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Tecnia Institute of Advanced Studies,
3-PSP, Institutional Area,
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From The Editor's Desk

I take this opportunity to thank all contributors and readers for making *Tecnia Journal of Management Studies* an astounding success. The interest of authors in sending their research-based articles for publication and overwhelming response received from the readers is duly acknowledged. I owe my heartfelt gratitude to all the management institutes for sending us their journals on mutual exchange basis, and their support to serve you better.

We are happy to launch the Eleventh issue of our academic journal. The present issue incorporates the following articles:

- ❖ A Study on Employees' Satisfaction with Performance Appraisal System in Andhra Pradesh Tourism Development Corporation.
- ❖ A Study on Customer and Dealer Satisfaction of Deccan Pumps, Coimbatore.
- ❖ Depreciation Accounting: Policies and Practices in Indian Companies
- ❖ Impact of Promotional Tools on Sales and Consumers' Buying Decision: A Comparative Study of ATL and BTL
- ❖ Challenges and opportunities for seafood product in Indian retail market
- ❖ Embedded Microprocessor Performance Evaluation- A Case Study of the Leon3 Processor
- ❖ Implementing Total Quality Management in Internal Customer Satisfaction at Kuwait National Petroleum Company
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- ❖ Going beyond the codes of corporate governance a case study of textile industry in India
- ❖ Total Productive Maintenance application to Medium/Small/Micro Enterprises.

My thanks to the authors Dr. Appalayya Meesala, Ms. Asma Sultana, Dr. N. Kathirvel, Dr. Sunil Kumar, Mr. Naveen, Dr. Geeta Nema, Dhanashree Nagar, Ms. Maitri Shah, Ms. Jitarani Udgata, Dr. Ajay Kumar Rathore, Dr. Nabil Litayem, Ms. Bochra Jaafar, Dr. Slim Ben Saoud, Dr. Ahmad Assaf Alfadly, Dr. Anurag Agnihotri, Dr. Anand Sharma and Dr. Sudhi Ranjan Dash, Mr. Anil Kumar Rajoria who have sent their manuscripts in time and extended their co-operation particularly in following the American Psychological Association (APA) Style Manual in the references.

I extend my sincere thanks to our Chairman Sh. R. K. Gupta, who has always been a guiding light and prime inspiration to publish this journal. I am grateful to Dr. A.K. Rathore, Director, for his continuous support and encouragement to bring out the Journal in a proper form. I also appreciate Editorial Committee Members for their assistance, advice and suggestion in shaping up the Journal. My sincere thanks to our distinguished reviewers and all team members of Tecnia family for their untiring efforts and support in bringing out this bi-annual Journal.

I am sure the issue will generate immense interest among corporate members, policy-makers, academicians and students.

Editor

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A STUDY ON EMPLOYEES' SATISFACTION WITH PERFORMANCE APPRAISAL SYSTEM IN ANDHRA PRADESH TOURISM DEVELOPMENT CORPORATION.

Appalayya Meesala*
Asma Sultana**

Abstract: *This empirical study on the employees of Andhra Pradesh State Tourism Development Corporation has set out to explore the levels of employees' satisfaction with their performance appraisal system (PAS) and relative contribution of important variables to their satisfaction with PAS. With the help of a 5-item Likert scale questionnaire, data were collected from 45 employees (n=45) all working in the headquarters of the corporation. The data were fed into MS Excel 2007; regression and correlation analyses were done. The results indicate that the employees are more than happy with the PA system. An important determinant of satisfaction with PA system, as revealed in this, is its property of comprehensiveness in that a PAS is well accepted by the employees principally due to comprehensiveness of aspects included in the appraisal system. Another notable finding is that the employees are not clearly happy with their reward system.*

Key Words: *Performance Appraisal System, High Performance Work Practices, Comprehensiveness, Reward System, Fair Pay Fixation.*

Introduction

Regular performance appraisals make for better corporate financial performance (Delery and Doty, 1996; Huselid, 1995). An estimated 80-90 percent of organisations in the USA and UK use appraisals, and there has been an increase from 69 per cent to 87 per cent of organizations between 1998 and 2004 using formal performance management systems (Armstrong and Baron, 2005). Between 1998 and 2004 a survey from the Chartered Institute of Personnel and Development of 562 firms has found that 506 of them were using performance appraisal in UK (Chartered Institute of personnel and Development, 2007). There is a rising use of performance appraisal feedback beyond professionals and managers to nearly 95 per cent of workplaces (Kersley et al., 2006).

Review of Literature

Caruth and Humphreys (2008) advise that

"although it is possible to theoretically separate the human resource function of performance appraisal from broader strategic management processes, such an approach is not realistic for organizational leaders charged with strategy execution..."

The study of Chen & Huang (2009) indicates that strategic human resource practices of which performance appraisal are an essential part lead to effective knowledge management. It has been revealed in the study of Howard and Foster (1999) "certain human resource (HR) management practices (such as a good performance appraisal system) establish a platform for basing employee empowerment, and that increasing empowerment would be positively related to perceptions of leadership commitment to quality."

Zhang et al (2008) have found that high-performance human resource practices are positively related to corporate entrepreneurship (CE), and that

*Dr. Appalayya Meesala, Professor & Director, Guru Nanak Institute of PG Studies-MBA and Head of the Department, Guru Nanak Engineering College (MBA department), Ibrahimpatnam, RR District, Hyderabad. Email: appalayyastrategypearson@gmail.com

**Ms. Asma Sultana, (Deccan School of Management) IT Recruiter, Integr8 IT, Hyderabad.
Email id: arshiyasultana42@yahoo.com

this relationship is mediated by the organizational citizenship behavior (OCB) of employees.

The study of Longenecker et al (1988) postulates that "performance appraisal will be effective to the extent that managers and subordinates have a shared perception of its purpose and function and the degree to which it meets the needs of both groups.

Dissatisfaction with PAS

According to Fletcher (1993) more than 80 per cent of UK organizations surveyed in the UK have expressed dissatisfaction with PAS (Performance Appraisal System) and perceive that PAS has failed as a mechanism to develop and motivate people. Bowles and Coates (1993), based on a survey of 48 UK organizations, report a figure of 68 per cent dissatisfaction with the PA process. Performance appraisal instruments often measure the "wrong things" (Latham&Mann,2006, p. 302). Employees on the receiving end of the appraisal often express dissatisfaction with both the decisions made as a result of performance assessment and the process of performance assessment (Milliman, Nason, Zhu, & De Cieri, 2002), which may have longitudinal effects on overall job satisfaction (Blau, 1999) and commitment (Cawley, Keeping &Levy, 1998). Legally sound performance appraisals should be objective and based on a job analysis (Malos, 1998). Mount (1983, 1984) concluded that employees' satisfaction with a PAS was mainly related to their overall experience with the system, whereas managers' satisfaction was much more aligned with some of the components of the system.

Appraisal Process

Landy, Barnes-Farrell, & Cleveland (1980) indicated that appraisal procedures and processes (e.g., opportunity to express feelings) influenced employee perceptions of fairness and accuracy to a greater degree than did the specific ratings employees received. In other words, procedures and processes are critical to satisfaction with PAS. Dobbins, Platz, and Houston (1994) too have suggested that an appraisal system high in procedural justice will enhance the level of employee trust in the system.

Reward System and Performance

Bretz, Milkovich, and Read (1992), in their summary of three large-scale surveys of U.S. private sector organizations, identified fairness as the most

important performance appraisal issue those organizations face. The justice concerning Rewards System and its perceived fairness is one dimension of organizational justice (OJ) which is about how organizations treat their employees (Greenberg, 1990; Cropanzano and Greenberg, 1997); organizational justice consists of two categories: (a) procedural justice and (b) distributive justice. Procedural justice relates to the fairness of procedures used in determining outcomes, while distributive justice is concerned with fairness of the outcomes themselves. The outcomes consist of : (a) how fairly the ratings are given, and (b) how fairly the rewards are given in proportion to ratings given. The research of Cook and Crossman (2004) indicates that the source of satisfaction or dissatisfaction with PAS is not equally attributable to all aspects of organizational justice-system-related, procedural and distributive; to be more specific, the perceived fairness of system corresponds to PAS satisfaction/dissatisfaction.

Folger and Konovsky (1989) found that appraisal-related procedural justice factors contributed more unique variance toward the prediction of trust in supervisor and organizational commitment than did salary-related distributive justice measures, whereas the distributive justice measures predicted more unique variance for satisfaction with pay than did the procedural justice factors.

Limited and mixed empirical support is present for a relationship between perceived appraisal accuracy and instrumentality beliefs - beliefs that regular appraisal is instrumental in grant of benefits to the person being appraised. Vest, Hills, and Scott (1989) found a significant positive relationship between perceived appraisal accuracy and instrumentality beliefs.

Training and Performance Appraisal Satisfaction

Spears, M.C& Parker, D.F. (2002) found from a study of 285 employed business professionals that "new employee training, in-house training, and support for continuing education each reduces the probability of employees being dissatisfied with the performance appraisal process; however, the influence of training is not the sole factor in determining employee satisfaction. The greatest improvement in satisfaction occurs when training takes place in conjunction with a performance appraisal system that provides specific measurable feedback to the employee."

Comprehensiveness of Appraisal

Campbell's (1990) model of job performance decomposes it into eight dimensions : (1) job-specific task proficiency, (2) non-task specific, (3) communication tasks, (4) tasks out of commitment, (5) personal discipline, (6) helping others, (7) supervisory tasks like meting out rewards and punishments and (8) furthering organizational goals.

Welbourne, T.M., et al (1998) in their role-based performance scale (RBPS) proposed five roles: (1) job role - work-related role to which usually merit or bonus is linked, (2) organization role – doing more than what is expected , (3) career role-competency-development for future roles, (4) team role-cooperating with others to further organizational goals and (5) innovator role-being creative and innovative both in his own work and organization's pursuits. Giles, W.F., Findley, H.M. & Field, H.S. (1997) note that an effective performance appraisal should encompass an overall frame work or context that enables the entire process to operate at optimal level of performance.

Blended Approach

A blended approach is one that couples an organization's strategy in the derivation of the broad competencies with the methodological rigor of task analysis. As Lievens, Sanchez, and De Corte (2004) note, a blended approach is likely to improve the accuracy and quality of inferences made from the resulting competency model because a blended approach capitalizes on the strengths of each method.

On how to evolve an effective performance appraisal system, the research of Goffin et al (2009) has established that social-comparative (RPM) performance appraisals have incremental criterion-related validity over traditional absolute performance appraisal methods. Simply stated, comparison with other employees makes an appraisal system more effective than the absolute rating method.

Verena & Wood (2008) observe that "one factor contributing to the gap between expectations and experience is the relative lack of motivations of managers as determinants of appraisal outcomes; the impacts of these contextual variables such as senior management concern, clarity of purpose, accountability and instrument adequacy on appraisal outcomes are mediated through their influence on the

perceived validity of the appraisal process and self-efficacy assessments of managers who must conduct appraisals."

The research of Sudarshan (2009) indicates that the most important factor appraised by organizations is the achievement of results or work output. The research of Kuvas, (2005) throws light on what factors contribute to performance appraisal satisfaction; his study on 64 Norwegian banks shows that performance appraisal satisfaction was directly related to affective commitment and turnover intention; both this relationship and an employee's performance, in turn, are mediated by an employee's intrinsic motivation.

Research Context

Against the foregoing state of research on performance appraisal content and process, we wanted to know the levels of satisfaction with PAS and relative contribution of a few selected variables to the satisfaction with PAS among the employees of Andhra Pradesh State Tourism Corporation, a state PSE for the development of tourism infrastructure in Andhra Pradesh. Its turnover was about Rs.200.40 crores in 2003. Being a government –controlled organization, its appraisal methods are really not the latest but definitely not the traditional, subjective appraisals either. These appraisal processes are not truly serious ones and thus vagueness and frivolousness characterize them. For a progressive-minded employee, government –type appraisals must be an anathema. We wanted to verify this dilemma through this inquiry. In other words, we basically wanted to find out the employees' satisfaction level with the current appraisal system, and the role of a few selected variables. We hoped that the findings would help the organization in making the required changes.

Statement of research Problem

1. Which are the variables that contribute most to the satisfaction of PAS? ;
2. Is a PAS which covers all aspects most accepted by the employees? ;
3. Does fair fixation of performance standards contribute to satisfaction with PAS? ;
4. Does fair reward system lead to acceptance of PAS?.

Research Methodology

About half of staff working in the corporate headquarters has been taken as the sample. They are 45 employees (n=45). The profile of the sample is furnished in the Table Nos.1 to 5. The data were collected a 5-item Likert scale questionnaire which includes questions on the demographics of the sample employees too. The demographic details comprise: Gender, Age, Education, Experience, Income with current organization, Total Experience and Average monthly salary. The research questions comprised : (1), Satisfaction with PA System, (2)Satisfaction with a comprehensive PA System, (3) Satisfaction with Performance standards fairly fixed, (4) Satisfaction with reward system, and (5) Satisfaction with training and guidance. In fact, the HR department of the organization supplied the measurement scale to an MBA student who is the other author of this article; they insisted on its use only no matter how the items in the questionnaire were repetitive and inconsistent and did not lend themselves to statistical analysis since their scales varied from item to item. Hence the data

Table 1: Gender Profile

Row Labels	Count of GENDER
F	09
M	36
Grand Total	45

Table 2: Age Profile of the sample

Row Labels	Count of AGE
21-30	17
31-45	16
46-58	12
Grand Total	45

Table 3: Education Profile

Row Labels	Count of EDU
Diploma, ITI and Inter	07
Graduates	19
Engineering	03
Post Graduate	16
Grand Total	45

relating to all items could not be analyzed. The data relating to the five variables only were found to be useful and so this analysis is made.

The responses from the filled-in questionnaires have been fed into MS Excel Sheet Version 2007). Data Analysis Tool Pack of MS Excel 2007 was used to do regression analysis, inter-correlations and summary statistics.

