.000   | -8.31   | Sig    |
| Textiles Industry             | 0.890             | 0.913   | 0.956   | 0.934   | 0.965   | 0.837              | 0.815   | 0.901   | 0.882   | 0.882   | 3.23    | Sig    |
| Chemicals & Chemical Products | 0.963             | 0.944   | 0.941   | 0.947   | 0.953   | 1.000              | 1.000   | 1.000   | 1.000   | 1.000   | -12.94  | Sig    |
| Consumer Goods                | 1.000             | 1.000   | 1.000   | 1.000   | 1.000   | 0.889              | 0.882   | 0.896   | 0.986   | 0.891   | 4.71    | Sig    |
| Construction Materials        | 1.000             | 1.000   | 1.000   | 1.000   | 1.000   | 1.000              | 1.000   | 1.000   | 1.000   | 1.000   | Nd      | Nd     |
| Metals & Metal Products       | 0.975             | 0.987   | 0.987   | 0.982   | 0.977   | 1.000              | 1.000   | 1.000   | 1.000   | 0.967   | -1.65   | Insig  |
| Machinery                     | 1.000             | 1.000   | 1.000   | 1.000   | 1.000   | 0.967              | 0.923   | 1.000   | 1.000   | 0.990   | 1.63    | Insig  |
| Transport Equipment           | 0.937             | 0.975   | 0.951   | 0.971   | 0.971   | 0.913              | 1.000   | 0.946   | 0.952   | 0.971   | 0.29    | Insig  |
| Misc. Manufacturing           | 0.921             | 0.958   | 1.000   | 0.957   | 0.952   | 0.884              | 0.890   | 0.941   | 0.937   | 0.898   | 2.73    | Sig    |
| Diversified                   | 0.986             | 0.974   | 0.963   | 0.963   | 0.991   | 0.972              | 0.867   | 0.971   | 0.994   | 0.980   | 0.79    | Insig  |

Source: Author's Calculations

Note: 5 Per cent Level of Significance

**Table 3: Pure Technical Efficiency Score from 2009-10 to 2013-14**

| Sub-Sector                    | First Combination |         |         |         |         | Second Combination |         |         |         |         | t-value | Result |
|-------------------------------|-------------------|---------|---------|---------|---------|--------------------|---------|---------|---------|---------|---------|--------|
|                               | 2009-10           | 2010-11 | 2011-12 | 2012-13 | 2013-14 | 2009-10            | 2010-11 | 2011-12 | 2012-13 | 2013-14 |         |        |
| Food and Agro Products        | 0.960             | 0.974   | 0.952   | 0.963   | 0.996   | 1.000              | 1.000   | 1.000   | 1.000   | 1.000   | -4.07   | Sig    |
| Textiles Industry             | 0.899             | 0.917   | 0.962   | 0.936   | 0.965   | 0.852              | 0.881   | 0.911   | 0.884   | 0.893   | 3.22    | Sig    |
| Chemicals & Chemical Products | 1.000             | 1.000   | 1.000   | 1.000   | 1.000   | 1.000              | 1.000   | 1.000   | 1.000   | 1.000   | Nd      | Nd     |
| Consumer Goods                | 1.000             | 1.000   | 1.000   | 1.000   | 1.000   | 0.935              | 1.000   | 0.989   | 1.000   | 0.952   | 1.88    | Insig  |
| Construction Materials        | 1.000             | 1.000   | 1.000   | 1.000   | 1.000   | 1.000              | 1.000   | 1.000   | 1.000   | 1.000   | Nd      | Nd     |
| Metals & Metal Products       | 1.000             | 1.000   | 1.000   | 1.000   | 1.000   | 1.000              | 1.000   | 1.000   | 1.000   | 1.000   | Nd      | Nd     |
| Machinery                     | 1.000             | 1.000   | 1.000   | 1.000   | 1.000   | 0.968              | 0.932   | 1.000   | 1.000   | 0.991   | 1.67    | Insig  |
| Transport Equipment           | 0.949             | 1.000   | 0.977   | 1.000   | 1.000   | 0.925              | 1.000   | 0.955   | 0.965   | 1.000   | 0.92    | Insig  |
| Misc. Manufacturing           | 1.000             | 1.000   | 1.000   | 1.000   | 1.000   | 1.000              | 1.000   | 1.000   | 1.000   | 1.000   | Nd      | Nd     |
| Diversified                   | 1.000             | 1.000   | 0.982   | 1.000   | 1.000   | 1.000              | 0.992   | 1.000   | 1.000   | 1.000   | -0.52   | Insig  |

Source: Author's Calculations

Note: 5 Per cent Level of Significance

**Table 4: Scale Efficiency Score from 2009-10 to 2013-14**

| Sub-Sector                    | First Combination |         |         |         |         | Second Combination |         |         |         |         | t-value | Result |
|-------------------------------|-------------------|---------|---------|---------|---------|--------------------|---------|---------|---------|---------|---------|--------|
|                               | 2009-10           | 2010-11 | 2011-12 | 2012-13 | 2013-14 | 2009-10            | 2010-11 | 2011-12 | 2012-13 | 2013-14 |         |        |
| Food and Agro Products        | 0.990             | 0.963   | 0.992   | 0.992   | 0.976   | 1.000              | 1.000   | 1.000   | 1.000   | 1.000   | -3.12   | Sig    |
| Textiles Industry             | 0.990             | 0.996   | 0.994   | 0.998   | 1.000   | 0.982              | 0.926   | 0.989   | 0.998   | 0.988   | 1.47    | Insig  |
| Chemicals & Chemical Products | 0.963             | 0.944   | 0.941   | 0.947   | 0.953   | 1.000              | 1.000   | 1.000   | 1.000   | 1.000   | -12.94  | Sig    |
| Consumer Goods                | 1.000             | 1.000   | 1.000   | 1.000   | 1.000   | 0.951              | 0.882   | 0.905   | 0.986   | 0.936   | 3.78    | Sig    |
| Construction Materials        | 1.000             | 1.000   | 1.000   | 1.000   | 1.000   | 1.000              | 1.000   | 1.000   | 1.000   | 1.000   | Nd      | Nd     |
| Metals & Metal Products       | 0.975             | 0.987   | 0.987   | 0.982   | 0.977   | 1.000              | 1.000   | 1.000   | 1.000   | 0.967   | -1.65   | Insig  |
| Machinery                     | 1.000             | 1.000   | 1.000   | 1.000   | 1.000   | 0.999              | 0.991   | 1.000   | 1.000   | 0.999   | 1.21    | Insig  |
| Transport Equipment           | 0.987             | 0.975   | 0.973   | 0.971   | 0.971   | 0.987              | 1.000   | 0.990   | 0.987   | 0.971   | -2.01   | Insig  |
| Misc. Manufacturing           | 0.921             | 0.958   | 1.000   | 0.957   | 0.952   | 0.884              | 0.890   | 0.941   | 0.937   | 0.898   | 2.73    | Sig    |
| Diversified                   | 0.986             | 0.974   | 0.981   | 0.963   | 0.991   | 0.972              | 0.874   | 0.971   | 0.994   | 0.980   | 0.95    | Insig  |

**Table 5: Super Efficiency Score from 2009-10 to 2013-14**

| Sub-Sector                    | First Combination |         |         |         |         | Second Combination |         |         |         |         | t-value | Result |
|-------------------------------|-------------------|---------|---------|---------|---------|--------------------|---------|---------|---------|---------|---------|--------|
|                               | 2009-10           | 2010-11 | 2011-12 | 2012-13 | 2013-14 | 2009-10            | 2010-11 | 2011-12 | 2012-13 | 2013-14 |         |        |
| Food and Agro Products        | 0.950             | 0.938   | 0.944   | 0.955   | 0.972   | 1.022              | 1.007   | 1.036   | 1.028   | 1.133   | -4.04   | Sig    |
| Textiles Industry             | 0.890             | 0.913   | 0.956   | 0.934   | 0.965   | 0.837              | 0.815   | 0.901   | 0.882   | 0.882   | 3.21    | Sig    |
| Chemicals & Chemical Products | 0.963             | 0.944   | 0.941   | 0.947   | 0.953   | 1.581              | 1.250   | 1.293   | 1.501   | 1.558   | -7.05   | Sig    |
| Consumer Goods                | 1.030             | 1.174   | 1.243   | 1.504   | 1.753   | 0.889              | 0.882   | 0.896   | 0.986   | 0.891   | 3.32    | Sig    |
| Construction Materials        | 1.800             | 1.526   | 1.022   | 1.213   | 1.508   | 2.445              | 2.006   | 1.284   | 1.506   | 2.046   | -1.79   | Insig  |
| Metals & Metal Products       | 0.975             | 0.987   | 0.987   | 0.982   | 0.977   | 1.234              | 1.349   | 1.114   | 1.051   | 0.967   | -2.39   | Insig  |
| Machinery                     | 1.138             | 1.045   | 1.360   | 1.108   | 1.019   | 0.967              | 0.923   | 1.038   | 1.074   | 0.990   | 2.06    | Sig    |
| Transport Equipment           | 0.937             | 0.975   | 0.951   | 0.971   | 0.971   | 0.913              | 1.090   | 0.946   | 0.952   | 0.971   | -0.42   | Insig  |
| Misc. Manufacturing           | 0.921             | 0.958   | 1.014   | 0.957   | 0.952   | 0.884              | 0.890   | 0.941   | 0.937   | 0.898   | 2.61    | Sig    |
| Diversified                   | 0.986             | 0.974   | 0.963   | 0.963   | 0.991   | 0.972              | 0.867   | 0.971   | 0.994   | 0.980   | 0.79    | Insig  |

**Table 6: Ranking of Sub-Sectors based on Super Efficiency Score from 2009-10 to 2013-14**

| Sub-Sector                    | First Combination |       |       |       |       | Second Combination |       |       |       |       |
|-------------------------------|-------------------|-------|-------|-------|-------|--------------------|-------|-------|-------|-------|
|                               | 09-10             | 10-11 | 11-12 | 12-13 | 13-14 | 09-10              | 10-11 | 11-12 | 12-13 | 13-14 |
| Food and Agro Products        | 7                 | 9     | 9     | 8     | 6     | 4                  | 5     | 5     | 5     | 3     |
| Textiles Industry             | 10                | 10    | 7     | 10    | 8     | 10                 | 10    | 9     | 10    | 10    |
| Chemicals & Chemical Products | 6                 | 8     | 10    | 9     | 9     | 2                  | 3     | 1     | 2     | 2     |
| Consumer Goods                | 3                 | 2     | 2     | 1     | 1     | 8                  | 8     | 10    | 7     | 9     |
| Construction Materials        | 1                 | 1     | 3     | 2     | 2     | 1                  | 1     | 2     | 1     | 1     |
| Metals & Metal Products       | 5                 | 4     | 5     | 4     | 5     | 3                  | 2     | 3     | 4     | 7     |
| Machinery                     | 2                 | 3     | 1     | 3     | 3     | 6                  | 6     | 4     | 3     | 4     |
| Transport Equipment           | 8                 | 5     | 8     | 5     | 7     | 7                  | 4     | 7     | 8     | 6     |
| Misc. Manufacturing           | 9                 | 7     | 4     | 7     | 10    | 9                  | 7     | 8     | 9     | 8     |
| Diversified                   | 4                 | 6     | 6     | 6     | 4     | 5                  | 9     | 6     | 6     | 5     |

**Table 7: Rank Correlation**

| First & Second Combination | Rank Correlation | Result |
|----------------------------|------------------|--------|
| 2009-10                    | 0.564            | Insig  |
| 2010-11                    | 0.394            | Insig  |
| 2011-12                    | -0.188           | Insig  |
| 2012-13                    | 0.345            | Insig  |
| 2013-14                    | 0.164            | Insig  |

## BRIDGING THE SKILL GAP IN INDIA: CHALLENGES AND SOLUTIONS

Amit Iqbal Srivastava★ Aamir Hasan★★

*The globalised world demands vocational skilled manpower to convert growth opportunities into jobs and stable incomes. With millions of new job-seekers entering the job market every year, vocational skill development has become one of India's urgent priorities. Skill development is one of the essential ingredients for India's future economic growth as the country transforms into a diversified and internationally-competitive economy. Skill development is going to be the defining element in India's growth story. The present paper attempts to study the present skill capacity, need of skill development in India, review the skill development policies, challenges for Skill development along with their solutions. The paper studied the relationship between education, employment and Skill development. The study also found that both the government and its partner agencies have undertaken various measures/initiatives for the effective implementation of the Skill development system in the country, but there are big challenges which need quick resolution. A survey (random survey) method was employed to elicit primary information from 100 students who took STAR training from different NSDC partners in Lucknow. The findings seek to answer some basic questions. Are the youths being really mobilized to be skilled outside the formal education system? Is the training delivery mechanism good enough to make the students employable? Would the industries be willing to cut down the minimum qualification criteria to promote skill development? A questionnaire based on random sampling, was employed for data collection. Data analysis was accomplished using simple weighted average and percentage method.*

*Keywords: NSDC, Skill Development, Vocational Education*

The education and skill development service sector broadly comprises of school education, higher education, industrial/technical training including vocational training. It should be noted that while, in general, 'skill development' refers to the larger objective of 'equipping an individual with marketable skills', however, in recent times 'skill development' has been largely used in the context of technical/vocational training for the manufacturing/industrial or services sector.

Vocational learning is defined as education, training or learning intended to specifically develop knowledge and skills in learners to make the learner specialized in a specific vocation. There are many higher education programmes which are explicitly vocational including medicine, engineering, law etc, other courses are less vocational, nevertheless, they help students develop analytical, synoptic and presentational skills which are highly valued in the modern economy. The paradigm shift from rote learning to the skill based learning is the need of the hour. Since ages the strength of Indians has been on learning by rote. However in the changing economic environment, it is necessary to focus on improving the skills of the Indian youth and to facilitate this change, one has to move from the traditional brahminical system of learning as it is of limited value in this modern world. Vocational training such as carpentry and plumbing becomes easier if the youth

have experience of how to work with their hands. In this competitive world, training plays an important role in the competent and challenging format of business.

Training is the backbone for the smooth functioning of work which helps in enhancing the quality of work life of employees and organizational development too. Development is a process that leads to both horizontal and vertical advancements in the organization, especially at the managerial level, it is less considered with physical skills and is more concerned with knowledge, values, attitudes and behaviour in addition to specific skills. Hence, development can be said as a continuous process whereas training has specific areas and objectives. So, every organization needs to study the role, importance and advantages of training and its positive impact on development for the growth of the organization.

There are many reasons for studying, especially going for higher education including – naturally – a love of the subject to be studied, and the opportunity to experience a different way of life. Higher education is much more than a production line for work-ready graduates. Some people assume those who support vocational education and training, would oppose academic learning, but one must

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remember there are many paths to success, be it higher education through academics, apprenticeship, continuing education and adult & community learning.

## I. Review of Literature

Vocational education and training is an important component for socio-economic growth of any country. The countries that have adapted to the changing global scenario by upgrading the vocational education and training sector to provide higher and specialized skills are more prosperous as compared to others. India can also learn from their experiences by contextualizing the learning in the Indian context.

Spatial considerations for vocational educational training schools are not the same as conventional schools (Cutshall, 2003). In technical schools, instructional rooms and space design tend to be driven by the highly-specialized equipment, furnishings, machinery and tools needed to properly instruct students (JISC, 2006; Cutshall, 2003). However, construction and refurbishment decisions are more and more driven by administrator and teacher requests for areas that are flexible, which will allow spaces to be used for multiple purposes and different sized groups; and adaptable, to allow for building renovations or additions in a time- and cost-efficient manner. Vocational educational training facility planning necessitates flexible design with consideration for the future and accompanying changes to pedagogic approaches and changes in labor market demands (Wolff, 2002; JISC, 2006). For the learning environment to be effective, the design of the space must be coordinated with user needs and related activities, while maintaining physical, technological and spatial flexibility. Indeed, Jamieson (2000) who examines space from the teacher perspective notes that the physical environment will influence how teachers construct activities. Therefore arguably the less specific the function attributed to the space, the greater the opportunity for teachers to create different instructional settings.

Emphasizing on skill development is a global phenomenon. The skills development legislation and interventions failed in the UK due to various reasons such as: some organizations were exempt from paying skills levies; managers themselves did not receive sufficient training; and complacent training providers failed to encourage and empower themselves or employers to plan for, deliver and sustain workplace skills development. It would seem that the skills levy system creates policies that shift power from training providers and employees onto employers and politicians. (Trowler, 1995:73). Currently, the UK employs

a moderately successful National Vocational Qualifications or NVQ framework to manage national workplace skills development.

(Trowler, 1995)

In West Germany, training providers and managers undergo formal training on the management techniques of training in the 21st century workplace. Most German graduates receive regulated 3-year management skills (Esland, 1991:314-5). Training providers and managers must be competent to deal with action learning, mentoring, self-development, counseling, coaching and facilitation skills. The challenge is to improve employee development, create job satisfaction and treat every human resource as part of the assets of the organization (Dale, 1998:67-9). A recurring challenge is that employees must be encouraged to become competent at learning to learn and be committed to lifelong learning.

Employability is a difficult concept to define succinctly and comprehensively. As Hillage and Pollard (1998) state, it is a term used in a variety of contexts with a range of meanings and can lack clarity and precision as an operational concept. Employability is a difficult concept to define – it is a multi-dimensional concept, and there is a need to distinguish between factors relevant to obtaining a job and factors relevant to the preparation for work (Little, 2001).

From the employers' point of view, employability is the propensity of the graduate to exhibit attributes that employers anticipate will be necessary for the future effective functioning of their organization (Harvey, 1997). Increasingly, graduates need to be more flexible in response to the growing number of career changes experienced through life for many people, because of the increase in short term contracts, part-time work, outsourcing and home-working (Harvey, 2000a). Van der Heijden (1996) has called this new cohort of flexible experts 'flexperts'.