Table 4: Length of Experience in current organization

Row Labels	Count of EXP-CURRORG
1-5 years	19
6-10 years	15
11-30 years	10
Grand Total	44

(One respondent did not fill blank on service length)

Table 5: Monthly Salary Profile of the Sample

Row Labels	Count of AV-MONT-SAL
5000-10000	11
10001-15000	23
15001-25000	9
26000-40000	1
Grand Total	44

(One respondent did not furnish his salary information)

Results and Discussion

Table No. 7 gives the details of beta coefficients of performance appraisal determinants of performance appraisal satisfaction. The adjusted R-Square is 0.429196 which is neither high nor negligible. The calculated “F” value at 9.271 shows that the regression coefficients have properties useful for prediction.

It may be noted that the comprehensiveness of PA system shows a high beta value of 0.564547. Their PA satisfaction is greatly determined by the comprehensiveness of a performance appraisal system. It is needless to say that a system which covers all aspects of one’s performance is very much

appreciated by the appraised employees. The other determinant in the order of their influence on performance appraisal system satisfaction are: 1. Fair fixation performance standards (0.171505), 2. Satisfaction with reward system (0.073742), and (3)

satisfaction with training and guidance (0.047155). The same is, by and large, confirmed by the correlation coefficients as shown Table No.7. The correlation coefficients of (1) comprehensiveness of PA system, (2) fair fixation of performance standards, (3)

Table 6: Regression Analysis

Independent Variable	Beta Coefficient	"t"Value	Significance
Comprehensiveness	.565	5.42	.001
Fairness of Standards	.172	1.55	n.s.
Reward System	.074	0.58	n.s.
Training & Guidance	.047	0.29	n.s.
R ² = .481 R ² = .429 F _{4,40} = 9.27 P < .001 n.s. = not significant			

Table 7: 5 x 5 Inter-Correlation Matrix (N=45)

Var. Across Var. Down	PA System	How Compré- nsive is PA Standards	Fairness of PA	Reward System	Training & Guidance
PA System	1.000	.661***	.198 ^{ns}	.261 ^{ns}	.003 ^{ns}
Comprehensiveness of PA System	.661***	1.000	.012 ^{ns}	.240 ^{ns}	-.095 ^{ns}
Fairness of PA Standards	.198 ^{ns}	.012 ^{ns}	1.000	.145 ^{ns}	.059 ^{ns}
Reward System	.261 ^{ns}	.240 ^{ns}	.145 ^{ns}	1.000	.266 ^{ns}
Training & Guidance	.003 ^{ns}	-.095 ^{ns}	.059 ^{ns}	.266 ^{ns}	1.000
Mean Score	3.778	3.511	3.800	2.711	4.111
SD	0.997	1.141	1.036	0.968	0.745

*** P < .001

ns = not significant

satisfaction with reward system and (4) satisfaction with training and guidance are: 0.66142, 0.19799, 0.26149 and 0.00340 respectively. It follows from this finding that covering all aspects of performance (Comprehensiveness) is the cardinal principle to be followed in evolving a good PA system.

Further, Table Nos. 8 & 9 show the means of the satisfaction with PA, satisfaction with comprehensiveness of the system, satisfaction with performance standards fixation, satisfaction with reward system, and satisfaction with training and guidance as 3.78, 3.51, 3.8, 2.71, and 4.11 respectively. Except with reward system, the employees are clearly satisfied with the other determinants.

Conclusion, Recommendations and Scope for Further Research

The analysis boils down to the suggestion that the organization has to see that all aspects are covered in the performance appraisal. Secondly, the employees are not clearly happy with the reward systems, and so they have to be reviewed immediately. The findings are just indicative but not conclusive since the sample size is small. Lastly, the variables taken for analysis are exhaustive. The research on PSEs should be more comprehensive in that the entire gamut of areas of PA is covered.

The sample is male-dominant but it represents a well-balanced age mix. Further, the share of engineers

is disproportionately low. From monthly earnings standpoint, it is nothing but a mirror of typical government organizations. On the experience length

factor too, there appears to be a balanced composition of juniors and seniors.

Table 8: Descriptive Statistics Relating to Satisfaction with PA, Comprehensiveness of PAS, and Fair Fixation of Performance Standards

<i>Satisfaction with PA</i>		<i>Comprehensiveness of PA System</i>		<i>Fair fixation Performance Standards</i>	
Mean	3.78	Mean	3.51	Mean	3.8
Standard Error	0.148694	Standard Error	0.170	Standard Error	0.154396839
Median	4	Median	4	Median	4
Mode	4	Mode	4	Mode	4
Standard Deviation	0.992	Standard Deviation	1.1406	Standard Deviation	1.0351
Sample Variance	0.999	Sample Variance	1.30	Sample Variance	1.07
Range	4	Range	4	Range	4
Minimum	1	Minimum	1	Minimum	1
Maximum	5	Maximum	5	Maximum	5
Sum	170	Sum	158	Sum	171
Count	45	Count	45	Count	45

Table 9: Descriptive Statistics relating to Satisfaction with Reward and Satisfaction with Training and Guidance

<i>Sat wit Reward</i>		<i>Sat with Training & Guidance</i>	
Mean	2.71	Mean	4.11
Standard Error	0.144	Standard Error	0.11
Median	3	Median	4
Mode	3	Mode	4
Standard Deviation	0.968	Standard Deviation	0.745
Sample Variance	0.937	Sample Variance	0.555
Range	3	Range	4
Minimum	1	Minimum	1
Maximum	4	Maximum	5
Sum	122	Sum	185
Count	45	Count	45

References

- Armstrong, M., & Baron, A. (2005). *Managing Performance: Performance Management in Action*, Chartered Institute of Personnel and Development, London.
- Blau, G. (1999). Testing the longitudinal impact of work variables and performance appraisal satisfaction on subsequent overall job satisfaction. *Human Relations*, (52), 1099–1113.
- Bowles, M.L., & Coates, G. (1993). Image and substance: the management of performance as rhetoric or reality?, *Personnel Review*, 22(2), pp. 3-21.
- Bretz, R.D., Milkovich, G.T., & Read, W. (1992). The current state of performance appraisal research and practice: Concerns, directions, and implications. *Journal of Management*, (18), 321-352.
- Campbell, J. P. (1990). Modeling the performance prediction problem in industrial and organizational psychology. In M. D. Dunnette & L. M. Hough (Eds.), *Handbook of industrial and organizational psychology*:(pp. 688-732). Palo Alto, CA: Consulting Psychologists Press.
- Caruth, D.L.& Humphreys, J.L. (2008). *Performance Appraisal: Essential Characteristics*

- for Strategic Control. *Measuring Business Excellence* 12(3), 24-32.
- Cawley, B.D., Keeping, L.M., & Levy, P.E. (1998). Participation in the performance appraisal process and employee reactions: A meta-analytic review of field investigations. *Journal of Applied Psychology*, 83, 615-633.
 - Chartered Institute of Personnel and Development (2007). Learning and Development: Annual Survey Report, Chartered Institute of Personnel and Development, London.
 - Chen, C.J. & Huang, J.W. (2009 January). Strategic Human Resource Practices and Innovation Performance — the Mediating Role of Knowledge Management Capacity. *Journal of Business Research* 62(1), 104-114.
 - Cook, J., & Crossman, A. (2004). Satisfaction with performance appraisal systems: A study of role perceptions. *Journal of Managerial Psychology* 19(5), 526-541.
 - Cropanzano, R. & Greenberg, J. (1997). Progress in organizational justice: tunneling through the maze. In Cooper, C.L. and Robertson, I.T. (Eds), *International Review of Industrial and Organizational Psychology* (pp. 317-72). John Wiley, New York.
 - Delery, J.E. & Doty, D.H. (1996). Modes of theorizing in strategic human resource management: tests of universalistic, contingency, and configurational performance predictions, *Academy of Management Journal* 39(4), 802-35.
 - Dobbins, G.H., Platz, S.J., & Houston, J. (1994). Relationship between trust in appraisal and appraisal effectiveness: A field study. *Journal of Business and Psychology*, 7, 309-322.
 - Fletcher, C. (1993 September). Appraisal: an idea whose time has gone?, *Personnel Management*, (pp. 34-7).
 - Folger, R., & Konovsky, M.A. (1989). Effects of procedural and distributive justice on reactions to pay decisions. *Academy of Management Journal*, 32, 115-130.
 - Giles, W.F., Findley, H.M. & Field, H.S. (1997). Procedural fairness in performance appraisal: Beyond the Review Session. *Journal of Business and Psychology* 11(4), 493-510.
 - Goffin, R.D., Jelly, R.B., Powel, D.M., & Johnston, N.G. (2009). Taking Advantage of Social Comparisons in Performance Appraisal: The Relative Percentile. *Human Resource Management* 48(2), 251 – 268.
 - Greenberg, J. (1990). Organizational justice: Yesterday, today, and tomorrow. *Journal of Management*, 16, 399-432.
 - Howard, L. & W, Foster, S.T. (1999). The influence of human resource practices on empowerment and employee perceptions of management commitment to quality. *Journal of Quality Management* 4(1), 5-22.
 - Huselid, M.A. (1995). The impact of human resource management practices on turnover, productivity, and corporate financial performance. *Academy of Management Journal* 38(3), 635-72.
 - Kersley, B., Alpin, C., Forth, J., Bryson, A., Bewley, H., Dix, G. & Oxenbridge, S. (2006). Inside the Workplace: Findings from the 2004 *Workplace Employment Relations Survey*, Routledge.
 - Kuvas, B. March, (2005). Performance Appraisal Satisfaction and Employee Outcomes: Mediating and Moderating Roles of Work motivation. *International Journal of Human Resource Management* 17(3), 504-52.
 - Landy, F.J., Barnes-Farrell, J., & Cleveland, J.N. (1980). Perceived fairness and accuracy of performance evaluation: A follow-up. *Journal of Applied Psychology*, 65, 355-356.
 - Latham, G.P., & Mann S. (2006). Advances in the science of performance appraisal: Implications for practice. *International Review of Industrial and Organizational Psychology*, 21, 295-337.
 - Lievens, F., Sanchez, J.I., & De Corte, W. (2004). Easing the inferential leap in competency modeling: The effects of task-related information and subject matter expertise. *Personnel Psychology*, 57, 881-905.
 - Longenecker, C.O., Liverpool, P.R., & Wilson, K.Y. (1988). An assessment of manager/subordinate perceptions of performance appraisal effectiveness. *Journal of Business Psychology* 2(4), 311-320.
 - Malos SB. (1998). Current legal issues in performance appraisal. In Smither JW (Ed.), *Performance appraisal: State of the art in practice* (pp. 49-94). San Francisco: Jossey-Bass.
 - Milliman, J., Nason, S., Zhu, C., & De Cieri, H. (2002). An exploratory assessment of the purposes of performance appraisals in North and Central America and the Pacific Rim. *Asia Pacific Journal of Human Resources*, 40, 105-122.
 - Mount, M.K. (1983). Comparison of managerial and employee satisfaction with a performance

- appraisal system. *Personnel Psychology*, 36, 99-110.
- Mount, M.K. (1984). Satisfaction with a performance appraisal system and appraisal discussion. *Journal of Occupational Behavior*, 5, 271-9.
 - Spears, M.C., & Parker, D.F. (2002). Profit Analysis of Impact of Training on Performance Appraisal Satisfaction. *American Business Review*, (pp.12-16).
 - Sudarshan, A. (2009). Performance appraisal criteria: a survey of Indian organizations. *International Journal of Indian Culture and Business Management* 2(4), 373 – 391.
 - Verena, M. & Wood, R. E. (2008). The Dynamics of Effective Performance Appraisal: An Integrated Model. *Asia Pacific Journal of Human Resources* 38(3), 62-90.
 - Vest, M. J., Hills, F. S., & Scott, K D. (1989). Determinants of instrumentality beliefs in a merit pay system. Paper presented at the Annual Meeting of the Academy of Management, Washington, DC.
 - Welbourne, T.M., Johnson, D.E. & Erez, A. (1998). The role-based performance scale: Validity Analysis of a theory-based measure. *Academy Journal of Management* 4(15), 540-555.
 - Zhang, Z. Wan, D., & Jia, M . (2008). Do high-performance human resource practices help corporate entrepreneurship? The mediating role of organizational citizenship behavior. *The Journal of High Technology Management Research* 19(2), 128-138.
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A STUDY ON CUSTOMER AND DEALER SATISFACTION OF DECCAN PUMPS, COIMBATORE.

N. Kathirvel *

Abstract: *This project is undertaken to study the customer and dealer satisfaction of Deccan Pumps, Coimbatore. The sample size consists of 75 customers and 25 Dealers in Coimbatore Districts. Convenience sampling method was adopted. Important findings of this study: it was found that 52 per cent of the dealers preferred to stock Deccan Pumps, 16 per cent preferred other brands, 12 per cent CRI and Sharp Pumps and the remaining 8 per cent preferred to stock Texmo pumps. Suggestions of this study, It is suggested to the company to concentrate more on the pricing aspects as many respondents are not happy with the same. More incentives to dealers / offers to customers may be given to improve the market share. So there is a need for studying the dealer and customer satisfaction towards the pump. In this regard the various factors which influence the customers to purchase the product and their satisfaction level are studied in this project.*

Key Words: *Deccan Pumps, Texmo pumps, Bore well, Customer, Dealer, Reputation*

Introduction

In the 21st century, marketing is becoming more attractive at the company, state, national and international levels. In the early days there was no difference between selling and marketing, but today, the difference between these two terms have been highlighted. From barter exchange system to the present marketing scenario *customer is the king*. An organization to have a competitive edge over the others must have a flawless marketing policy. The change from “cavet emptor” to “cavet vendor” i.e. from customer beware to seller beware; the marketing scenario has undergone a tremendous change, empowering the customer to choose from wide options available to them.

Introduction to the Pump Industry

India's economy is based mainly on agriculture and it is the backbone of the country. India's agriculture depends upon the timely monsoon and the amount of rainfall in any year. To avoid the

uncertainty of monsoon, farmers in India resort to various methods of irrigation. India, being a vast country with a high variation in geographical conditions needs several irrigation techniques.

In areas of shallow water levels (1-6 meters head) axial flow or mixed flow pumps are used to lift water. Where water levels are at 6-40 meters head or on riversides, mostly radial flow pumps are used. For deep bore wells submersible or jet or compressor pumps are used depending on the head and discharge requirements and on the availability of water in the bore well (yield).