Employment and employability are not the same thing. Being employed means having a job, being employable means having the qualities needed to maintain employment and progress in the workplace

Coopers and Lybrand (1998) define 'employability skills' in terms of four key areas: 1). traditional intellectual skills – e.g. critical evaluation, logical argument; 2). Key skills communication, IT, etc., 3). Personal attributes – motivation, self-reliance and 4). Knowledge of organizations and how they work. There are several synonyms - core, key, generic, personal transferable skills, common, work or employment related skills – this is another of the reasons

why it is difficult to conceptualize what is meant by employability skills. Added to that, 'skills' are often referred to as capabilities, competencies or attributes, levels or learning outcomes, thus compounding the sense of confusion.

The present paper tries to study the biggest challenge before the Skill Development Policy of skilling the Indian youth outside the formal education system and its solution.

### Objective

To study the need of skill development in India

To study the national policy of skill development in India

To improve employability skills of rural youth outside the formal education

## II. Research Design & Methods

### Methodology

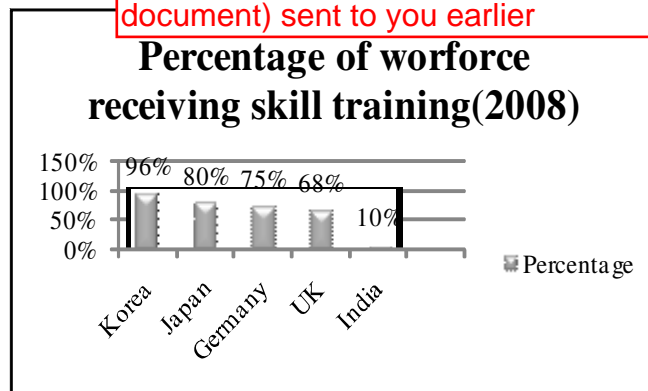
This paper utilizes both primary and secondary method of data collection which include books, journals and use of Internet.

To study the need of skill development in India

India's population is huge at 1.21 billion. It is fast expanding at a rate of 17% and integrating rapidly into the global economy. India is among the 'young' countries in the world, with the proportion of the work force in the age group of 15-59 years, increasing steadily. The government of India has set a target to skill 500 million people by 2022. However, presently only 2% of the total workforce in India have undergone skills training. India's infrastructure is insufficient enough to take proper care of the demands of the ever increasing population. The present resources are going to be no match to the outnumbering population very soon and India will be on the verge of depletion of resources on one hand and the enormous population on the other hand. The rise in the number of the unemployables could be a fact in spite of the rising number of job opportunities. One of the main reasons for this could be lack of skilled and trained manpower. Hence it is necessary to provide training and skill development to both educated and the uneducated sections of the masses in order to control the unemployment issue. India has a great opportunity to meet the future demands of the world, India can become the worldwide sourcing hub for skilled workforce. Presently 80% of the workforce in India (both rural and urban) does not possess any identifiable or marketable skills. Therefore, bridging this gap (through the various skill development initiatives) could make India the global hub for skilled

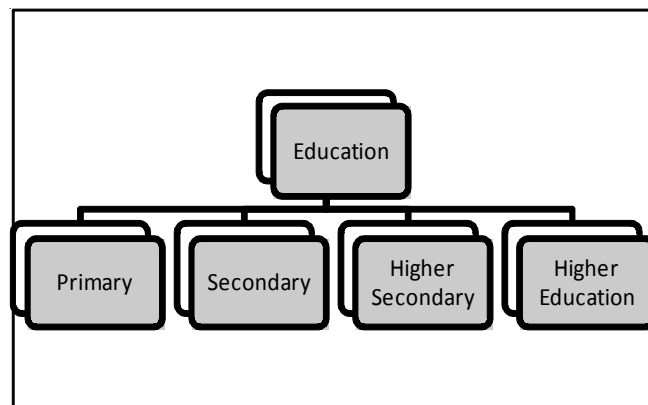
manpower, and also result in a surplus of skilled manpower of approximately 47 million 2020 India lags far behind in imparting skill training as compared to other countries. Only 10% of the total workforce in the country receive some kind of skill training (2% with formal training and 8% with informal training). Further, 80% of the entrants into the workforce do not have the opportunity for skill training.

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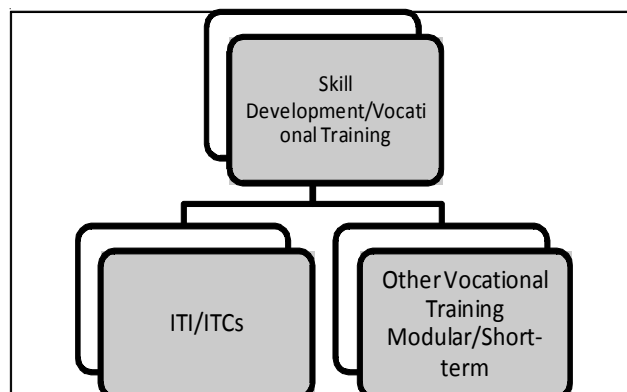
Source: Planning Commission Report (2008)

### Structure of Education in In



Source: Ministry of Human Resource Development

### Structure of Skill Development in India



Source: NSDC

## Current Education Capacity in India

| Category         | Sub Category                        | No. of Institutions |
|------------------|-------------------------------------|---------------------|
| School Education | Pre primary/Pre basic schools       | 67,157              |
|                  | Primary/Junior Basic Schools        | 772,568             |
|                  | Middle Schools                      | 288,493             |
|                  | High Schools                        | 106,024             |
|                  | Higher Secondary Schools            | 53,643              |
| Higher Education | Universities                        | 236                 |
|                  | Deemed Universities                 | 101                 |
|                  | Arts, Commerce & Science Colleges   | 11,698              |
|                  | Engineering & Architecture Colleges | 1,562               |
|                  | Medical/Dental & Pharmacy Colleges  | 2,053               |
|                  | Teachers Training Colleges          | 1,669               |
|                  | Polytechnics                        | 1,274               |
|                  | Management, Law etc                 | 2,513               |

Source: Ministry of Human Resource Development, 2005-06

## Enrollment of Students in India

| Category                   | Sub Category                            | Enrollments        |
|----------------------------|---|--------------------|
| School Education           | Pre primary/Pre basic schools           | 5,264,000          |
|                            | Class 1-V                               | 132,049,000        |
|                            | Class VI-VIII                           | 52,195,000         |
|                            | Class IX-X                              | 24,972,000         |
|                            | Class XI-XII                            | 13,414,000         |
| <b>Total Enrollment</b>    |   | <b>227,894,000</b> |
| <b>Vocational Training</b> | ITI/ITC                                 | <b>1,062,524</b>   |
| Higher Education           | PhD/D.Sc/D.Phil                         | 36,000             |
|                            | MA                                      | 482,000            |
|                            | M.Sc                                    | 230,000            |
|                            | M.Com                                   | 157,000            |
|                            | B.A                                     | 3,728,000          |
|                            | B.Sc                                    | 1,579,000          |
|                            | B.Com                                   | 1,455,000          |
|                            | BE/B.Arch                               | 1,688,000          |
|                            | Medicine/Dentistry/<br>Nursing/Pharmacy | 306,000            |
|                            | B.Ed/BT                                 | 245,000            |
|                            | Open Universities                       | 774,000            |
|                            | Polytechnics                            | 690,000            |
|                            | Law, Management & Others                | 2,974,000          |
|                            | <b>Total Enrollment</b>                 |                    |

Source: Ministry of Human Resource Development, 2005-06

### Findings:

From the above figure the combined technical workforce of ITI/ITC/BE/B/Arch/Polytechnics would be  $(1,062,524 + 1,688,000 + 690,000) = 3,440,524$ , which comes to approximately 3.4 million

## Population Growth in India

India is the second most populous country in the world. According to the planning commission report the population of India is expected to increase from 1029 million to 1400 million during the period 2001-2026 - an increase of 36 percent in twenty-five years at the rate of 1.2 percent annually.

| Indicators                   | 2001   | 2006   | 2011   | 2016   | 2021   | 2026   |
|------------------------------|--------|--------|--------|--------|--------|--------|
| <b>Population (millions)</b> | 1028.6 | 1112.2 | 1192.5 | 1269.0 | 1339.7 | 1399.8 |
| <b>Proportion (millions)</b> |        |        |        |        |        |        |
| <b>0-14</b>                  | 364.6  | 357.0  | 346.9  | 340.3  | 336.9  | 327.0  |
| <b>15-59</b>                 | 593.3  | 671.6  | 747.1  | 810.6  | 859.6  | 899.7  |
| <b>60+</b>                   | 70.7   | 83.6   | 98.5   | 118.1  | 143.2  | 173.2  |

Source: Population Commission, 2011

### Findings:

With expected population of 899.7 million in 2026 of the people who are within 15-59 yrs of age and are considered as the potential workforce, therefore 10 million people are expected to join the workforce. With the current capacity to train 3.4 million people annually, it is expected to train 13 million people annually.

### Share of employment in different sectors

| Year    | GDP Growth Rate | Agriculture | Industry | Services | Total |
|---------|-----------------|-------------|----------|----------|-------|
| 2007-08 | Actual          | 51%         | 20%      | 29%      | 100%  |
| 2011-12 | 9%              | 47%         | 22%      | 31%      | 100%  |
|         | 7%              | 47%         | 22%      | 31%      | 100%  |
|         | 5%              | 48%         | 21%      | 31%      | 100%  |
| 2016-17 | 9%              | 43%         | 23%      | 34%      | 100%  |
|         | 7%              | 44%         | 22%      | 34%      | 100%  |
|         | 5%              | 45%         | 22%      | 33%      | 100%  |
| 2021-22 | 7-9%            | 41%         | 23%      | 36%      | 100%  |

Source: [dcmsme.gov.in/The\\_Challenge\\_of\\_Employment\\_in\\_India.pdf](http://dcmsme.gov.in/The_Challenge_of_Employment_in_India.pdf)

### Findings:

The above data reflects that whatever is the range of growth rate of GDP (5-9%), the percentage of employment in the agriculture sector remains in between 40-50%, however the agriculture industry at present is unable to create the job opportunities, therefore in order to create job opportunities in agriculture or related industries, more emphasis has to be laid on manufacturing or food processing industry where the Make in India initiative of the Indian government could make a difference.

## Employment Opportunities in different sectors

| Sector                    | Employment in 2008 (million) | Employment in 2022 (million) |
|---------------------------|------------------------------|------------------------------|
| Textile & Clothing        | 35.4                         | 61.6                         |
| Building & Construction   | 25                           | 58                           |
| Auto & Auto Components    | 13                           | 48                           |
| RealEstate Services       | 11                           | 25                           |
| Organized Retail          | 0.3                          | 17.6                         |
| BFSI                      | 4.3                          | 8.5                          |
| Gems & Jewellery          | 3.3                          | 8                            |
| IT/ITES                   | 2.2                          | 7.5                          |
| Leather & Leather Goods   | 2.5                          | 7                            |
| Furniture & Furnishings   | 1.4                          | 4.8                          |
| Electronics & IT Hardware | 0.9                          | 4.2                          |

Source: NSDC **Graph is Missing. Please check edited paper sent to earlier**

### Findings:

The above data indicates that there would be huge job opportunities in the Textile and construction sectors, however the research findings indicate that the student don't prefer to work in these sectors. The government, NSDC, training partners and the corporate must ensure to mobilize the students to work in the above mentioned sectors.

### National policy on skill development

The realization of this demographic dividend led to the formulation of the "National Skills Policy" in 2009 which set a target of imparting skills training to 500 million, by 2022. The Prime Minister's National Council on Skill Development is an apex institution for policy direction and review. The Council is at the apex of a three-tier structure and would be concerned with vision setting and laying down core strategies. The Council would be assisted by the National Skill Development Coordination Board chaired by the Deputy Chairman, Planning Commission which will coordinate action for skill development both in the public and the private sector.

The National Skill Development Coordination Board was set up under the chairmanship of the Deputy Chairman of The Planning Commission, on the Public Private Partnership model (PPP)

### Key features of the National Skill Development policy

Scope: The skill development policy includes:

- Institution-based skill development, including ITIs/ vocational schools/technical schools/ polytechnics/ professional colleges, etc.

- Learning initiatives of sectoral skill development organized by different ministries/ departments
- Formal and informal apprenticeships and other types of training by enterprises
- Training for self-employment/entrepreneurial development
- Adult learning, retraining of retired or retiring employees and lifelong learning
- Non-formal training, including training by civil society organizations
- E-learning, web-based learning and distance learning

### Institutional framework:

The policy lays down three the institutional framework comprising:

- Prime Minister's National Council on Skill Development
- National Skill Development Co-ordination Board
- National Skill Development Corporation (NSDC)
- National Council for Vocational Training (NCVT)

The secretaries of Human Resource Development (MHRD), Ministry of Labour and Employment, Ministry of Rural Development, Ministry of Housing and Urban Poverty Alleviation and Ministry of Finance are members of The National Skill Development Coordination Board.

There are several challenges that are faced by the government in imparting quality skill training to the youth of the country. These challenges include:

- Increasing capacity and capability of the existing system to ensure equitable access for all
- Maintaining quality and relevance
- Creating effective convergence between school education and the government's skill development efforts
- Creating institutional mechanism for research development quality assurance, examinations and certification, affiliations and accreditation
- Mobilizing adequate investment for financing skill development

The policy states the roles and responsibilities of stakeholders, which include the government, industry, trade unions, local governments, civil society institutions and all skill providers promotes the expansion of outreach, equity and access under the skill development initiative: The skill development initiative requires that there is a considerable amount of capacity expansion, innovative delivery

approaches and PPPs. The policy provides for equal access of skill development for women, disadvantaged groups (SC, ST and OBCs), minorities, disabled persons and economically challenged people.

Lays down standards for quality and relevance: The policy provides for quality standards to achieve global competitiveness. It lays down standards for:

- Quality assurance (based on validation of qualifications for ensuring that qualifications
- Reflect market needs, validation of training process, accreditation of training providers/institutions, research and information)
- Quality of infrastructure
- Quality of trainer
- National vocational qualification framework
- Labor market information systems and HR planning mechanisms
- Emphasizes on skill development for the unorganized sector: The policy lays down special emphasis on skill development for the unorganized sector. The policy provides for having a separate institutional mechanism to plan, implement and monitor the skill development for the unorganized sector. It focuses on having target groups within the unorganized sector, literacy and soft skills, recognition of prior learning, and skill development for self-employment.

The National Skills Development Corporation (NSDC)

The National Skill Development Coordination Board has been set up under chairmanship of the Deputy Chairman of The Planning Commission in the Public Private Partnership mode (PPP). It formulates strategies to implement the decisions of the Prime Minister's Council on National Skill Development and also monitors and evaluates the outcomes of the various other schemes and programs for the council.

The Sector Skills Council (SSC) model, which is a National Partnership Organization that brings together academia, industry, labour and the government, has been adopted from the UK, has proved useful in addressing human resource gaps in the country.

Ministry of Skill Development

Under ministry of skill development there are following schemes operational

| Name of the Scheme  | Objective   |
|---|---|
| <b>Pradhan Mantri Kaushal Vikas Yojna</b>                     | Under the scheme, monetary reward would be provided to trainees who are successfully trained, assessed and certified in skill courses run by affiliated training providers.   |
| <b>UDAAN</b>  | The programme aims to provide skills training and enhance the employability of unemployed youth of J&K  |
| <b>STAR(Standard Training assessment &amp; reward) scheme</b> | The National Skill Certification and Monetary Reward Scheme, known as STAR (Standard Training Assessment and Reward), was operational between August 2013 and September 2014. |
| <b>Vocationalization school and higher education</b>          | The trainings conducted in the scheme are based on the National Occupational Standards set by NSDC through its Sector Skill Councils  |

Source: Ministry of Skill Development

NSQF Level:

There are 10 NSQF Levels. The ministry of HRD and National Skill Qualification Framework have different views on the NSQF Level.

The National Skills Qualifications Framework (NSQF) is a competency-based framework that organizes all qualifications according to a series of levels of knowledge, skills and aptitude. These levels, graded from one to ten, are defined in terms of learning outcomes which the learner must possess regardless of whether they are obtained through formal, non-formal or informal learning. NSQF in India was notified on 27th December 2013. All other frameworks, including the NVEQF (National Vocational Educational Qualification Framework) released by the Ministry of HRD, stand superseded by the NSQF. Under NSQF, the learner can acquire the certification for competency needed at any level through formal, non-formal or informal learning. In that sense, the NSQF is a quality assurance framework. Presently, more than 100 countries have, or are in the process of developing national qualification frameworks. According to the National Skill Qualification Framework the Job Role has been mapped to National Skill Qualification Framework which defines the competency level required by Job holder in terms of job complexity and level of supervision required.