Pump Industry in India

The first electric motor in India was manufactured in Coimbatore in 1930 and thereafter the motor pump industry expanded rapidly. Today 60% of India's requirements of domestic and agricultural pump sets are made in Coimbatore. The Southern India Engineering Manufacturers' Association (SIEMA) (established in 1952) has 215 members, most of whom

*Dr. N. Kathirvel, Associate Professor, Department of Commerce and Management, Karpagam University, Coimbatore-21.
Email : pnk70_samy@yahoo.co.in

manufacture motors and pumps of various types. Indian pumps are made according to the specifications of the Bureau of Indian Standards (BIS), Coimbatore (with 1.2 million population) is also famous for textile machinery manufacture and is rated sixth in the World. It is called the "Manchester" of South India due to the presence of hundreds of spinning mills, cloth and garment manufacturing units in and around Coimbatore. Besides Coimbatore, Ahmedabad, Baroda, Calcutta and Dewas are the other places where agricultural pump industries are situated.

Review of Literature

Kumar (1998) conducted "A Study on the customers Satisfaction and Promotional Strategy for ELGI Pump sets in Coimbatore City". The main objective of the study was to find socio-economic status of the customers and to find out the awareness and preference of customers towards the product.

Vinoth (1993) conducted "A study on Consumers preference towards Jet Pumps, a case study of Coimbatore and Karamadai City". The main objective of the study was to study the socio-economic factors of the respondents and their preference for purchase. A sample size of 150 was taken.

Niketha (2001) conducted "A study on customers' attitude and their satisfaction level towards the use of Best pumps". The main objective of the study was to find out the attitude of the customers towards the pumps.

Suresh (2000) had conducted "A study on Dealer perception towards the performance of different pumps-a survey". The main objective of the study was to find the dealer's perception and their expectation towards pumps. From the study he found that a good distribution channel and advertisement increase the sales. Dealers say that the pumps should be of good quality and they should be capable of running in single phase.

Need for the study

For the company to have a competitive edge over the others, they must have a flawless marketing policy. As far as pump sets are concerned they are marketed through a wide distribution/dealer network. The company must be able to satisfy customers for increasing their market share. So there is a need for

studying the dealer and customer satisfaction towards the pump set.

Objectives of the study

Primary Objective

- To assess the customer and dealer satisfaction of Deccan Pumps, Coimbatore.

Secondary Objectives

- To analyse the various factors that influence a customer to purchase Deccan pumps.
- To analyse the reasons for dealer preference of Deccan Pumps.
- To assess the satisfaction level of Deccan Pump users.
- To assess the best media of advertising for Deccan pumps.

Methodology of the study

This project is undertaken to study the customer and dealer satisfaction of Deccan Pumps, Coimbatore. The research design chosen is descriptive as the study reveals the state of facts existing. The sample size consists of 75 customers and 25 Dealers in Coimbatore Districts. Convenience sampling method was adopted. In this project, the data was collected through primary and secondary sources. Primary data was collected from Customers and Dealers in Coimbatore district through a questionnaire. Secondary Data was collected from Company Profile, Books, Journals and Company magazines. The data collected was tabulated, analyzed and interpreted using Simple Percentage Method and Chi-Square Test.

Limitations of the study

1. The study is confined only to in and around Coimbatore District.
2. The sample size taken was limited and hence the results obtained may not be applicable to the universe.
3. The answers given by a few respondents may be 'biased'.
4. The period of study is limited and hence time is a constraint.
5. Convenience sampling method has its own limitation.

Analysis and Interpretation

Table 1: Table showing the occupation of the respondents

Occupation	No of respondents	Percentage
Business	12	16
Service	20	27
Agriculture	43	57
Total	75	100.0

The Table No. 1 reveals that 57 per cent of the respondents come under the Agricultural sector, 27 per cent from Service sector and 16 per cent from the Business sector.

Table 2: Table showing the monthly income of the respondents

Monthly Income	No of respondents	Percentage
Below 5000	17	23
5001-10000	24	32
10001-15000	16	21
15001-20000	18	24
Above 20000	0	0

From the Table No. 2, it is clear that 32 per cent of the respondents draw a monthly income between 5001 and 10000, 24 per cent of the respondents between 15001 and 20000, 23 per cent is below 5000 and remaining 21 per cent between 10001-15000.

Table 3: Table showing the media of awareness of Deccan pumps

Media	No of respondents	Percentage
Newspaper/ magazines	8	11
Friends/Relatives	37	49
Television	13	17
Wall paintings	2	3
Dealers	15	20
Total	75	100

From the Table No. 3 it is clear that for 49 per cent of the respondents the media of awareness is through friends / relatives, 20 per cent through dealers, 17 per cent through television, 11 per cent through News paper / magazines and remaining 3 per cent through Wall paintings.

Table 4: Table showing the opinion of the respondents whether the pump they use is ISI certified

Opinion	No of respondents	Percentage
Yes	52	69
No	23	31
Total	75	100

From the Table No. 4 it is clear that 69 per cent of the respondents state that their pump is ISI certified and the remaining 31 per cent opined that their product is not ISI certified.

Table 5: Table showing the opinion of the respondents whether the pump set they use is branded

Opinion	No of respondents	Percentage
Yes	55	73
No	20	27
Total	75	100

The Table No. 5 exhibits that a majority (73 per cent) of the respondents indicate that their product is branded and the remaining 27 per cent informed that it is not so.

Table 6: showing the opinion of the respondents whether it is their first purchase of pumpset

Opinion	No of respondents	Percentage
Yes	30	40
No	45	60
Total	75	100

From the Table No. 6 it is clear that 60 per cent of the respondents have already purchased a pump and remaining 40 per cent say that they have purchased a pump for the first time.

Table 7: Table showing the reason for which a Deccan pumpset is purchased

Reason	No of respondents	Percentage
Utility	15	20
Efficiency	42	56
Economy	18	24
Total	75	100

From the Table No. 7 it is clear that 56 per cent of the respondents purchased a Deccan pump for its efficiency, 24 per cent for its economy and remaining 20 per cent for its utility.

Table 8: Table showing the type of operation for which a Deccan pump is used

Utility	No of respondents	Percentage
Bore well	11	15
Open well	30	40
Sump	34	45
Total	75	100

The Table No. 8 construes that 45 per cent of the respondents use the Deccan pump to fill a sump, 40 per cent for open well applications and remaining 15 per cent for Bore well applications.

Table 9: Table showing the opinion of the respondents about the purpose of utility of Deccan pumps

Purpose of utility	No of respondents	Percentage
Domestic	39	52
Industrial	8	11
Agriculture	28	37
Total	75	100

From the Table No. 9 it is clear that 52 per cent of the respondents use Deccan pumps for domestic purposes, 37 per cent for agricultural purposes and remaining 11 per cent for industrial purposes.

Table 10: Table showing the factors that influenced the respondents to purchase a Deccan pump

Factors	No of respondents	Percentage
Brand Image	2	3
Quality	4	5
Price	29	39
Service	16	21
Dealer recommendation	20	27
Advertisement	4	5
Total	75	100

The Table No. 10 shows that 39 per cent of the respondents' selected a Deccan Pump due to its Price,

27 per cent based on dealer recommendations, 21 per cent based on service, 5 per cent each based on quality and advertisements and remaining 3 per cent based on brand image.

Table 11: Table showing the opinion of the respondents on the mode of purchase of Deccan pumpsets

Mode of purchase	No of respondents	Percentage
Cash	68	91
Credit	7	9
Total	75	100

From the Table No. 11, it is clear that 91 per cent of the respondents purchase Deccan Pumps by cash and the remaining 9 per cent on credit.

Table 12 Table showing the satisfaction level of the respondents on the maintenance of a Deccan pump

Level of Satisfaction	No of respondents	Percentage
Satisfied	45	60
Moderately Satisfied	20	27
Dissatisfied	10	13
Total	75	100

The Table No. 12 indicates that 60 per cent of the respondents are satisfied with the maintenance aspects of a Deccan Pump while 27 per cent are moderately satisfied and the remaining 13 per cent are dissatisfied.

Table 13: Table showing the satisfaction level of the respondents on the power consumption of a Deccan pump

Level of Satisfaction	No of respondents	Percentage
Satisfied	42	56
Moderately satisfied	25	33
Dissatisfied	8	11
Total	75	100

The Table No. 13 reflects that 56 per cent of the respondents are satisfied about the power consumption of a Deccan pump, 33 per cent are moderately satisfied and the remaining 11 per cent are dissatisfied.

Table 14: Table showing the satisfaction level of the respondents on the water discharge of a Deccan pump

Level of Satisfaction	No of respondents	Percentage
Satisfied	64	85
Moderately Satisfied	7	9
Dissatisfied	4	6
Total	75	100

The Table No. 14 reflects that 85 per cent of the respondents are satisfied about the water discharge of a Deccan pump, 9 per cent are moderately satisfied and the remaining 6 per cent are dissatisfied.

Table 15: Table showing the satisfaction level of the respondents on the price of a Deccan pump

Level of Satisfaction	No of respondents	Percentage
Satisfied	43	57
Moderately Satisfied	32	43
Dissatisfied	0	0
Total	75	100

From the Table No. 15 it is inferred that 57 per cent of the respondents are satisfied with the price of a Deccan pump and 43 per cent are moderately satisfied.

Table 16: Table showing the opinion of the respondents whether they face any problem with their Deccan pump

Opinion	No of respondents	Percentage
Yes	15	20
No	60	80
Total	75	100

From the Table No. 16 it is clear that 80 per cent of the respondents do not face any problem with the Deccan pump and the remaining 20 per cent say that they face problems.

Table 17: Table showing the opinion of the respondents on frequently faced problems with the Deccan pump

Problems	No of respondents	Percentage
Over load	3	20
Burning of coil	7	47
Mechanical problem	5	33
Total	15	100

The Table No. 17 exhibits that 47 per cent of the respondents say that the burning of coil is a major problem that they face frequently with the Deccan pumpset, 33 per cent say it as Mechanical problem and 20 per cent say it as over load.

Table 18: Table showing the opinion of the respondents regarding the brand that they stock

Brand	No of respondents	Percentage
Texmo	2	8.0
CRI	3	12.0
Deccan	13	52.0
Sharp	3	12.0
Others	4	16.0
Total	25	100.0

The Table No. 18 reveals that majority (52 per cent) of the respondents prefer Deccan pumps regarding the brand they stock, 16 per cent others pumps stock, 12 per cent prefer for Texmo pumps and 8 per cent of the respondents are they kept stock in Texmo pumps.

Table 19: Table showing the opinion of the respondents regarding the reasons for referring Deccan pump

Reason	No of respondents	Percentage
Reputation of the manufacturer	1	8
Product features	3	23
Zero complaints	1	8
Cost	3	23
Due to new scheme	4	30
Performance	1	8
Total	13	100.0

The Table No. 19 reveals that majority (30 per cent) of the respondents prefer Deccan pumps due to new schemes, 23 per cent for cost and product features, 8 per cent prefer for performance, zero complaints and reputation of the manufacturers.

Table 20: Table showing the opinion of the respondents regarding the sales turnover incentives

Opinion	No of respondents	Percentage
High	2	15.0
Medium	8	61.0
Low	3	24.0
Total	13	100.0

From the Table No. 20 it is clear that a majority (61 per cent) of the respondents indicate that the sales turnover incentives are medium, 24 per cent indicate that it as low and remaining 15 per cent indicate it as High.

Table 21: Table showing the opinion of the respondents about the level of satisfaction on maintenance of Deccan pumps

Level of Satisfaction	No of respondents	Percentage
Satisfied	7	54.0
Moderately satisfied	4	31.0
Dissatisfied	2	15.0
Total	13	100.0

The Table No. 21 indicates that 54 per cent of the respondents are satisfied with the maintenance of Deccan pumps, 31 per cent are moderately satisfied and 15 per cent are dissatisfied with the maintenance of Deccan Pumps.

Table 22: Table showing the opinion of the respondents about the level of satisfaction on discharge of water of Deccan pump

Level of Satisfaction	No of respondents	Percentage
Satisfied	7	54.0
Moderately satisfied	5	38.0
Dissatisfied	1	8.0
Total	13	100.0

The Table No. 22 construes that 54 per cent of the respondents are satisfied with the discharge of water, 38 per cent opined as moderately satisfied and the remaining 8 per cent say that they are dissatisfied with the discharge of water of Deccan pump sets.

Table 23: Table showing the opinion of the respondents regarding the most effective media of advertising

Media	No of respondents	Percentage
Television	11	44.0
Wall paintings	4	16.0
Newspaper/ magazines	5	20.0
Hoardings	2	8.0
Others	3	12.0
Total	25	100.0

The Table No. 23 shows that 44 per cent of the dealers say that television is an effective media to advertise, 20 per cent opined as newspaper/magazines, 16 per cent as wall paintings, 12 per cent opined as other assorted medias and remaining 8 per cent say it as hoardings.

Chi-Square Test

Monthly Income	Level of Satisfaction		Total Satisfied
	Satisfied	Moderately	
Below 5000	11	6	17
5001-10000	15	9	24
10001-15000	9	7	16
15001-20000	8	10	18
Total	43	32	75

Observed	Expected	(O - E)	(O-E)^2	(O-E)^2/E
11	9.74667	1.25333	1.5708444	0.16117
15	13.76000	1.24000	1.5376	0.11174
9	9.17333	-0.17333	0.0300444	0.00328
8	10.32000	-2.32000	5.3824	0.52155
6	7.25333	-1.25333	1.5708444	0.21657
9	10.24000	-1.24000	1.5376	0.15016
7	6.82667	0.17333	0.0300444	0.00440
10	7.68000	2.32000	5.3824	0.70083
				1.86966

Calculated Value	Table Value	Degrees of Freedom	Significant
1.869696	7.815	3	Not Significant

As the calculated value of c^2 is less than the table value of 7.815 at 5% level of significance, there is no significant relationship between monthly income of the respondents and level of satisfaction on price.

H₀ : Null Hypothesis : There is no significant relationship between monthly income and level of satisfaction on price.

H₁ : Alternative Hypothesis: There is significant relationship between monthly income and level of satisfaction on price.

Table No. 24 shows the relationship between Monthly Income of Customers of Deccan Pumps and Level of satisfaction on price.

H₀ : Null Hypothesis: There is no significant relationship between problem faced and level of satisfaction towards maintenance.