According to the National Skill Qualification Committee

| NSQF Level | Job Complexity   | Job Supervision     |
|------------|------------------|---------------------|
| <b>1</b>   | Simplest Job     | Highest Supervision |
| <b>10</b>  | Most Complex Job | Lowest Supervision  |

Source: NSDC

According to the Ministry of Human Resources

| NSQF Level | Academic Equivalent                  | No of Hours |            |
|------------|--------------------------------------|-------------|------------|
|            |                                      | Teaching    | Vocational |
| Level 1    | Class 9 <sup>th</sup>                | 200         | 800        |
| Level 2    | Class 10 <sup>th</sup>               | 250         | 750        |
| Level 3    | Class 11 <sup>th</sup>               | 400         | 600        |
| Level 4    | Class 12 <sup>th</sup>               | 450         | 550        |
| Level 5    | Graduation 1 <sup>st</sup> year      | 550         | 450        |
| Level 6    | Graduation 2 <sup>nd</sup> year      | 600         | 400        |
| Level 7    | Graduation 3 <sup>rd</sup> year      | 750         | 250        |
| Level 8    | Post Graduation 1 <sup>st</sup> year | 800         | 200        |
| Level 9    | Post Graduation 2 <sup>nd</sup> year | 800         | 200        |
| Level 10   | PhD                                  |             |            |

Source: Ministry of Human Resource & Development

### Qualification Pack

Each sector skill council issues a qualification pack which is the curriculum for a particular job role, it certifies a person for a job role. Each qualification pack is broken down into National Occupational Standards (NOS), which describes what an individuals need to know and understand in order to carry out a particular job role or function. They are performance standards that individuals must achieve when carrying out functions in the workplace. Each NOS is broken down into:

Performance criteria: The functional responsibilities

Knowledge & Understanding: Which is further broken down into organizational knowledge(knowledge with reference to the organization) and technical knowledge(domain knowledge)

Skills: Which are further broken down into core/generic skills eg.reading, writing etc and professional skills e.g. decision making, problem solving etc

The qualification packs for the job role have been laid out comprehensively, and these standards are aligned with the needs and requirements of the industry for the job role. However the non-binding nature of the QPs allows training providers to incorporate selective parts. There are also some major issues with what the curriculum finally delivers. This affects the employability of the candidates enrolled in the scheme, and possibly affects job placement and retention rates to a large extent. This paper does not evaluate the quality of the QPs but assumes it to be of a good quality and goes on to check whether this funnel down into the employability and training delivery mechanism

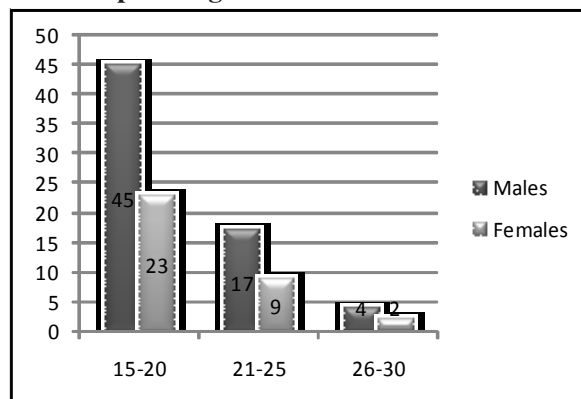
The quality of the training content has been diluted because

target centric nature of the scheme have forced training providers to reduce the course as short as one month. This has major effects on the skills acquired. For instance Accounts Receivable and Payable course of BFSI sector, should have good understanding of basic accounting concepts, and must have good interpersonal skills (the QPs have recorded these requirements accurately and systematically). However such skills, and cannot be gathered and mastered in one month, the ideal training period for such an job should be 3-6 months, along with the job training and even should be higher for the rural youth, keeping in mind the exposure of such youth to the formal education previously. Recruiters generally conduct interviews to test attitude, keenness to learn and most importantly communication and interpersonal skills, as well as fluency in English. This component of soft skills is awarded barely any time or importance in the course, and assessment. More often students take such programs under the influence of incentives

## III. Results & Analysis

Analysis of Data

**Graph 1: Age Distribution of Students**

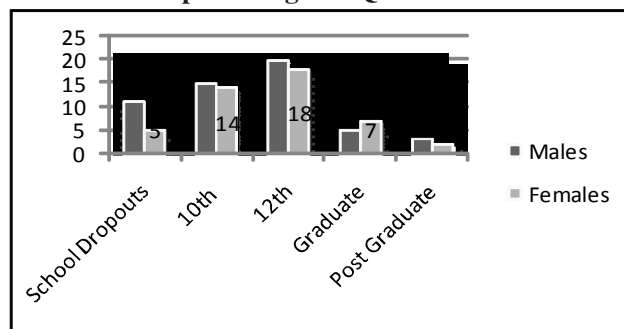


Findings:



Average age of students attending the program is 16 years

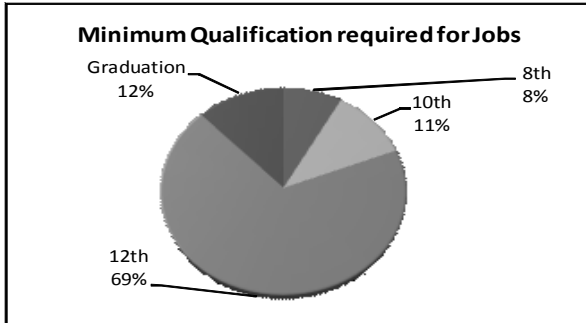
**Graph 2: Highest Qualification**



Findings:

The average qualification of students who attended the program was class 12<sup>th</sup> standards

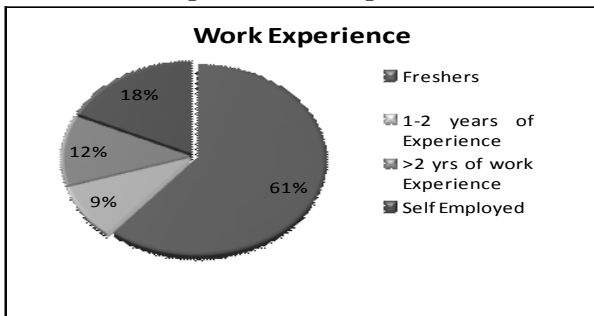
**Graph 3: Minimum qualification required for jobs**



Findings:

69% of the jobs required the students should have cleared class 12<sup>th</sup> as minimum qualification required to do jobs. In order to boost the employment situation in sectors such as construction, automotive etc where there is huge employment opportunities the industries should give weightage to skills in comparison to formal education

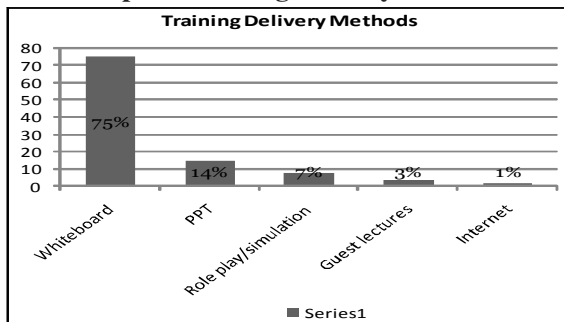
**Graph 4: Work experience**



Findings

61% of the students were freshers, however 18% of the students were self employed, there can be an opportunity for those who are self employed, they can be skilled to generate employment.

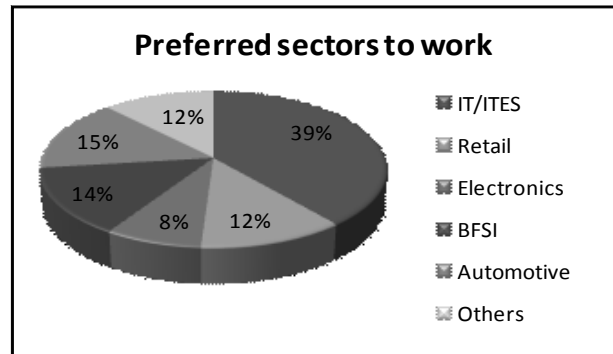
**Graph 6: Training delivery methods**



Findings

75% of the training is being delivered through whiteboard or through classroom lectures. The use of internet in the training delivery method is less than 1%, where government is taking initiative such as digital india drive.

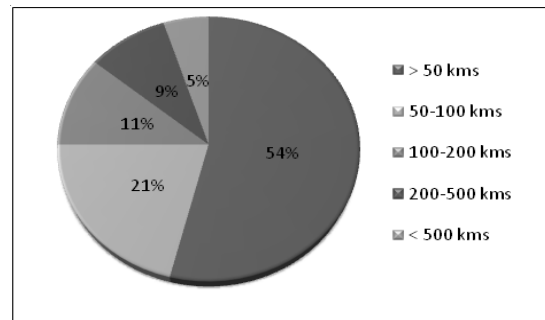
**Graph 7: Preferred sectors to work**



Findings:

39% of the students are willing to work in IT/ITES sector. However the job demand for the IT/ITES sector is going to be approximately 7% by the year 2026. The government, NSDC, Industries and the training partners should work together to mobilize the students to be skilled in sectors such as clothing/textiles, automotive, construction etc, where there is expected to be huge demand in terms of employment.

**Graph 8: Distance students willing to travel for jobs**



Findings:

54% of the students are not willing to travel beyond 50 kilometers for employment. It indicates that the local participation of industries is very important and the designing of the curriculum should be done with the consensus of the local industries to make the students more employable.

Recommendations

The skill India programme aims at providing training and skill development to 500 million youth of India by 2020,

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covering each and every village. Various schemes are also proposed to achieve this objective. The PPP model with minimal government involvement proves to be a more efficient model for skill training in India. At present 31 sector skill council have been set up, which are partially funded by government of India and by the trade specific sector, sector skill council have to work in close association with the industries to identify their requirement. The NSDC training partners should be further strengthened to ensure smooth delivery of the training programme. The government and industry must fasten the process of operationalization of the NSQF to make it mandatory for all jobs in government and the private sector. The mobilization of youth towards priority sectors such as construction is where there is huge employment opportunity. The course durations need to be based on the requirements of the course. Moreover one month is too short a time to effectively skill an individual even for entry-level courses. Course durations even for entry-level jobs need to be of 3- 6 months on an average. Moreover components of internships and on the job training need to be introduced along with greater emphasis on communication skills. Online job portals need to be opened for better placement opportunities and easier tracking of the candidates.

#### IV. Conclusion

This paper has examined the initiatives of Indian government for creating opportunities for Indian youth to develop their skills, and the constraints that challenge them. India adds 13 million people to the workforce every year, less than 2% of the workforce receives any formal training. The Indian workforce is the lowest in the world and a large chunk of existing training infrastructure is irrelevant to industry needs. Today, India faces big challenges to develop the skills of Indian youth. Indian young people fall into two main groups. A tiny fraction of economically well-off middle classes get good education and training leading to well-paid jobs in the organized sector. Meanwhile, the majority of youth from economically and socially disadvantaged groups get very limited education and little access to vocational training. They work in the unorganized sector. Currently there are at least 20 different government bodies in India running skill development programmes with no synergies and considerable duplication of work. The local participation of industries is required to boost employment, because for any skill development effort to succeed, markets and industry need to play a large role in determining courses, curriculum and relevance. To help realize the 'Skill India' dream the government needs to act

as a regulator and not an implementer.

#### Limitations of the Study

Due to lack of time and resources the study was limited to the Lucknow district. The findings may not entirely reflect the views of students of the entire country in general and the results may vary in case the survey is conducted in other parts of the country. Hence, research in other cities and with other students is required to examine the validity and reliability of the findings.

#### Future Research

A possible direction for future research is to review and conduct a similar study in other

districts, or states to discover similarities and differences. Another possible direction for

future research is to examine the other factors such as placement aspect of the scheme to further investigate placement and retention levels of the candidates.

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# A STUDY ON EMPLOYEE ENGAGEMENT AND ITS EFFECT ON JOB PERFORMANCE AND RETENTION IN RAMSOL PVT., LTD., IN CHENNAI

Ramkumar★ Neeraja.B★★

*Employee engagement is the extent to which an employee is committed to their work and their organization and the extent to which this commitment impacts their performance and intent to stay with the organization. Engaged employees are seen to productive members of an organization who are psychologically committed to their role in the organization. They are likely to stay longer in their organization, advocate its products and services and contribute to the overall success of an organization. The organization must work to develop and nurture engagement, which requires a two-way relationship between employer and employee. Thus Employee engagement is a barometer that determines the association of a person with the organization. Employee engagement refers to a situation where all the employees are engaged in their own work and take keen interest in the organization's activities. An engaged employee is one who is focused, enjoys his work and learns something new each day. An engaged employee is satisfied with his work and would never think of quitting his job. He is the one who willingly accepts responsibilities and looks forward towards a long term association with the organization.*

*Keywords: Employee engagement, Performance, Satisfaction, Job, Organization, Commitment, Interest, Goal, Psychology & Relationship*

William Kahn (1990) defines employee engagement as “the harnessing of organization members selves to their work roles; in engagement, people employ and express themselves physically, cognitively, and emotionally during role performances”.

Employee engagement leads to commitment and psychological attachment and reflects in the form of high retention (low attrition) of employees. The level of engagement in employees can be enhanced by identifying its drivers (influential factors) and work on them. The relationship between employee engagement and employee retention is examined in this study. The study finds that the employee retention can be improved by increasing the level of employee engagement and focusing on few non-financial drivers. Those drivers have been analyzed in this study. Employee engagement refers to a situation where all the employees are engaged in their own work and take keen interest in the organization's activities. An engaged employee is one who is focused, enjoys his work and learns something new each day. An engaged employee is satisfied with his work and would never think of quitting his job. He is the one who willingly accepts responsibilities and looks forward towards a long term association with the organization

Need for the Study

- ◆ This study is conducted to know the employee perceptions towards engagement programs which are

to be conducted to assess the effect of engagement in employee job performances and employee retention in Ramsol Pvt.,Ltd., in Chennai.

- ◆ It is also done to know the total percentage of the employees who all are totally committed to their work and are actually supporting in the completion of work more effectively and achieving the organizational goals.
- ◆ This study helps not only to retain valued employees, but also to increase its level of job performance. The study helps to estimate the organization's capacity to manage employee engagement that is closely related to its ability to achieve high performance levels and superior business results.
- ◆ In a consulting firm it's highly impossible for retention of employees, because the growth for employee is limited. But the employee gets an employee engagement for this short period is a great challenge. In human resource (HR) consulting firm it's very important that more attention towards the client should be created.
- ◆ Always the employee engagement programs are done to release the stress created in the minds of people. In a consulting firm like RAMSOL the stress is more as long
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process is involved and there is more chance for negative results. Hence the employee engagements should be encouraged for improving the total productivity and that helps in retention of employees.

#### Objectives of the Study

- To know about the engagement programs practiced in Ramsol.
- To know the views of the employee and their perceptions towards engagement programs.
- To assess the effect of employee engagement in job performances.
- To assess the effect of engagement programs in employee retention.

### I. Review of Literature

Brad Shuck, Thomas G. Reio Jr stated poor workforce engagement can be detrimental to organizations because of the ensuing decrease in employee well-being and productivity. The purpose of the present study was to investigate the degree to which psychological workplace climate was associated with personal accomplishment, depersonalization, emotional exhaustion, and psychological well-being, and whether employee engagement moderated these relations.

A sample of 216 health care employees from the United States, Canada, and Japan completed an online survey. Regression results suggested that psychological workplace climate was significantly related to each outcome variable; engagement moderated relations between workplace climate and each of the four dependent variables. ANOVA results revealed that high engagement group employees demonstrated higher psychological well-being and personal accomplishment, whereas low engagement group employees exhibited higher emotional exhaustion and depersonalization.

Michael Haid, senior vice president, Global Solutions in the article: Employee Engagement- Maximizing Organizational Performance analyzed that engaged employees lead to increased productivity, retention, customer loyalty and profitability. Savvy organizations focus on both the lead and lag indicators of business success, so business leaders need to know about engagement levels in the same way they need to know about other critical management information, such as financial, productivity and customer data. Robust, business-oriented measurement and analysis is required to identify the key drivers of engagement for your

organization. Survey design should be aligned to your organization, your Strategy, your values and your people. Key insights are provided when organizations know whether employees are engaged to both the jobs that they do and the company that they work for. This knowledge enables organizations to predict behavior and its impact on key business metrics. Measurement without action can do more harm than good. Simply surveying for the current engagement level and then doing nothing with that information often leads to employees feeling that they aren't being heard, which in turn can negatively impact morale and trust levels. Identifying and analyzing engagement levels and the drivers of success is the first step. The real challenge is in equipping your business to act and ensuring that change is embedded in your culture so that your workforce remains focused and aligned to the business strategy. An engaged workforce is the key to sustained competitive advantage and accelerated business performance.

Karen Wilson (May 2009) in A Survey of Employee Engagement made a study and the results from this study contributed to the limited empirical research on the topic of employee engagement. Specifically, it contributed the first statistical information about rates of engagement among staff in a human services agency. Because employee engagement is now understood to be a critical component of successful organizational outcomes, it needs to be closely examined in the social work field, if for no other reason that agencies are held increasingly more accountable for outcomes, and funding is often tied to success rates. An engaged staff can contribute significantly to reaching positive outcomes. Therefore, the engagement concept should be at the forefront of social work research and policy implementation.

C. Balakrishnan, Dr. D. Masthan, Dr. V. Chandra (August 2013) in Employee Retention through Employee Engagement - A Study at an Indian International Airport, the present study was conducted when the airport was reeling under the high employee turnover. The study brought out how employee retention can be improved by improving engagement level of employees. There was statistical evidence in the study to confirm that the employee retention can be improved by addressing non-financial drivers of employee engagement like communication, recognition, manager/supervisor support (relationship), work engagement, team work and role clarity. Therefore it has given a very positive message that even without financial expenditure the employee engagement and hence retention can be improved.

The result can be applied as a starting point for further

studies or can be emulated in similar airports or organizations which really require a cost effective way of retention. Limitation of the study is that it has not gone in details to analyze the impact of each drivers separately, instead had a holistic approach. As such future studies can be conducted in two directions: one to find the impact of non-financial drivers on the employee engagement and retention and the other to include financial drivers of employee engagement and have an elaborate study of the impact of engagement drivers on employee engagement and retention.

According to NitinVazirani, employee engagement is the buzz word term for employee communication. It is a positive attitude held by the employees towards the organization and its values. It is rapidly gaining popularity, use and importance in the workplace and impacts organizations in many ways. Employee engagement emphasizes the importance of employee communication on the success of a business. An organization should thus recognize employees, more than any other variable, as powerful contributors to a company's competitive position. Therefore employee engagement should be a continuous process of learning, improvement, measurement and action. We would hence conclude that raising and maintaining employee engagement lies in the hands of an organization and requires a perfect blend of time, effort, commitment and investment to craft a successful endeavor.

Jim Geier, How to Attract and Retain Great People

#### A **Seven**-Step Process

1. Know your business, your customer, and what product you are selling so you can develop a strategy that will make you a successful venture.
2. Determine the people that are the right fit for your business. Without the right people your business will fail.
3. Spend time interviewing. Interviews may seem easy, but you need to really understand their importance. In the end, you only have a couple of hours to get to know someone and determine that they not only have the skills and competencies, but are right fit for the company culture.
4. Don't settle. Just because a job has been open a while, don't rush to fill it. That never works. It will always come back to bite you in the long run. Find the person who is right for the job and is the right fit, and they will help you drive your business success as well as make you look like a genius.