H₁ : Alternative Hypothesis: There is significant relationship between problem faced and level of satisfaction towards maintenance.

As the calculated value of c^2 is more than the table value of 5.991 at 5% level of significance, there is significant relationship between problem faced by the respondents and level of satisfaction towards maintenance.

Table 25: Relationship between Problem Faced by Customers of Deccan Pumps and Level of Satisfaction towards Maintenance

Level of Satisfaction towards maintenance	Problem Faced		Total
	Yes	No	
Satisfied	5	40	45
Moderately Satisfied	5	15	20
Dissatisfied	5	5	10
Total	15	60	75

Observed	Expected	(O - E)	(O-E)^2	(O-E)^2 / E
5	9.00000	-4.00000	16	1.77778
5	4.00000	1.00000	1	0.25000
5	2.00000	3.00000	9	4.50000
40	36.00000	4.00000	16	0.44444
15	16.00000	-1.00000	1	0.06250
5	8.00000	-3.00000	9	1.12500
				8.159722

Calculated Value	Table Value	Degrees of Freedom	Significant
8.159722	5.991	2	Not Significant

Table No 25 shows the relationship between Problem Faced by Customers of Deccan Pumps and Level of Satisfaction towards Maintenance.

Findings from customer survey

- It was found that 57 per cent of the respondents come under the Agricultural sector, 27 per cent from Service sector and 16 per cent from the Business sector.
- It was found that 32 per cent of the respondents draw a monthly income between 5001 and 10000, 24 per cent of the respondents between 15001 and 20000, 23 per cent is below 5000 and remaining 21 per cent between 10001-15000.
- It was found that for 49 per cent of the respondents the media of awareness is through friends / relatives, 20 per cent through dealers, 17 per cent through television, 11 per cent through News paper / magazines and remaining 3 per cent through Wall paintings.
- It was found that 69 per cent of the respondents state that their pump is ISI certified and the remaining 31 per cent opined that their product is not ISI certified.

Findings from dealer survey

- It was found that 52 per cent of the dealers preferred to stock Deccan Pumps, 16 per cent preferred other brands, 12 per cent CRI and Sharp

Pumps and the remaining 8 per cent preferred to stock Texmo pumps.

- It was found that majority (30 per cent) of the respondents prefer Deccan pumps due to new schemes, 23 per cent for cost and product features, 8 per cent prefer for performance, zero complaints and reputation of the manufacturers.
- It was found that a majority (61 per cent) of the respondents indicate that the sales turnover incentives are medium, 24 per cent indicate that it as low and remaining 15 per cent indicate it as High.
- It was found that 54 per cent of the respondents are satisfied with the maintenance of Deccan pumps, 31 per cent are moderately satisfied and 15 per cent are dissatisfied with the maintenance of Deccan Pumps.

Suggestions

- It is suggested to the company to concentrate more on the pricing aspects as many respondents are not happy with the same. More incentives to dealers / offers to customers may be given to improve the market share.
- It is suggested to the company to look into the coil burning and mechanical problems as reducing the same would lead to a higher level of satisfaction on maintenance of the pump.
- It is suggested to the company to look into the problem of higher power consumption as many respondents are not satisfied about the same.
- It is suggested to the company to capitalize on the water discharge as many respondents are satisfied with the same.
- It is suggested to the company to offer better credit terms to the dealer as many dealers are not satisfied with the same.
- It is suggested to release frequent advertisements on Television to improve the image of the company.

Conclusion

For the company to have a competitive edge over

the others, they must have a flawless marketing policy. As far as pump sets are concerned they are marketed through a wide distribution/dealer network. The company must be able to satisfy customers for increasing their market share. So there is a need for studying the dealer and customer satisfaction towards the pump. In this regard the various factors which influence the customers to purchase the product and their satisfaction level are studied in this project. The name Deccan has a major impact on the pump industry and customers and dealers are happy with the brand. By implementing the above suggestions, the company can aim for a higher market share in the forthcoming years.

References

- Amarchand, D., & Jain, V. B. (1999). *A Text Book Marketing*, Konark Publishers, New Delhi.
- Eswar, (1992). *Indian Economy*, Wiley Eastern Ltd., New Delhi.
- Gupta, S.P. (1990). *Statistical Members*, Sultan Chand and Sons, New Delhi.
- Kumar, S. N. (1998). Unpublished MBA Project Bharathiar University, Coimbatore.
- Kothari, C.R. (1999). *Research methodology – Methods and Techniques*, Wishwa Prakashan, New Delhi.
- Niketha, E. (2001). Unpublished MBA Project Bharathiar University, Coimbatore.
- Kotler, P. (1999). *Marketing Management*, Prentice Hall India, New Delhi.
- Kotler, P. (1997). *Marketing Management, Analysis Planning and Control*, Practice Hall, New Delhi.
- Sharma, D.P. (1997). *Marketing Research – Sultan Chand and Sons Publications*, New Delhi.
- Sherlekar, S.A. (1991). *Marketing Management*, Himalaya Publishing House, Bombay.
- Suresh, K. S. (2000). Unpublished MBA Project, Bharathiar University, Coimbatore.
- Vinoth, M.N. (1993). Unpublished MBA Project, Bharathiar University, Coimbatore.

DEPRECIATION ACCOUNTING: POLICIES AND PRACTICES IN INDIAN COMPANIES

Sunil Kumar*
Naveen Sirohi **
Bhavet ***

Abstract: *This paper examines the policies and practices of depreciation accounting by the computer companies in India. The main focus of the study is to find out the preference of methods and rates of depreciation being adopted by the computer companies in India with reference to the methods and rates stated in Schedule XIV of Companies Act. Analysis is based on data collected from the annual reports of 54 listed computer companies in India. An examination has also been made to know whether there is any association between choice of depreciation method rates and company's characteristics like Age, Turnover, Paid up capital, Ownership and Region of the companies.*

Key Words: *Depreciation Methods, Depreciation Rates, Schedule XIV of Companies Act, Turnover, Paid up capital*

Introduction

Depreciation is most discussed topic in accounting. The term depreciation is derived from the Latin words "De" (meaning down) and "Pretium" (meaning Price) and in popular everyday usage simply means a decline in value. The Customs and Inland Revenue Act of 1875 was one of the first official recognition of depreciation in the world.

Review of Literature

Kapoor (1965) "Some methods of depreciation and their impact on business decisions", discussed three depreciation methods viz. (i) Straight-line (ii) Reducing balance (iii) Sum of digits. He analyzed their impact on business decisions by giving comparative statements of results under different methods. Aggarwal (1978) "Depreciation Accounting-A Probabilistic Approach" considered probabilistic measure as better than conventional methods.

Buckley (1992) The Accounting Standard Committee (TR648) has issued a publication on the current version of SSAP 12, where it has been agreed that provision for depreciation were allocations of cost (or revalued amount) rather than reflection of loss of value of fixed assets during the period. Thus amended the definition of depreciation accordingly. This definition confirms that depreciation is a process of allocating cost to the business and not base on changes in value. Das (1995) "Depreciation and Excise Duty - A case for Review" suggested that in order to minimize the possibilities of divergent treatments of items like depreciation, excise duty etc. in the accounts and to ensure uniformity; and comparability, efforts should be made for standardization.

Barbara M. Fraumeni (1997) depreciation is the change in value associated with the aging of an asset. As asset ages, its price changes because it declines in efficiency, or yields fewer productive services, in the

*Dr. Sunil Kumar, Faculty, School of Management Studies, IGNOU, Maidangarhi, New Delhi-11006.

Email: sunilk4gupta@yahoo.co.in

**Mr. Naveen Sirohi, Faculty, Chandiwala Institute of Management, Dwarka, New Delhi.

Email: naveensirohi@yahoo.co.in

***Mr. Bhavet, Assistant. Professor, Department of Management. Studies, MM University, Maullana.

Email: bhavetgarg@gmail.com

current period and in all future periods. Kate and Herman (1997) the Bureau of Economic Analysis (USA) define depreciation as “the decline in value due to wear and tear, obsolescence, accidental damage and aging” this includes retirements or discards. The Bureau of Economics Analysis (BEA) viewed depreciation as a cost incurred in the production of gross domestic product (GDP), as a deduction in the calculation of business income, and as a partial measure of the value of services of government fixed asset.

Bhat (1999) “Capital depreciation accounting - Recognizing current purchasing power” tried to give a new version of Capital depreciation accounting in the era of changing prices. In his words “ Capital depreciation accounting means valuing the capital at current purchase price and providing from the profits/financial system of the firm to bring up the capital figure to the extent of loss or erosion so incurred.” Further, Capital depreciation accounting was an attempt to provide for the loss in the purchasing power of money which was infused into the system originally and thus restore its original value.

Rhys (2000) the way which the quantity of assets wastes away overtime, with “physical depreciation”. Here assets are categorized into two categories, which are discrete or continuous. Discrete is where the assets waste away one at a time as in a number of machineries in used. Continuous asset on the other hand is like a tank of oil, which will waste away through use or evaporation in a continuous fashion.

Narayanaswamy (2001) in his book “ Financial Accounting: A Managerial Perspective “ explained the concept of Fixed Asset and Depreciation in a very elaborate manner. He concluded that depreciation was not a source of cash. It was similar to any other expense as it reduces profit, but with a difference that it did not entail a cash payment.

Dun (2005) “Depreciation - Methods of Accounting” looked at three methods of depreciation viz. Straight line method, Written down value method and sum of years’ digits methods along with the factors of providing depreciation in the light of FRS 15 in detail with examples.

Schedule XIV of the Indian Companies Act, 1956

It provides for the rates of depreciation to be charged on the assets by the companies while

preparing their balance sheet and profit and loss account in accordance with Section 350 and while providing the dividend under section 205, respectively, of the Companies Act, 1956 (the “Act”).

The Government of India has in the meantime, notified Companies (Accounting Standards) Rules, 2006 (the “Rules”) under the Act. For the present, in pursuance of the requirements under the Act and to provide guidance for ascertaining the amount of depreciation to be charged, it is proposed to retain Schedule XIV with suitable modifications/ amendments. The purpose of such exercise is to provide comprehensive guidance for charging of depreciation by companies in compliance of the Act, enable consistency between Schedule XIV and the Rules, recognition of assets arising out of concession agreements/contracts/agreements relating to relating to infrastructure projects etc, and amortization of the same. On the basis of the issues arising in implementation of provisions relating to depreciation under the Act noticed by the Ministry from time to time, changes felt desirable in Schedule XIV to address the environment determined by the Accounting Standards Rules have been prepared.

Objectives of the Study

The major objective of the study is to find out the different depreciation practices being followed by computer companies in India with reference to Schedule XIV of Companies Act.

Following are the other objectives considered in support of the above major objective:

- To study which of the method(s) as stated in the Schedule XIV of Companies Act 1956 is being adopted by computer companies in India;
- To enquire how many computer companies are using method other than the methods stated in Schedule XIV and whether requisite disclosure is being made.
- To find out whether the companies are using higher rate than the rates prescribed in Schedule XIV and whether requisite disclosure is being made.
- To investigate whether companies are creating Sinking fund, Replacement Reserves etc. or not. If they are doing so, then to study the investment of such funds.
- To examine whether the companies are providing for inflation adjustments.

Scope of the Study

All depreciable assets, like Buildings, Plant and Machinery, Vehicles, Furniture etc., are considered for study except the following :

- a. Forest, Plantation and similar regenerative resources.
- b. Wasting Assets
- c. Expenditure on research and development
- d. Goodwill/patents/copyrights
- e. Live stock

Methodology

From all of the listed computer (Hardware, Software and Information Technology) companies in India a sample of 54 has been taken for the study. Secondary data have been gathered from the available published annual reports of the above mentioned computer companies. Tabular analysis, percentages, and chi square test have been applied for analyzing the same. The period for the study is eight years (2001-2009). The following abbreviations have been used at different places including tables:

- i. SLM denotes Straight-line method,
- ii. WDV refers to Written down value method,
- iii. SCH XIV refers to Schedule XIV of Companies Act,
- iv. HALL implies higher rate of depreciation (than Sch XIV rates) in all assets,
- v. I. Tax rates mean rates of depreciation as prescribed by Income Tax Act,
- vi. HSA represents higher rate of depreciation (than Sch XIV rates) in some assets,
- vii. Pvt. SPL means private sector public limited companies.

Hypotheses

Chi-square test has been used in this study for testing the following hypotheses:

- There is no association between choice of depreciation method and company’s characteristics such as age; turnover, paid up capital ownership pattern and region of company.
- There is no association between choice of depreciation rates and company’s Characteristics such as age, turnover, paid up capital, ownership pattern and region of the company.

Organization of the Study

The main focus of the study is to find out the practices of computer companies regarding depreciation methods and depreciation rates as proscribed by Sch XIV of Companies Act.

The study has been organised into following sub heads:

- 1. General Discussion
- 2. Age-wise Study
- 3. Turnover-wise Study
- 4. Paid -Up Capital-wise Study
- 5. Ownership Pattern-wise Study
- 6. Region-wise Study

1. General Discussion

That data relating to 54 companies compiled and analyzed. The Table 1 shows the breakup of companies for depreciation accounting.

Table 1 : Method-wise Breakup of Companies

No. of Companies	SLM	WDV	SLM & WDV
54	45	4.04	5.0
Percentage	83.33	7.41	9.26

Source: Annual Reports of the Companies.

SLM = Straight Line Method; WDV= Written Down Value Method

The above table reveals that about 83 per cent of sample companies are opting for SLM followed by simultaneous use of SLM and WDV method by about 9 per cent of companies. About 8 per cent of companies have been opting for WDV method.

Sch XIV = Schedule XIV of Companies Act; HALL= Higher than Sch. XIV rates in case of all assets; HSA=

Table 2: Rate-wise Breakup of Companies

No. of Companies	Sch XIV	HALL	Sch XIV & HSA	I. Tax	Sch&IT
54	12	24	16	—	2
Percentage	22.22	44.45	29.63	—	3.70

Source: Annual Reports of the Companies.