## II. Research Design & Methods

Research Type:

This research uses survey questionnaire method of collecting the data. It is descriptive research type are those, which are concerned with describing the characteristic of a particular individual or of a group, where we cannot control the variable

Research Design:

A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with the economy in procedure.

Research Instrument:

Questionnaire was used to conduct the survey among 70 employees which includes open-ended and closed-ended questions.

Methods of Data Collection:

The primary data is collected through structured questionnaire method. The questions are based on the objectives of the study. The secondary data for this study is collects from records, research papers, magazines and internet sources. There were opened ended and closed ended questions in Likert scale showing agreement or disagreement and rating scale attribute of poor to excellent.

To arrange and interpret the collected data the following statistical tools were used.

- Percentage analysis
- Chi-square analysis

### HYPOTHESIS

#### CHI-SQUARE ANALYSIS:

1. "Relationship between age of the respondent and their motivation level to work towards the organizational goals"

Null hypothesis ( $H_0$ ): There is no significant relationship between the age of the respondent and their motivation level to work towards the organizational goals.

Alternative hypothesis ( $H_1$ ): There is significant relationship between the age of the respondent and their motivation level to work towards the organizational goals.

**Table 1: Observed Table**

| Motivation Level  | Age         |             |             |             |                | Total     |
|-------------------|-------------|-------------|-------------|-------------|----------------|-----------|
|                   | 21-25 years | 26-30 years | 31-35 years | 36-40 years | Above 40 years |           |
| Strongly agree    | 4           | 5           | 8           | 1           | 1              | 19        |
| Agree             | 7           | 12          | 8           | 3           | 3              | 33        |
| Neutral           | 5           | 6           | 2           | 3           | 2              | 18        |
| Disagree          | 0           | 0           | 0           | 0           | 0              | 0         |
| Strongly disagree | 0           | 0           | 0           | 0           | 0              | 0         |
| <b>Total</b>      | <b>16</b>   | <b>23</b>   | <b>18</b>   | <b>7</b>    | <b>6</b>       | <b>70</b> |

FORMULA:

Chi-square analysis:  $\chi^2 = \sum \frac{(O-E)^2}{E}$

$E = \text{ROW TOTAL} * \text{COLUMN TOTAL} / \text{GRAND TOTAL}$

Here, O is the observed frequencies

E is the expected frequencies

**Table 2: Expected Table**

| S.NO | O            | E     | O-E    | O-E <sup>2</sup> | O-E <sup>2</sup> /E |
|------|--------------|-------|--------|------------------|---------------------|
| 1    | 4            | 4.34  | -0.340 | 0.116            | 0.027               |
| 2    | 5            | 6.24  | -1.240 | 1.538            | 0.246               |
| 3    | 8            | 4.88  | 3.120  | 9.734            | 1.995               |
| 4    | 1            | 1.90  | -0.900 | 0.810            | 0.426               |
| 5    | 1            | 1.62  | -0.620 | 0.384            | 0.237               |
| 6    | 7            | 7.54  | -0.540 | 0.292            | 0.039               |
| 7    | 12           | 10.84 | 1.160  | 1.346            | 0.124               |
| 8    | 8            | 8.48  | -0.480 | 0.230            | 0.027               |
| 9    | 3            | 3.30  | -0.300 | 0.090            | 0.027               |
| 10   | 3            | 2.82  | 0.180  | 0.032            | 0.011               |
| 11   | 5            | 4.11  | 0.890  | 0.792            | 0.193               |
| 12   | 6            | 5.91  | 0.090  | 0.008            | 0.001               |
| 13   | 2            | 4.62  | -2.620 | 6.864            | 1.486               |
| 14   | 3            | 1.80  | 1.200  | 1.440            | 0.800               |
| 15   | 2            | 1.54  | 0.460  | 0.212            | 0.138               |
| 16   | 0            | 0.00  | 0.000  | 0.000            | 0.000               |
| 17   | 0            | 0.00  | 0.000  | 0.000            | 0.000               |
| 18   | 0            | 0.00  | 0.000  | 0.000            | 0.000               |
| 19   | 0            | 0.00  | 0.000  | 0.000            | 0.000               |
| 20   | 0            | 0.00  | 0.000  | 0.000            | 0.000               |
| 21   | 0            | 0.00  | 0.000  | 0.000            | 0.000               |
| 22   | 0            | 0.00  | 0.000  | 0.000            | 0.000               |
| 23   | 0            | 0.00  | 0.000  | 0.000            | 0.000               |
| 24   | 0            | 0.00  | 0.000  | 0.000            | 0.000               |
| 25   | 0            | 0.00  | 0.000  | 0.000            | 0.000               |
|      | <b>TOTAL</b> |       |        |                  | <b>5.777</b>        |

Calculated value of chi-square ( $\chi^2$ ) = 5.777

Degrees of freedom = (r-1)(c-1) = (5-1)(5-1) = (4)(4) = 16

Level of significance = 0.05(5%)

Tabulated value for 16 DGF and 5% Level of significance = 26.296

The calculated value (5.777) is less than (<) tabulated value (26.296)

Hence the Null hypothesis (H<sub>0</sub>) is accepted.

Inference:

Since, the calculated value (5.777) is less than the table value (26.296). Hence the null hypothesis (H<sub>0</sub>) is accepted. Therefore, there is no significant relationship between the age of the respondent and their motivation level to work towards the organizational goals.

2. Relationship between experience of the employees and their willingness to stay in the organization to improve their skills.

Null hypothesis (H<sub>0</sub>): There is no significant relationship between experience of the employees and their willingness to stay in the organization to improve their skills.

Alternative hypothesis (H<sub>1</sub>): There is significant relationship between experience of the employees and their willingness to stay in the organization to improve their skills.

**Table 8.1.2: Observed Table**

| Staying with their current Organization | Experience   |           |           |            |                | Total     |
|---|--------------|-----------|-----------|------------|----------------|-----------|
|   | Below 1 year | 1-3 Years | 3-7 Years | 7-15 Years | Above 15 years |           |
| Strongly agree                          |              |           |           |            |                |           |
| Agree                                   | 1            | 4         | 13        | 14         | 1              | 33        |
| Neutral                                 | 0            | 2         | 1         | 8          | 0              | 11        |
| Disagree                                | 1            | 0         | 2         | 1          | 0              | 4         |
| Strongly disagree                       | 0            | 0         | 0         | 0          | 0              | 0         |
| <b>Total</b>                            | <b>7</b>     | <b>9</b>  | <b>21</b> | <b>31</b>  | <b>2</b>       | <b>70</b> |

FORMULA:

Chi-square analysis:  $\chi^2 = \sum \frac{(O-E)^2}{E}$

$E = \text{ROW TOTAL} * \text{COLUMN TOTAL} / \text{GRAND TOTAL}$

Here, O is the observed frequencies

E is the expected frequencies

**Table 8.1.2: Expected Table**

| S.No.        | O  | E     | O-E    | O-E <sup>2</sup> | O-E <sup>2</sup> /E |
|--------------|----|-------|--------|------------------|---------------------|
| 1            | 5  | 2.20  | 2.800  | 7.840            | 3.564               |
| 2            | 3  | 2.82  | 0.180  | 0.032            | 0.011               |
| 3            | 5  | 6.60  | -1.600 | 2.560            | 0.388               |
| 4            | 8  | 9.74  | -1.740 | 3.028            | 0.311               |
| 5            | 1  | 0.62  | 0.380  | 0.144            | 0.232               |
| 6            | 1  | 3.30  | -2.300 | 5.290            | 1.603               |
| 7            | 4  | 4.24  | -0.240 | 0.058            | 0.014               |
| 8            | 13 | 9.90  | 3.100  | 9.610            | 0.971               |
| 9            | 14 | 14.61 | -0.610 | 0.372            | 0.025               |
| 10           | 1  | 0.94  | 0.060  | 0.004            | 0.004               |
| 11           | 0  | 1.10  | -1.100 | 1.210            | 1.100               |
| 12           | 2  | 1.41  | 0.590  | 0.348            | 0.247               |
| 13           | 1  | 3.30  | -2.300 | 5.290            | 1.603               |
| 14           | 8  | 4.87  | 3.130  | 9.797            | 2.012               |
| 15           | 0  | 0.31  | -0.310 | 0.096            | 0.310               |
| 16           | 1  | 0.40  | 0.600  | 0.360            | 0.900               |
| 17           | 0  | 0.51  | -0.510 | 0.260            | 0.510               |
| 18           | 2  | 1.20  | 0.800  | 0.640            | 0.533               |
| 19           | 1  | 1.77  | -0.770 | 0.593            | 0.335               |
| 20           | 0  | 0.11  | -0.110 | 0.012            | 0.109               |
| 21           | 0  | 0.00  | 0.000  | 0.000            | 0.000               |
| 22           | 0  | 0.00  | 0.000  | 0.000            | 0.000               |
| 23           | 0  | 0.00  | 0.000  | 0.000            | 0.000               |
| 24           | 0  | 0.00  | 0.000  | 0.000            | 0.000               |
| 25           | 0  | 0.00  | 0.000  | 0.000            | 0.000               |
| <b>TOTAL</b> |    |       |        |                  | <b>14.782</b>       |

Calculated value of chi-square ( $\chi^2$ ) = 14.782

Degrees of freedom = (r-1) (c-1) = (5-1) (5-1) = (4) (4) = 16

Level of significance = 0.05(5%)

Tabulated value for 16 DGF and 5% Level of significance=26.296

The calculated value (14.782) is less than (<) tabulated value (26.296)

Hence the Null hypothesis (H<sub>0</sub>) is accepted.

Inference:

Since, the calculated value (14.782) is less than the table value (26.296). Hence the null hypothesis (H<sub>0</sub>) is accepted. Therefore, there is no significant relationship between experience of the employees and their willingness to stay

in the organization to improve their skills

### Limitations of the Study

There are some limitations for research which are as follows:-

- Some of the respondents were reluctant to answer negatively doubting their answer may not be confidential.
- The sample taken for the study was only 70 and from only one unit of the company so the result drawn may not be very accurate for all the employees.
- The workers were busy with their work therefore they could not give enough time for the interview.

### III. Results & Analysis

The findings of the study are only based on the information provided by the respondents. The following are the findings of the study on “Employee Engagement and its effect on Job Performance and Retention” in Ramsol.

- It is found that 64% of the respondents are male.
- It is found that 33% of the respondents belong to the age group of 26-30years.
- It is found that 53% of the respondents are married.
- It is found that 44% of the respondents are having an experience of 7 to 15 years.
- It is found that 97% of the respondents will be more committed if engagement programs are conducted effectively.
- It is found that 94% of the respondents have said that they are highly committed to the organization.
- It is found that 87% of the respondents think that their participation and view in the organization are valued.
- It is found that 97% of the respondents agree that their work is properly recognized by the management..
- It is found that 46% of the respondents have expressed as neutral with the administration of compensation benefits.
- It is found that 59% of the respondents think that the organization acts immediately regarding the feedback.
- It is found that 77% of the respondents are satisfied with their working environment.
- It is found that 74% of the respondents agree that the employee engagement activities have been motivated to

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work towards the organizational goals.

- It is found that 43% of the respondents feel that the employee engagement activities boost their morale.
- It is found that 44% of the respondents have expressed as neutral for the appreciation of their work.
- It is found that 94% of the respondents agree that they are willing to put extra work for get the job done.
- It is found that 74% of the respondents agree that they get increments and promotions in time for their performances.
- It is found that 89% of the respondents agree that their management showing commitment for their continuous learning and development.
- It is found that 78% of the respondents agree that they are aware of the career opportunities in the organization.
- It is found that 77% of the respondents have said that for developing their skills in the organization right now is to stay with their current team.
- It is found that 91% of the respondents have said that for advance in this organization is to stay with their current project leader.
- It is found that 78% of the respondents have said that for advance in this organization is to stay with their current organization.
- Chi square test was applied to check whether there exist any significant relationships between the age of the respondent and their motivation level to work towards the organizational goals. The calculated value of chi square was found to be (5.777) the Table value at 5% significance level was (26.296). Since the calculated value is less than the table value, we accept the null hypothesis ( $H_0$ ) which tells that there is no significant relationship between the age of the respondent and their motivation level to work towards the organizational goals.
- It is inferred from the Chi square test analysis that the calculated value (14.782) is less than the table value (26.296). Hence the null hypothesis ( $H_0$ ) is accepted. Therefore, there is no significant relationship between the experience of the employees and their willingness to stay in the organization to improve their skills.

#### Recommendations and Suggestions

The following suggestions were put forth by the researcher based on the findings of the study. The engaged workers are more actively present in the organization. These employees work with passion and feel a profound

connection to the company. To retain the engaged workers the management must constantly motivate their employees. Cash prizes, trophies, gift vouchers, certificates are an effective way to motivate the employees and keep them engaged in their work. People that are actively engaged help to move the organization forward.

The management may properly recognize their workers by giving timely promotion, reward and incentives to retain them. Training and growth opportunities contribute of the totally engaged employees and help them in the retention of those employees.

Management could try to expedite action taken on feedback. Employee counseling and mentoring techniques can be used to get the feedback from the employee about his role and job performances, when employees issues are addressed immediately by management, employees will have more trust on management, show more involvement and they would come forward to tell more ideas and suggestions about the work and it does not mean that employees always place only complaints. It would be also better if management take effort to improve work life balance of employees.

The company may have a proper pay system so that the employees are motivated to work in the organization. In order to boost his engagement levels the employees should also be provided with certain benefits and compensations. Compensation is an important factor in job satisfaction. In any organization compensation level determines employee's motivational level, morale, productivity and overall job satisfaction. An employee who feels adequately compensated monetarily is more likely to stay with their organization.

## IV. Conclusion

In today's competitive business world, employees are expecting more and more from the organization. With increased change in needs and expectation of the employees and the employers need to be cautious in choosing the right fit and giving a realistic job preview and engage the employees through their engagement activities to build passion, commitment and alignment with the organization's strategies and goals.

From the study on the employee engagement and its effect on job performance and retention in Ramsol, it was found that the most of the employees are highly engaged with the company both intellectually & emotionally. Also the study infers that most of the employee engagement programs have produced good result on engaging the

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employees in accordance with organization's objectives and goals. When they have proper engagements programs they will be free from the internal pressure and can relax themselves and boost them for the further growth in their organization.

Compensation constitutes the largest part of the employee retention process. The employees always have high expectations regarding their compensation packages. So providing an attractive compensation package plays a critical role in retaining the employees. Personal counseling to be provided to all employees so that they feel de-stressed and relaxed to work

To conclude, the organization can still concentrate on specific areas which are evolved from this study in order to make the engagement programs more effective. Only if the employees are properly engaged they work well and only if they work well the organization is going to benefit out of it. An employee's engagement levels depend not just on his work but also the work and attitude of his subordinates, peers and superiors as well as various processes and environment in the organization. Steps have to be taken to improve the conditions in future. The suggestions of this report may help in this direction.

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## A BOOK REVIEW ON “RESEARCH METHODS FOR BUSINESS AND SOCIAL SCIENCE STUDENTS (2<sup>ND</sup> EDITION)”

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Pooja Goel★

Quality research is an important parameter for any institution to be at a good position than its contemporaries. By introducing research among our students at early stage we can definitely improve the ranking of Indian higher education institutes in global perspective. Some universities in India are already doing it but a serious effort is necessary for getting the job done. There is plethora of research books in the market. But very few books are there which can be understood by non-research background students. The book titled “Research Methods for Business and Social Science Students”, 2<sup>nd</sup> Edition, is an endeavor to conceptualize the various research concepts in precise and clear way so that students can easily understand various research related concepts.

The book is divided into sixteen chapters. First two chapters give the answers of some basic questions regarding research and research methodology. Third chapter briefly explains the research cycle and also throws light on the problems with the research process. Literature review is the backbone of any research and authors have fully justified it by devoting complete chapter four to it. Apart from describing the importance and types of literature review, various literature sources and examples of literature review are also given in the chapter. Chapter five onwards book introduces some technical aspects of the research, especially quantitative research techniques. Chapter five explains types of sampling, types of data and measurement, methods of data collection, sample size determination, and key statistics concepts briefly. Chapter six gives idea about primary data collection while chapter seven is about secondary data collection and also provides a brief list of various sources of secondary data. All the steps of survey process are explained in chapter eight with the help of examples and snapshots of excel sheets while passing through various stages of data input. Interviews and focus groups techniques are discussed in chapter nine. Chapter ten dedicated to qualitative data analysis gives insight about preparation of data, coding and indexing of data, content

analysis, tabulation and summarization of data. Knowledge about descriptive quantitative analysis has been imparted in chapter eleven, where frequency distribution, scatter plots t-test, chi-square test, are briefly explained. Correlation and regression are also the part of the discussion as the book progresses to chapter twelfth. Authors have enhanced the worth of the book by introducing some advanced statistical analysis such as sssas factor analysis and logistic regression analysis. These techniques are explained with the help of proper examples and output tables which makes explanation quite understandable. Tests of measurement are vital for ensuring the quality of the research work done. Reliability, validity are discussed in depth in chapter fourteen. Chapter fifteen is very useful for the beginners, as it provides guidance about the selecting a topic, using supervisor’s time, and how to undertake the research. Example of a research proposal is also given at the end of the chapter to give a clear understanding of the structure of the research. Lastly, in chapter sixteen writing and presenting the dissertation is explained by giving useful tips on how to present the dissertation, citing of literature, list of items that could be covered in appendices etc.

In short, this book fully justify its title as the content chosen for the book and the level of explanation given in the book is in accordance to its target group i.e. students. The book is full of examples and simple language is used to make it more useful for the beginners and I hope the books like this will surely enhance the interest of students in research.

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