Higher (than Sch XIV) rates in some Assets; I. Tax =Income Tax

From Table 2, 22 per cent of the total sample companies are using Sch XIV rates as the base rates for providing depreciation. However the combination of Sch XIV rates and HSA policy has been preferred by about 30 per cent of the sample companies. As far as the higher rates in all assets (HALL) is concerned it has got quite good response from computer companies in India as about 45 per cent of the sample companies are practicing this policy. Computer companies in India do not welcome the use of Income Tax rates for providing depreciation as no company out of 54 companies has been using these rates. A very small percentage of companies i.e. about 4 per cent has been opting for combined use of SCH XIV & I Tax rates. This indicates that combined use of SCH XIV & I Tax rates is not in the common practice amongst the computer companies in India.

2. Age -wise study

Under this companies are divided into five categories viz. below 5 years, 5-10 years, 10-15 years, 15-20 years and above 20 years (Refer Table 3).

Preference of Method

Table 3 reveals that 67 per cent of the companies below the age of 5 years have been using SLM. Whereas 79 per cent companies in the age group of 5-10 and 83 per cent of the companies in group of 10-15 years are using SLM. Further in the age group of 15-20 years 100 per cent companies opt for SLM whereas 91 per cent of companies above the age of 20 years provide depreciation according to SLM. Further 17 per cent of the companies below 5 years of age adopt the policy of combined use of SLM and WDV method followed by 15 per cent of companies under the age group of 5-10 and 5 per cent in 10-15 years age group. One company out of the eleven companies in the age group of above 20 years i.e. 9 per cent uses the above combination. Interesting thing is that according to the data no sample company in the age group of 15-20 years follows combination of these two methods. Next comes the choice of WDV method in this case about 7 per cent of below 5 years of age, 17 per cent companies in the age group of 5-10 years and 12 per cent in case of 10-15 years category prefer WDV method only.

In case of remaining categories no company has been opting for WDV method. The above analysis indicates that SLM is the most preferred method by the computer companies irrespective of their age. Statistically the computed lesser value of the chi-square than the tabular value shows the acceptance of the hypothesis that use of depreciation method is not associated with age.

Preference of Rates

Companies below the age of 5 years do not opt for Sch XIV rates. Rather they prefer HALL and the combination of Sch XIV rates & HSA policies (refer Table 4). As out of the 6 companies under this age group 4 (67 per cent) companies use HALL and the remaining 2 (33 per cent) opt for the combination of Sch XIV rates & HSA policy. In the age group of 5-10 years 10 (60 per cent) out of 17 companies use HALL policy followed by 3 (17 per cent) companies in the age group of 5-10 years use Sch XIV rates and the same number of companies i.e. 3 (17 per cent) use combination of Sch XIV rates & HSA policy in this age group. Remaining 1(6 per cent) company has opted for combination of Sch XIV and I Tax rates. 7 out of 15 (46 per cent) companies in 10-15 years age group are using HALL policy. However 4(27 per cent) companies have used SCH XIV rates and same number has used Combination of SCH XIV and HSA rates in 10-15 years age group i.e. 27 per cent. 3(60 per cent) out of the 5 companies in the age group of 15-20 are using Sch XIV rates. Further in this age group 1(20 per cent) company uses combination of Sch XIV and HSA and remaining 1(20 per cent) opts for HALL policy. 6 (55 per cent) out of 11 companies with standing of more than 20 years are using the combination of Sch XIV rates & HSA policy whereas 2(18 per cent) companies in each case under this age group are opting for Sch XIV rates and HALL policy respectively. Remaining 1(9 per cent) company of this age group opted for combination of Sch XIV and ITax rates. With the exception that companies above the 20 years of age are not much inclined to Sch XIV. Rather they prefer the combination of Sch XIV rates & HSA policy. The computed value of chi-square is smaller than the tabulated value, the hypothesis that there is no association between age and the choice of depreciation rates, is accepted.

3. Turnover -wise Study

Under this the corporate sector has been divided into five segments. Viz. below Rs. 50 crore, Rs. 50- 100 crore, Rs. 100-150 crore, Rs. 150-200 crore and above Rs. 200 crore.

Table 3: Study of Depreciation Method used by Computer Companies in India w.r. to Age, Turnover, Paid up Capital, Ownership Pattern and Region

Age	(years)	SLM	WDV	SLM & WDV	TOTAL
1.	Below 5	4(67)	10(7)	1(17)	6
2.	5-10~	11(79)	1(7)	2(15)	14
3.	10-15	15(83)	2(12)	1(5)	18
4.	15-20	5(100)	-	-	5
5.	Above 20	10(91)	-	1(9)	11
Turnover (cr.)					
1.	Below50	12(75)	2(12.5)	2(12.5)	16
2.	50-100~	9(90)		1(10)	10
3.	100-150	3(60)	1(20)	1(20)1(20)	5
4.	150-200	6(86)	-	1(14)	7
5.	Above 200	15(93)	1(7)	-	16
Paid up Capital (cr.)					
1.	1-10	14(88)	1(6)	1(6)	16
2.	10-25	14(70)	2(10)	4(20)	20
3.	25-50	10(100)	-	-	10
4.	Above 50	7(88)	1(12)	-	8
Ownership					
1.	Pvt. Sector Public Limited Companies		37(84)	2(5)	5(11) 44
2.	Govt. Companies		3(100)~	-	3
3.	Foreign Companies		5(71)	2(29)	7
Region					
1.	North	9(100)	-	-	9
2.	South	18(82)	2(9)	2(9)	22
3.	East	3(75)	1(25)		4
4.	West	15(79)	1(5)	3(16)	19
	TOTAL	45	4	5	54

Preference of Method

This has been observed from Table 3 that SLM of depreciation is used by 75 per cent, 90 per cent, 60 per cent, 86 per cent and 93 per cent of companies having turnover range of Rs. 0-50 crore, Rs. 50-100 crore, Rs. 100-150 crore, Rs. 150--200 crore, and above Rs. 200 crore respectively. WDV method is used by 2 (12.5 per cent) out of 16 companies in Rs. 0-50 crore segment. 1(20 per cent) out of 5 companies in Rs. 100- 150 crore and 1(7 per cent) out of 16 companies in above Rs. 200 crore segment. Combination of SLM and WDV methods has been used by only 5 companies with bifurcation as 2 companies belong to Rs. 0-50 crore segment and

one company each from Rs 50-100 crore, Rs. 100-150 crore and Rs. 150-200 crore segment respectively. No company above Rs. 200 crore segments has been opting for Combination of SLM and WDV methods. Chi-square test results prove that there is no association between turnover and the choice of method of providing depreciation.

Preference of Rates

As far as the rates of Sch XIV are concerned *only* 37.5 per cent, 30 per cent, 20 per cent, 17 per cent and 6 per cent of companies having turnover ranging from Rs. 0-50 crore, Rs. 50-100 crore, Rs. 100-

150 crore, Rs. 150-200 crore and above Rs. 200 crore respectively are using these rates. The percentage of use of HALL rates are 37.5 per cent, 40 per cent, 20 per cent, 66 and 53 per cent by companies having turnover range of Rs. 0-50 crore, Rs. 50-100 crore, Rs. 100-150 crore, Rs. 150--200 crore and above Rs. 200 crore respectively. This indicates that companies having turnover more than Rs. 150 crore prefer HALL policy than Sch XIV rates. In case of the combined use of Sch XIV and HSA the percentage is 19 per cent, 30 per cent, 60 per cent, 41 per cent by companies having turnover range of

Rs. 0- 50 crore, Rs. 50-100 crore, Rs. 100-150 crore and above Rs. 200 crore respectively. No company having turnover ranging between Rs. 150-200 crore is using the combination of Sch XIV and HSA rates. Hypothesis, that choice of rates of providing depreciation is not associated with turnover, is proved.

4. Paid-up capital-wise Study

In this section corporate sector has been divided into four segments, viz. Rs.1-10 crore, Rs. 10-25 crore, Rs. 25-50 crore and above Rs. 50 crore.

Table 4: Study of Depreciation Method used by Computer Companies in India w.r. to Age, Turnover, Paid up Capital, Ownership Pattern and Region

Age (years)		SLM XIV	HALL	I.TAX	Sch & I.Tax	Sch & HSA	TOTAL
1.	Below 5	---	4(67)	---	---	2(33)	6
2.	5-10~	3(17)	10(60)	---	1(6)	3(17)	17
3.	10-15	4(27)	7(46)	---	---	4(27)	15
4.	15-20	3(60)	1(20)	---	---	1(20)	5
5.	Above 20	2(18)	2(18)	---	1(9)	6(55)	11
Turnover (cr.)							
1.	Below50	6(37.5)	6(37.5)	---	1(6)	3(19)	16
2.	50-100~	3(30)	4(40)	---	---	3(30)	10
3.	100-150	1(20)	1(20)	---	---	3(60)	5
4.	150-200	1(17)	4(66)	---	1(17)	---	6
5.	Above 200	1(6)	9(53)	---	---	7(41)	17
Paid up Capital (cr.)							
1.	1-10	4(25)	9(56)	---	---	3(19)	16
2.	10-25	4(20)	8(40)	---	2(10)	6(30)	20
3.	25-50	1(10)	8(40)	---	---	5(50)	10
4.	Above 50	3(37.5)	3(37.5)	---	---	2(25)	8
Ownership							
1.	Pvt. Sector Public Ltd.Co. Limited Companies	8(18)	20(45)	---	2(5)	14(32)	44
2.	Govt. companies	2(67)	-	---	---	1(33)	3
3.	Foreign Companies	2(29)	4(57)	---	---	1(14)	7
Region							
1.	North	4(45)	4(45)	---	---	1(10)	09
2.	South	4(18)	10(45)	---	1(5)	7(32)	22
3.	East	1(25)	1(25)	---	---	2(50)	04
4.	West	3(16)	9(47)	---	1(5)	6(32)	19
	TOTAL	12	24	---	2	16	54

Preference of Method

Table 3 reveals that in Rs.1-10 crore segment 14 (88 per cent) out of 16 companies are using SLM, whereas 1(6 per cent) company each has been using combination of SLM & WDV method and WDV method under this segment. 14 (70 per cent) out of 20 companies in Rs.10-25 crore segment have chosen SLM, 2(10 per cent) have opted for WDV method and remaining and 4 (20 per cent) opted for combination of SLM & WDV method. All companies under Rs.25-50 crore segments are using SLM of providing depreciation. Whereas above Rs.50 crore category 7 (88 per cent) out of 8 companies are opting for SLM and remaining 1(12 per cent) company has been using combination of SLM and WDV methods. The hypothesis that there is no association between paid up capital and choice of method is accepted.

Preference of Rates

Table 4 provides that in Rs.1-10 crore segment 4(25 per cent) out of 16 companies use Sch XIV rates, 9(56 per cent) opt for HALL policy and remaining 3(19 per cent) companies use the combination of Sch XIV and HSA policy. 4(20percent) out of 20 companies having capital Rs.10-25 crore are using Sch XIV and 6.30 per cent) Sch XIV & HSA rates. 8(40 per cent) use HALL policy in this category and remaining 2(10 per cent) companies use the combination of Sch XIV and I Tax rates. Whereas in case of Rs.25-50 crore category only 1(10 per cent) out of 10 companies opt for Sch XIV rates. Under this category 5(50 per cent) and 4(40 per cent) of the companies has used combination of Sch XIV & HSA and HALL policies respectively. In above Rs.50 crore category 3(37.5 per cent) out of 8 companies in each opt for Sch XIV rates and HALL policy and remaining 2(25 per cent) companies are using combination of Sch XIV and HSA rates. Statistically hypothesis that there is no association between paid up capital and choice of depreciation rates are proved.

5. Pattern of Ownership

For the purpose of the study, ownership has been divided into following three segments: Private sector Public limited companies (Pvt.SPL), Government Companies and Foreign companies. Table 3 Study of Depreciation Method used by Computer Companies in India w.r. to Age, Turn-

over, Paid up Capital, Ownership Pattern and Region.

Preference of Method

After analyzing the available data in Table 3 it emerges that 84 per cent of the Pvt. SPL computer companies use SLM whereas all sample Government companies use SLM As far as the foreign computer companies are concerned 5 (71 per cent) out of are using SLM. Only 2(5 per cent) out of 44 companies from Pvt. SPL sector are using WDV method. Whereas no Government company from the sample has been opting for WDV method. Only 2 (29 per cent) out of 7 foreign companies are using WDV as method of providing depreciation. In case of use of both SLM and WDV methods simultaneously 5(11 per cent) out of 44 of the Pvt. SPL companies are opting for the above practice. Whereas neither Foreign nor the Government companies use both SLM and WDV methods simultaneously. This shows that the simultaneous use of SLM and WDV method has been practiced only in Pvt. SPL concerns. The hypothesis that the adoption of depreciation method is not associated with ownership pattern is accepted.

Preference of Rates

If we consider the use of rates of providing depreciation from ownership pattern-wise it has been observed from Table 4 that 2 (67 per cent) out of 3 Government companies are opting for the Sch XIV rates. Whereas in case of Pvt.SPL companies 8(18 per cent) companies out of 44 and 2(29 per cent) out of foreign companies are using Sch XIV rates for providing depreciation. As far as the practice of combination of Sch XIV & HSA is concerned 14 (32 per cent) of Pvt.SPL companies adopt this policy. However Government companies and foreign companies have shown lesser interest towards practice of combination of Sch XIV & HSA with 1(33 per cent) out of 3 companies and 1(14 per cent) out of 7 companies respectively. Further no company from all the three sectors has been using rates given under Income Tax Act. Government companies and foreign companies have, once again, not adopted the practice of combination of Sch XIV & Income Tax rates. Whereas about 5 per cent of the Pvt.SPL companies are using this. As far as the HALL policy is concerned about 4(57 per cent) out of 7 foreign companies and 20(45 per cent) out of 44 Pvt.SPL companies have opted for this. Whereas Government companies say no to this practice as no company has opted for this

policy in the data collected. The hypothesis that there is no association between ownership pattern and use of rates is proved.

6. Region-wise Study

For simplification and purposeful conclusions Corporate sector in India has been divided into four geographical regions viz. North, South, East and West.

Preference of Method

The data collected in Table 3 show that it is the northern region where the entire sample companies are opting for SLM. In case of southern companies about 18(82 per cent) out of 22 companies use SLM and 2(9 per cent) companies opt for WDV method and remaining 2 (9 per cent) companies use combination of SLM and WDV method. 3(75 per cent) out of 4 companies from Eastern region adopt SLM for providing depreciation and remaining 1(25 per cent) company from the same region opt for WDV method. In the Western region companies 15(79 per cent) out of 19 companies are using the SLM however 3(16 per cent) companies from this region prefer combination of SLM and WDV method and only 1(5 per cent) company use WDV method alone for providing depreciation. The hypothesis that there is no association between adoption of method of providing depreciation and regions is accepted.

Preference of Rates

Now we can study the region-wise preference of rates of depreciation by Computer companies in India. By referring Table 4 we can observe that in each case of northern companies 4(45 per cent) out of 9 companies have opted for Sch XIV & HSA policy have been opted by 45 per cent and 32 per cent of the companies respectively. Only 18 per cent of the companies are using Sch XIV rates for providing depreciation in this region. Only 1(5 per cent) company out of 22 uses both rates simultaneously as prescribed by Sch XIV and Income Tax Act. 1(25 percent) company in each case out of 4 sample entities in eastern region has been following Sch XIV rates and HALL policy respectively. Remaining 2(50 percent) companies are using the combination of Sch XIV & HAS policy. Only 1(5 per cent) company from western regional has opted for the combination of Sch XIV rates and I Tax rates. The hypothesis that there is no

association between adoption of rates of providing depreciation and regions is accepted.

Findings

From the above discussion it is concluded that:

SLM is the most preferable method amongst the computer companies in India.

- Combination of SLM and WDV methods is the next preference of Computer companies in India.
- WDV method alone is least preferred.
- No Company has opted for method other than SLM and WDV.
- All sample Govt. companies prefer SLM whereas 84 percent of private sector limited companies opt SLM.
- SLM is more popular in all segments of paid up capital.
- All sample companies in north region follow SLM.
- The combination of Sch XIV & HAS and HALL policies are popular in computer companies in India as compared to the adoption of Sch XIV rates.
- Use of Sch XIV rates is the next preferred policy by computer companies in India.
- No Sample company has been using Income Tax rates for providing depreciation.
- Foreign computer companies in India prefer Hall policy, as about 57 per cent of sample foreign companies are opting for this.
- Rates given under Sch XIV are more preferred in northern region as compared to other regions.
- Private sector public limited computer companies prefer HALL policy followed by combination of Sch XIV & HSA.
- Not even a single company has been creating sinking fund or replacement reserves.
- NO company has created inflation reserve.

Implications and Suggestions

Following are the two main implications of the study:

1. Straight Line Method is the most preferred method amongst the computer companies in India.
2. Majority of the computer companies are using depreciation rates higher than Sch XIV rates. As far as the method of providing depreciation is concerned in an industry, like computer industry where technological changes are more frequent and which is prone to obsolescence, method of charging higher amount of depreciation in the earlier years is more suitable.
3. In practice it has been observed that most of the companies are providing depreciation at fixed installments. Rather WDV method is more suitable to these companies as under this method the higher amount of depreciation is provided in the early years of an asset's life. Although no company has been providing for inflation adjustments yet it is a positive sign that most of the companies are using higher rates than the rates prescribed by Sch XIV. The purpose behind this practice may be to offset the impact of inflation on depreciation charge based on historical cost of the depreciable assets.

References

- Aggarwal, J. D. (1978, January). Depreciation Accounting: A Probabilistic Approach *The Chartered Accountant*, (pp. 33-34).
- Batilibo, J.R. (2009). *Financial Management: Theory and Practice*. In Gupta, S.K. & Sharma, R.K (Eds.). (pp. 24.1-24.3). Kalyani Publishers, Ludhiana.
- Bhat. V. P. (1999). Capital Depreciation Accounting-Recognizing Current Purchasing Power. *The Hindu Business Line*.
- Dass, A.K. (2005, September). Depreciation and Excise Duty – A Case for Review. *The Chartered Accountant*, (pp. 20-21).
- Dun, P. E. (2005, December). Depreciation – Methods of Accounting. Retrieved from <http://www.accountingweb.do.uk/item/38170>.
- Foster, J.R., & Bernard, S. R. (2001). *Public Utility Accounting*, Prentice Hall Inc., p. 324, New York.
- Jain, N. K. (2006). August, Adoption of Straight Line Method of Depreciation, *The Chartered Accountant*, (pp. 83-84).
- Kapoor, O.N. (2005 July-September). Some Methods of Depreciation and their impact on Business Decisions. *Indian Journal of Commerce*, (pp. 263-264).
- Narayanswamy, R. (2001). *Financial Accounting: A Managerial Perspective*, Prentice Hall of India Pvt. Ltd., New Delhi, (pp. 289-290).
- Rathor, B.S. (2006, April-June). Depreciation and Replacement in Modern Management Thinking, *The Indian Journal of Commerce*, (pp. 159).
- Spicer, Pegler, Maheshwari, S.N. (2008). *An Introduction to Accountancy*, p. 224. Vikas Publishing House Pvt. Ltd.



IMPACT OF PROMOTIONAL TOOLS ON SALES AND CONSUMERS' BUYING DECISION: A COMPARATIVE STUDY OF ATL AND BTL

Geeta Nema*
Dhanashree Nagar**
Maitri Shah***

Abstract: This paper is an attempt to study the impact of promotional tools on sales and consumer buying decision. The study is focused on the comparative aspect of ATL and BTL and their effect is observed on the output in terms of sales and purchase decision. A comparative study has also been carried out to find the better promotional attempt out the two to increase sales and influence the buying decision of the customer. The survey technique is used to collect the primary data from the sample respondents and the analysis is done by using correlation and factor analysis. The results of the study indicate that there are six factors related to the impact of promotional tools on sales and consumer buying decisions namely: print and outdoor advertisement, sales promotion tools, TV advertisements, impulse and repetitive buying, personal selling activities and discounts and unplanned buying.

Keywords: ATL and BTL promotion, sales, buying decision

Introduction

Promotional activity has always been the important activity of an organization. It is a mode of communicating with the existing and potential customers. A product is designed and developed according to the needs of the customers; cost and market trends decide its price and channel members put it in the shoes of the customers. Promotion involves all the efforts that a marketer uses to take his product from the factory to the customers. The various promotional tools include:

- **Advertising-** A popular but comparatively costly mode of promotion with use of mass media vehicles like TV, radio, newspaper, etc.
- **Direct Marketing-** A tool where manufacturer directly contacts to the consumers through mails.
- **Personal Selling-** One to one selling where

consumer and seller's representative have face to face interaction.

- **Sales Promotions-** Short term incentives in monetary and non monetary form to increase the sales.
- **PR and Publicity-** Tools like events, exhibitions, and press conferences etc. used to approach a huge crowd.

Promotion can be classified into two categories, Above the line (ATL) promotion and Below the line (BTL) promotion. In organizational business and marketing communications, ATL and BTL are the techniques that help a customer to build any brand or product preference. Promotional activities carried out through mass media such as television, radio and newspaper, are classified as 'Above the line' promotion. The terms 'Below the line' promotion or

*Dr Geeta Nema, Reader IIPS, DAVV, Indore-452001. E-mail: geetanema@rediffmail.com

**Ms Dhanashree Nagar, Lecturer, Shri Vaishnav Institute of Management, Indore, Sch. No. 71, Gumasta Nagar, Indore-452009. E-mail: hi_dhanashree@yahoo.co.in

***Ms Maitri Shah, Lecturer, Shri Vaishnav Institute of Management, Sch. No. 71, Gumasta Nagar, Indore-452009. E-mail: shahmaitri04@yahoo.co.in

communications, refers to forms of non-media communication, even non-media advertising. (Pithadia, 2005) Below the line promotions are becoming increasingly important within the communications mix of many companies, not only those involved in FMCG products, but also for industrial goods.

Above the line (ATL) and below the line (BTL) promotion

Above the line is a type of advertising through media such as TV, cinema, radio, print, banners and search engines to promote brands. Major uses include television and radio advertising, web and internet banner ads.

Below-the-line sales promotion is an immediate or delayed incentive to purchase, expressed in cash or in kind, and having only a short term or temporary duration. BTL promotion involves direct interaction with the consumers through direct mails, product display and demonstrations, exhibitions, price discounts, coupons as well as sales promotion. Another interesting and very effective BTL promotion is trained sales personnel, often young women, are deployed at Retail Stores, near the shelves of targeted products. These young women convince customers visiting these shelves about the better aspects of their brand compared with others.

ATL Vs BTL Techniques

BTL techniques ensure recall of the brand while at the same time highlighting the features of the product, ATL techniques are used to inform 'something about the brand to mass media. ATL promotions are tailored for a mass audience, BTL promotions are targeted at individuals according to their needs or preferences. While ATL promotions can establish brand identity, BTL can actually lead to a sale. ATL promotions are also somewhat impossible to measure well, while BTL promotions are highly measurable, giving marketer's valuable insights into their return-on-investment.

Methods of Above the line (ATL) Promotion

Above the line promotion includes promotion methods using "mass media", for example TV, print or the internet. Such techniques are usually seen as impersonal, designed to reach as many people at as little cost as possible. They include:

- TV, Radio and Cinema - allows businesses to target a large group of people.
- Print through newspapers and magazines - allow advertisers to reach specific groups of people.
- The web - allows businesses to reach a large international audience at a very low cost.
- Outdoor/transport - advertisements on the side of busses and outside shops.

Methods of Below the line (BTL) Promotion

- **Price promotion:** These can be done in two ways:
 - » A discount to the normal selling price of a product, or
 - » More of the product at the normal price
- **Coupons:** The coupons attached with the product, a buyer has to fill in the coupon and claim for the prize. Normally the winner is selected through lucky draw.
- **Gift with purchases, also gifts certificates:** This is one of the ways to lure the customers. The "gift with purchase" is a very common promotional technique. In this scheme, the customer gets something extra along with the normal good purchased. E.g. buy a packet of coffee and get a glass or jar free with it.
- **Competitions and prizes:** Once the customer purchases the product he is invited to participate in competition like 'Complete the slogan' or 'I like this product because...' etc.
- **Money refunds:** Here, a customer receives a money refund after submitting a proof of purchase to the manufacturer.
- **Point-of-Purchase display:** Most of the decisions of buying are taken by the virtue of point-of-sale displays in the retail outlets. In big retail stores like Big Bazaar the buying decision can be stimulated by offering point of purchase promotion scheme.

Review of Literature

Mela and Gupta (1997) in a study on long term impact of promotions on consumers stated that non loyal consumers become more price and promotion sensitive over time because of reduced ads and increase promotions. Thus they increase the sales of promoted product. But the loyal consumer responds less and thus does not increase the sales much to the considerable amount compared to the sales of the

brand towards which he is loyal. Point of purchase or point of sales promotions also plays an important role in stimulating buyer's response for brand.

Vyas (2005) has studied the consumer preferences for sale promotion schemes for FMCG products. It has found that irrespective of demographic variations, sales promotion offer which provides immediate incentive, especially of price cut nature are likely to appeal to all the segments. Sales promotions and advertising functions stimulate the customer purchase decision in consumer durable products (Pithadia & Sharma 2005). The study examined the comparative effectiveness issue of sales promotion and advertising measures where the results showed that consumers perceived Sales Promotion as a purchase decision factor over advertisement.

Vyas (2007), indicates that usage of sales promotion activities has a direct impact on behaviour and it motivates a consumer to buy now rather than in future. According to Johnson (2006), point-of-sales promotion has emerged as a competitive strategy for retail firms. Despite the apparent risks, managers are exploring the scope of acquiring and retaining customers.

The study by Alvarez and Vazquez (2005) evidences the influence that sales promotion has on brand choice behaviour. The study reveals that promotion based on price has the greatest effectiveness compared to others tools of promotion.

Ayanwale et al (2005) studied on influence of advertising on consumer brand preferences. The study reveals that brand preference does exist in the food drink industry. Advertising helps in projecting product quality and value to the consumers.

Schultz (2004), argues that over dependence on promotions can erode consumers' price-value equation. The results of a study by Jedidi et al. (1999) indicates that in the long term, advertising has a positive effect on brand equity where as price promotions have a negative effect.

Vecchioa, Henardb, and Frelingc (2006) found that on an average, sales promotions have neither a positive nor a negative effect on brand preference beyond the promotion period. Rajagopal (2008) found that brand loyal customers are attracted to the store brands during the promotional offers, while new shoppers are price sensitive and are attracted by promotions and volume discounts.

Lefa and Teng (2009) have compared two types of price discounts and found that the effects of the

discounts may change consumers' attitudes and purchase intentions regarding a particular brand.

Bansal and Singh (2008) have conducted a study on the customers' decision to visit a shopping mall and various factors associated with their satisfaction level. It has been observed that customers generally buy the grocery and raw food from the shopping malls. The study found that apart from the quality of the products, what lures the customers to make purchases from shopping malls is the advertising and sales promotion adopted by shopping malls.

Rawal (2009) has linked advertising to the impulsive buying. According to the study in-stores or point of purchase advertising can be strategically designed to draw the attention of the consumers and entice them to try and buy the product.

Objectives of the study

1. To analyze various promotion related (ATL & BTL both) factors creating impact on consumers' buying decision
2. To study the effectiveness of Below-the-line (BTL) promotion techniques on sales and consumer buying decision.
3. To study the impact of Above-the-line (ATL) promotion techniques on sales and consumer buying decision.
4. To compare the effectiveness of ATL and BTL.

Methodology

The study has been carried out to find out the effectiveness of ATL and BTL. A comparative study is done to find out the effective mode of promotion which results into sales and affect the purchase decision of the customer out of the above two. The sample size of 77 respondents has been selected randomly. The source of primary data collection is through structured questionnaire. The questionnaire is divided into two parts. Part I has the demographic information of the respondent. Part II has been designed with structured questions on different variables like TV and print ads, discount, hoardings, exhibitions etc.

To measure the data, five point scales has been used. The scale has been rated from 5 to 1 rank where 5 suggests as 'Always' of given parameter, 4 suggests as 'Most of the times' of given parameter, 3 as 'Neutral' of given parameter, 2 as 'Sometimes' of given

parameter and 1 as 'Never' of given parameter. The questions have been designed to find out the media used to induce repetitive purchases, impulse buying, brand recall etc. Factor Analysis has been used as a statistical tool by using SPSS 10 version which helps in reducing the variables and making the group among the variables on the basis of commonness.

Analysis of the study

After collecting the data, they are analyzed. The Part-A of the questionnaire consist of demographic variables including gender, profession, age group and questions based on awareness (Table 1). These data are analyzed by using percentage method.

The part-B of the questionnaire consist of variables contributing to ATL and BTL. It is observed that out of the 19 variables taken in the study, the rotated component matrix has grouped those variables into 6 groups on the basis of communalities (Table 2).

Out of 77 respondents Male respondents are 36 (47%) and Females consists of 41 (53%). This shows that female respondents are contributing more in the study.

It was observed that most of the respondents are working professionals. Out of total 77 respondents 73 are working class respondents and only 4 are non-working.

Further the respondents have been categorized on the basis of their age group. Out of total 77 respondents maximum number belongs to the age group of 25-30 years of age (i.e. 28), below that 25 respondents belong to the age group of 30-35 years of age and 18 respondents are of more than 35 years of age. Only 6 respondents belong to the age group of 20-25 yrs and no respondent belongs to the age of 15-20 years. This shows that the major contribution in the study belongs to respondents belonging to the age group 25-30 yrs.

Respondents have been asked how much time they spend for watching TV everyday. Maximum no. of respondents i.e. 37 spend less than one hour, 27

Table 1: Findings and Discussion of Part-A of the questionnaire

<u>Demographic Variables</u>	<u>No</u>	<u>%</u>
<u>Gender</u>		
Males	36	47

Females	41	53
<u>Profession</u>	<u>No.</u>	<u>%</u>
Working professionals	73	95
Non-working	4	5
<u>Age group</u>	<u>No.</u>	<u>%</u>
15-20	0	0
20-25	6	8
25-30	28	37
30-35	25	32
>35	18	23
<u>Place of shopping</u>	<u>No.</u>	<u>%</u>
Nearby kirana store	34	44
Super market	23	30
Wholesaler	20	26
<u>Time spend in watching TV everyday</u>	<u>No.</u>	<u>%</u>
<1 hour	37	48
1-2 hours	27	35
2-3 hours	11	14
>3 hours	2	3
<u>Time spend in reading newspaper everyday</u>	<u>No.</u>	<u>%</u>
<1 hour	40	52
1-2	28	36
2-3	9	12
>3	0	0

respondents watch TV for 1-2 hours and 11 respondents watch TV for 2-3 hrs per day. Only 2 respondents watch TV for more that 3 hours in a day. Similarly they are also asked how much time they spend in reading newspaper everyday. Maximum no.

Table 2: Various statements in Impact of promotional tools on sales and consumer buying decision

<u>Codes</u>	<u>Statements</u>
V01	I feel the ads through TV force me to visit a particular place for shopping.

Codes	Statements
V02	I recall the TV ads while I buy any product from the above outlet.
V03	I feel TV advertisements are effective in making me buy products.
V04	I feel the ads through any print media (newspaper, magazines) force me to visit a particular place for shopping.
V05	I recall the print ads while I buy any product from the above outlet.
V06	I feel print ads are also effective in making me buy products.
V07	Banners and hoardings are also a part of my 'shopping place decision.'
V08	I rely upon these Medias for my purchases, may be they are daily necessities or special purchases.
V09	Point of purchase or sales promotion motivates me to buy the product in the outlet.
V10	I get motivated to buy a product when a salesperson discusses with me about a particular product?
V11	"Buy One Get One Free" scheme makes me buy the product, though it is not in my list?
V12	Gifts, Coupons, Free Samples attract me for purchasing the product which I have not decided to buy.
V13	I even buy the products exhibited or demonstrated by a sales person in exhibitions and events.
V14	Price and non-price discounts are a part of my shopping.
V15	I keep looking for the brands at a discounted rate or more for same price.
V16	I purchase discounted or scheme products even if they are not my need presently.
V17	Next time when I go to a particular outlet for shopping, I first look for the scheme items I had purchased last time.
V18	I feel point of purchase price and non price promotion leads to impulse buying.
V19	I feel point of purchase price and non price promotion leads to repetitive buying for the same brand.

Note: Cronbach alpha is .879; Number of respondents is 77.

of respondents i.e. 40 spend less than one hour, 28 respondents spend for 1-2 hours and 9 respondents spend time in reading for 2-3 hrs per day. No respondent spends more than 3 hours for reading

As the place from where they buy the products is also important, the respondents are asked to show their shopping place. Nearby grocery shop or *kirana* shop is the most popular destination of shopping which is been chosen by 34 respondents. Below that 23 respondents go to super market and 20 respondents go to wholesalers.

Thus, it can be interpreted from the findings of the study that majority of the sample respondents are working class people spending least time in watching television and reading newspaper. They prefer to buy the products from the nearby kirana store. This might be due to the reason that working professional spend majority of their time in thinking about their jobs and secondly it is also seen that the number of female respondents are more so it can be concluded that after their working hours at workplace they spend their time for the family life.

A correlation matrix (Table-3) is generated for all the variables. Factors are extracted from the correlation matrix based on the correlation coefficient of the variables. The factors are rotated in order to maximize the relationship between the variables and some of the factors.

Print and outdoor advertisement (ATL)

It is observed that, respondents have shown positive interest to visit to a particular outlet. Print ads have been proved to be effective (.770) increase footfall in a retail outlet where as outdoor ads through banners (.705) and POP motivations (.701) induce the consumers to buy the products.

Sales Promotion Tools (BTL)

Table shows below the line promotion tools used where offering gifts with a product has highest contribution (.782) which means offering gifts with a product (non monetary incentive) induces to buy a particular brand. Overall sales promotion activities carried out by a retail store (.672) is also one of the BTL promotion tool used effectively to induce buying among the buyers.

TV advertisements (ATL)

Table also highlights on the use of media to increase footfalls, recall and induce buying.

Table 3 about hereTable 3: Correlation Matrix

	V01	V02	V03	V04	V05	V06	V07	V08	V09	V10	V11	V12	V13	V14	V15	V16	V17	V18	V19
V01	1																		
V02	.464**	1																	
V03	.494**	.531**	1																
V04	.489**	.113	.308**	1															
V05	.331**	.399**	.217	.353**	1														
V06	.295**	.329**	.360**	.585**	.506**	1													
V07	.416**	.207	.296**	.605**	.331**	.484**	1												
V08	.121	.316**	.224	.175	.360**	.243*	.149	1											
V09	.270*	.147	.204	.445**	.469**	.514**	.495**	.255*	1										
V10	.112	.015	.221	.206	.086	.338**	.243*	.128	.532**	1									
V11	.330**	-.009	.156	.391**	.247*	.255*	.294**	.044	.399**	.087	1								
V12	.463**	.160	.325**	.407**	.234*	.340**	.400**	.111	.274*	.165	.613**	1							
V13	.268*	.148	.270*	.400**	.265*	.468**	.370**	.068	.382**	.364**	.338**	.555**	1						
V14	.225*	.110	.154	.125	.239*	.347**	.193	.138	.199	.244*	.277*	.422**	.310**	1					
V15	.332**	.151	.247*	.300**	.118	.404**	.454**	.187	.312**	.261*	.443**	.486**	.325**	.322**	1				
V16	.335**	.174	.186	.276*	.219	.286*	.154	.106	.249*	.152	.387**	.388**	.304**	.180	.285*	1			
V17	.179	.031	.338**	.299**	.144	.315**	.268*	.089	.111	-.057	.378**	.381**	.275*	.134	.320**	.207	1	1	
V18	.254*	.153	.144	.351**	.114	.252*	.262*	.062	.280*	.287*	.250*	.230*	.300**	.341**	.248*	.286*	.323**	1	1
V19	.359**	.364**	.268*	.511**	.205	.453**	.400**	.229*	.321**	.266*	.203	.244*	.388**	.252*	.227*	.325**	.125	.689**	1

Note: ** Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed); Number of respondents is 77.

Table 4: Factors Affecting Impact of Promotional Tools on Sales and Consumers Buying Decision

Factor	Name of Factor Loading	Eigen Value		Statements	Factor
		Total	% of variance		
1	Print and outdoor advertisement (ATL)	6.269	32.997	Print increase footfalls ads to	0.77
				Print ads recalled while buying	0.543
				Effectiveness of print ads for buying	0.607
				Outdoor (banners) ads to induce buying	0.705
				Point of purchase motivations	0.701
2	Sales Promotion Tools (BTL)	1.782	9.378	Overall Sales Promotion to induce buying	0.672
				Gifts offerings to induce buying	0.782
				Product Exhibits to induce buying	0.467
				Price & non price discounts to induce buying	0.587
				Discount factor to product search	0.667
				Discount for repetitive buying	0.61
3	TV advertisements (ATL)	1.488	7.833	Media Ads to increase footfalls	0.646
				Media recalled while buying	0.887

Factor	Name of Factor Loading	Eigen Value		Statements	Factor
		Total	% of variance		
				Effectiveness of media ads for buying	0.675
				Media reliance for buying decision	0.337
4	Impulse and repetitive buying (BTL)	1.274	6.703	Point of purchase motivations and impulse buying	0.867
				Point of purchase motivations and repetitive buying	0.795
5	Personal selling activities (BTL)	1.093	5.755	Sales person interaction and buying decision	0.748
6	Discounts and unplanned buying (BTL)	1.021	5.375	Price & non price discounts to induce impulse buying	0.623

Respondents recall TV ads (.887) of a particular product while making most of the buying decisions. They also feel that ads through media are effective in making buying decision. But they refused to rely on this media only (.337) while making a purchase decision.

Impulse and repetitive buying (BTL)

Table has considered POP motivation to induce impulse buying among the shoppers. Point of purchase motivators not only induce impulsive buying behavior but also ensure repetitive buying for the same brand next time they shop.

Personal selling activities (BTL)

Table also proves that interaction with a sales person can also be used as effective tool to induce buying among the shoppers. (.748) Buying decisions are also made on the basis of the interaction with the sales person which results into actual buying of the product.

Discounts and unplanned buying (BTL)

Table shows the contribution of price and non price discount in connection with impulse buying.

Offering discounts to induce impulsive buying (.623) has much less contribution as compare to Point of purchase motivations (.867).

Conclusion

From the findings, it can be concluded that above-the-line promotion tools like TV, print or outdoor media ads are effective to increase footfalls in retail. But what makes them induce buying is use of various

below the line promotion techniques like discounts and other sales promotion activities. So it can be said that Point for purchase motivations can use BTL to increase impulsive and repetitive buying as compared to price and non price discounts. As compared to media ads (Table 2) i.e. ATL, Consumers have shown much more response to sales promotion activities (Table 3) i.e. BTL which motivate them to buy a particular product from a store. ATL promotion tools like ads through print and TV, are effective to inform or to increase footfalls in retail. But what make them buy actually are various BTL promotion activities like sales promotion schemes and point of purchase motivations.

From the above findings, it can also be concluded that Below the Line promotional tool is more effective as compared to above the line. The reason could be that in case of BTL, the marketer can put more focused efforts and hence he can convince the customer in a better manner. The marketer can also look into the needs of the customer more closely and accordingly manufactures the product. The marketing communications mix is made up of personal selling, a range of conventional advertising media and a range of non-media communication tools. The market is activated through information flows. The way a potential buyer perceives the seller's market offering is heavily influenced by the amount and kind of information he or she has about the product offering, and the reaction to that information. Marketing, therefore, relies heavily upon information flows between the seller and the prospective buyer. To many people marketing communications, such as television advertising, direct mail and poster advertising is marketing. This is because marketing communications

is certainly the most highly visible aspect of marketing activity and it impacts on everyday on life. Marketing communications, whether above or below the line activity, is collectively just one of the '4P's' of the marketing mix. However, it is a very important part. No matter how good a firm's product or service offering is the benefits to the consumer need to be communicated effectively.

References

- Alvarez, B., & Vazquez, C. R. (2005). Consumer evaluations of sales promotion: The effect on brand choice. *European Journal of Marketing*, 39(½), 54-70.
- Ayanwale, A. B., Taiwo, A., & Ayanbimipe, M. A. (2005). The Influence of Advertising on consumer brand preference. *Journal of Social Sciences*, 10(1), 9-16.
- Bansal, G., & Singh, A. (2008). Study on consumer perception regarding purchase of the products from big shopping malls. *Journal of IMS Group*, 5(2), 13-23.
- Del Vecchioa, D., Henardb, D. H., & Frelingc T. H. (2006). The effect of sales promotion on post-promotion brand preference: A Meta-Analysis. *Journal of Retailing*, 82(3), 203-213.
- Jeddi, K., Mela, C. F., & Gupta, S. (1999). Managing advertising for long term profitability. *Marketing Science*, 18(1), 1-22.
- Johnson, L. K., (2006). Successful business process outsourcing. *Sloan Management Review*, 47(2), 5 – 6.
- Manning, K.C., & Sprott, D.E. (2007). Multiple unit price promotions and their effects on quantity purchase intentions. *Journal of Retailing*, 83 (4), 411-421.
- Mela, Carl F., Gupta, S., & Lehmann D. R. (1997). Long-term impact of promotion and advertising on consumer brand choice. *Journal of Marketing Research*, XXXIV, 248-261.
- Pithadia, V., & Sharma, A. (2005). Role of sales and advertising promotions in the purchase decision of consumer durable products.
- Rajagopal, (2008). Point-of-Sales promotions and buying stimulation in retail stores. *Database Marketing & Customer Strategy Management*, 15, 249-266.
- Rawal, P. (2009). Driving impulse purchases with POP Advertising. *The ICFAI University Press*, 35-39.
- Role of advertising within marketing and promotional mix. Retrieved from www.rocw.com.
- Schultz, D. E. (2004). A clean brand slate. *Marketing Management*, 13(5), September/October, 10-11.
- Shih-Fen S., Chen, K. B., Monroe & Yung-Chien Lou, (1998). The effect of framing price promotion messages on consumers' perceptions and purchase intentions. *Journal of Retailing*, 74 (3), 353-372.
- Teng, Lefa, (2009). A comparison of two types of price discounts in shifting consumers' attitudes and purchase intentions. *Journal of Business Research*, 62 (1), 14-21.
- Vyas, Preeta H, (2005). Measuring consumer preference for sales promotion schemes through conjoint design in FMCG sector, W.P.No. 2005-09-08., 1-12. Retrieved from <http://www.iimahd.ernet.in>.
- Vyas, Preeta H., (2007). Sales promotion practices in apparel retail sector and challenges head, W.P.No.2007-11-02, November, 1-13.



CHALLENGES AND OPPORTUNITIES FOR SEAFOOD PRODUCT IN INDIAN RETAIL MARKET

Jitarani Udgata*,
Ajay K. Rathore**

Abstract

Fish and fisheries products have created a sensation world over because of high health attributes. With the high unit value, Fish and fisheries especially seafood has been acclaimed as one of the fastest moving commodity not only in the domestic market, but also in the global market. The seafood industry is very competitive and will become even more competitive in the near future. The dietary habits of the people all over the globe are changing fast and India is gearing up to produce and supply value added products in convenience packs by adopting the latest technologies and by tapping the unexploited and under exploited fishery resources. Moreover, the fast changing retail environment demands that professionals learn new skills, improve their efficiency, learn to compete and think out of the box and facilitate the customers by meeting the demands of seafood. The paper tries to analyse the opportunities and challenges involved in the marketing of seafood products (ready to eat products) in organized retail shops by creating an effective strategy. Since retailers work directly with customers, there is need for good managerial talent to deliver and satisfy the needs and desires of customers. All this requires an education that is intensive, comprehensive and closely linked to the retail business world.

Key Words: Seafood, Retail Market, Efficiency, Strategy, Marketing

Introduction

Fish and fisheries products have created a sensation world over because of high health attributes. With the high unit value, fish and fisheries product especially seafood has been acclaimed as one of the fastest moving commodity not only in domestic market, but also in the world market. The world market for seafood has doubled within the last decade reaching US \$49.32 billion mark India's share is 2.4% (Ministry of Food Processing, 2006). The dietary habits of the people all over the Globe are changing fast and India is gearing up to produce and supply value added products in convenience packs by adopting the latest technologies and by tapping the unexploited and

under exploited fishery resources. At a global level, aquaculture is one of the fastest growing food production sectors (9.6 per cent/yr in the last decade), a fact that will ultimately change the way that fish is perceived as food. Indian retailing industry has seen phenomenal growth in the last five years (2001-2006). Organized retailing has finally emerged from the shadows of unorganized retailing and is contributing significantly to the growth of Indian retail sector. As well as the fast changing retail environment demands that professionals learn new skills, improve their efficiency, learn to compete and think out of the box and facilitate the customers by providing demanded products, like seafood.

*Jitarani Udgata, Asst. Director, Gems & Jewellery Promotion Council of India, Research Scholar, IIFT, New Delhi,
Email id: ranijita@yahoo.co.uk*

Dr. Ajay K. Rathore, Professor/ Director, Tecnia Institute of Advanced Studies, New Delhi. Email id: ajay_rathore160@rediffmail.com

This study is focus to the seafood, as it is not easily available in all parts of India. It is also accounted as a tasty, highly calcium and other vitamins and mineral contained food. Most animal meat, eggs and shellfish are comparatively high in cholesterol and have therefore in the past received a lot of negative publicity. Therefore there is a lot of hope of sustainability in this seafood retail marketing. But it needs proper infrastructure like product quality, attractive packaging, more verity, offers on products, maintaining of brand, proper price decision and supply chain. Likewise the bone-less chicken of super-bazar or other retail shops debone fish, smoked fish and cover cleaned lobster and shrimp/prawn (head-off, shell-off etc.) are also a popular food product. According to Porter' "Diamond Model" (1990), the domestic market provides organizations with specific factors, which will potentially create competitive advantages globally.

Key Highlights of the Study

The research study addresses the issues and the facts that are critical to the success of Indian retail industry in general & organized retail industry in particular.

1. The scope of the fish and fisheries (seafood) product in Indian retail market;
2. Can seafood be driving growth in retail sector;
3. The opportunities & challenges in front of the retailers in India for this product;
4. Marketing Strategy required for Indian Retailers to handling this product.

Scope for Fish/ Fishery Products

Demand for fish and fisheries products are increasing considerably, both at domestic and export fronts. The projected demand for fish in the country by 2012 is 9.74 million tons, which can be met by the projected supply of fish of 9.60 million tons by 2012. The projected share for fish demand in India is estimated at 60% for domestic consumption, 7% for exports and 33% for other purposes (ICAR, 2006). This indicates that focus needs to be given to the domestic sector which has a very high share in the projected demand. The analyses shows that there is a huge domestic market for fish and fisheries product (including seafood), from the Figure-1. There is immense scope for this product, especially in north,

northeast, metro cities, second tier cities of India, where production capacity is nil.

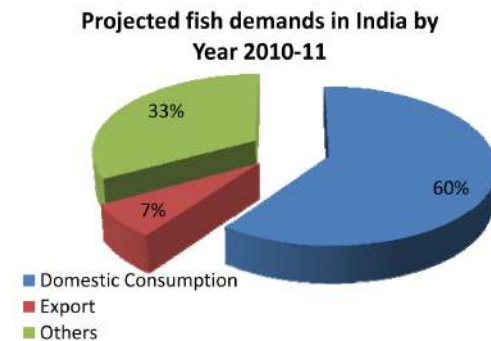


Figure 1: Projected Fish Demands in India by Year 2010-11. Source

Source: ICAR, (2006)

Contribution in Driving Market Share Growth

Driving Market Share Growth:

There should be few questions asked by the marketer to find the scope where to be marketed and for create an effective strategy (Avault, 1991).

1. Who will purchase my product?
2. Where do I have to deliver the product?
3. When do I have to deliver?
4. Upon what criteria will the product be evaluated?
5. What price will pay and how is it determined?

Market Structure for Indian Fisheries (seafood) Product

Fishermen and Farmer

Wholesaler (Cooperative Society)

Organized (Packed)

Retailer Traditional (Loose)

HORECA (Hotels, Restaurants, Canteens)

Destination Markets

Methods of Measuring the Performance of the Organized Retail Industry

To measure the increment of the organized retail seafood industry for a particular duration, say from 2000 (A) to 2007 (B), then it has to take the year 2000 (A) as a base year and follow the given formula:

1. % of increased in product sell = $\frac{[(B)-(A)]}{(A)} \times 100$
2. One way is to measure its share of national output. A standard measure of output in a country is gross domestic product (GDP).
3. We can measure the importance of retaining by retail employment in relation to total employment (Newman & Cullen, 2002).
4. Another way to measure the monetary contribution of retailing is through the total net output or value added of all the firms in the industry. This represents the wages paid and profits earned in the business and are the total sales or gross output of retailers minus taxes, such as VAT, and spending on goods and services that they buy in (Newman & Cullen, 2002).
5. However, the more usual way of describing retailing is by the level of retail activity, which is given by gross sales (or turnover) of retailers and is another indicator of the economic and social importance of the industry (Newman & Cullen, 2002).

Challenges with Seafood Product in Organised Retailing

Know Your Competition

If you are considering aquaculture as a business because you think there is limited competition, then you should reconsider aquaculture. The seafood industry is well established and very competitive and will become even more so in the near future. Midwestern producers have to compete with wild-caught and farm-raised products of both domestic and foreign origin. By understanding current sources of seafood, the new producer will be more knowledgeable and better able to build a production and marketing program that will be responsive to market opportunities and able to endure adverse price fluctuations.

The Growth Prospects Related To the Indian Fisheries (Seafood) Product

Consumers prefer to buy packed, level and

branded food product generally. However their preference for seafood or any fisheries product goes to the fresh products, which generally available in traditional market in a competitive price. Today it is not a matter of if retailers will need to integrate customer data and seek to optimize the value of each customer relationship, but a matter of how and when they integrate data in order to drive desired customer behavior and preferences.

Here are steps that leading retail enterprises are using with success to optimize customer relationships:

- Decide how the organization wants to view its customers. The first step toward establishing a single, unified view of customers is to develop a roadmap incorporating readiness and gap analysis, business strategy and a customer-centric vision with the goal of capturing and collecting customer data from all relevant sources and gathering them into a single repository.
- Unify and share the view of the customers. Beyond consolidating the data into a single repository, cleansing the data, organizing the data and appending the data for completeness, make the data available across the enterprise to enable informed decisions beyond the marketing lane. Merchandising, real estate planning and product development are among the parts of a retail organization that can put such data to profitable use.
- Use knowledge of customers to understand and predict behavior. Successful retail organizations use customer data to see and understand patterns of behavior, to shape overall marketing strategies, and to identify, refine and target segments. Using knowledge of customers, retailers are then able to customize relevant media and messages.
- Execute dynamic and trigger-based marketing. Leveraging data-driven marketing communications technologies such as email personalized Web pages, print-on-demand and permission-based voice messaging calls enable retail marketers to deliver truly customized and relevant messages at the optimum time.
- Develop multichannel understanding and communication. Retailers that have integrated channel (in-store, Web store, call/contact center, etc.) information, activities and performance report a deeper understanding of how customers browse, search and buy, and how the channels support (or fail to support) each other.

- Sometimes customer-facing processes do not need to be executed in exactly the same way, such efforts as promotion redemption, returns and inventory checks must be able to cross sales and service channels.
- Standardize methods to measure marketing performance. The goal is to measure and report all customer interaction points from all channels with the same precise definitions to ensure results are meaningful and translate throughout the organization.

Develop customer communications strategies that leverage all of these practices. The goal is to direct retail marketing with clear knowledge of who the customer is, what messages to deliver and why, when to deliver them and how, and the return to expect on each marketing investment individually and collective investments over time. As customers continue to use diverse channels to educate them and to buy and communicate, increasingly it is essential for retailers to gain an accurate, total view of each customer to enable relevant messaging and effective cross-channel relationships (Wendy, 2007).

Challenges and Threats in Retail Business of Fisheries (Seafood) Products

- The consumer generally thinking that, if they will go for any retail shop, they have to have pay both for the product and also for the service that the shop giving;
- The local vendor's lively hood is effecting;
- Multiple laws, wrong policy decisions, unnecessary/illegal imports, poor infrastructure and logistics;
- High cost of equipment and packing material, which compel to increase the product price;
- High cost of maintaining the hygienic standard of the product;
- Cheap imports from overseas;
- Incorrect species identification at point of sale;
- Irregularity of the supply and lack of information on small businesses;

Marketing Strategy Required for Indian Retailers

Basic Requirements to Introduce Retail Marketing in Fisheries Product

- Avoid the common pitfalls associated with not

being intelligent about what levels of customer service the retail industry requires. Heir the skilled employees who can deal with this product in an efficient way or provide the basic training to the employees.

- Emphasizing popular products at attractive prices. For example the marine shrimps, crabs and lobsters are a quite popular in sense of test by which, customer can willing to be pay a higher cost.
- Improve the strength of your sales message. "**At Fish Marketing, we smell your pain**", which will remind the unbearable fishy smell of the local market and attract the consumer for the processed, packed fish products
- Spend more on advertising. Sometimes the customers are unaware about the products. So there is a necessity of advertisement either in TV ad, in newspaper or by wall poster.
- Published a directory, both as a book and on the web which is also has the Official Guide to Quality Products and Services. The website should be designed to grant easy access with information on them and links to websites related to the company's product and affairs.
- Evaluation of current market trends as well as does the profile discussion of key players in this sector.

Back-end Issues for Fisheries Product

Seasonal or periodic changes are those that occur in a regular and predictable way during the year. The retailer has to change its product range, prices and other aspects of the store to meet changing customer requirements during the year. The four natural seasons of spring, summer, autumn and winter have a significant influence on customer demand and also on the availability of some products. For example, even if the white meat is quite a healthy food, there are some months, in which fish is strictly avoided. In North, the people are not having fish in the month's which does not have the 'R', like May, June, July and August. Similar in east, west and south east people are avoid having fish in extreme hot and cold day (Vaishakh, Savan and Kartik holy month). However in west it is the month of 'Savan'. The ethic behind this theory is fish is a highly vitamin and mineral contain food. So if in extreme hot or cold day, fish consumed, then it create problem of indigestion. Similarly in rain season, there is a chance of virus and

bacteria disease infection of fish. These fluctuations occur over a relatively short time and affect the demand and the costs of supplying the market. Retailers need to assess these carefully when planning investments as well as their normal seasonal patterns of stocking.

Effective Strategy for Successful Retail Marketing of Fisheries (Seafood) Product

- Design a consumer-friendly item mix, resulting in better management of retail inventory assets and improved speed-to-shelf for new items to garner those important first-time sales.
- Choose a species (viz. lobster, shrimps, trout, pomfret, striped bass, etc.), which is recognized as being marketable.
- Create shelf layouts that increase consumer purchases while reducing retail out-of-stocks.
- Produce effective retail promotions that efficiently allocate promotion funds to drive sales and enhance profitability.
- Strategically price items to heighten consumer-perceived value while maintaining gross profit at retail.
- Create specific store strategies to address alternative-format competition and store layout recommendations to capture today's busy consumers.
- When customers talk about retail stores, they are 14 times more likely to say something nice than nasty, according to Keller Fay Group's measurement program for word-of-mouth (WOM) marketing called Talk Track (Keller and Fay, 2007). This WOM often includes a recommendation and customers are compelled to visit the stores. Discounters, department stores and specialty stores are the top retail WOM brands by category (*Stores Magazine*, 2007).

Change the Threats into Opportunities

- Have a record of active engagement in fishing and skilled in capture methods and post-harvest care;
- Be a member of the Fishermen's Association and have the support of the Personnel Support Programs (PSP);
- Have a selling and buying relationship with the fishermen to avoid the middlemen commission.

- Demonstrate a willingness to engage in the project as an entrepreneur
- Be willing to engage the fishermen full-time in fishing activities or in the retail shop to take care of the fish product for their survival.
- Have a viable business plan.

Summary and Conclusion

The seafood industry is very competitive and will become even more competitive in the near future. The fast changing retail environment demands that professionals learn new skills, improve their efficiency, learn to compete and think out of the box. Since retailers work directly with customers and there is need for good managerial talent to interpret and satisfy the needs and desires of customers. All this requires an education that is intensive, comprehensive and closely linked to the retail business world. Marketing is as important, and in some respects more important, than actual production. Assuming that all you have to do is produce the fish and people will buy them will lead to certain failure of an aquaculture enterprise. Product, price, promotion and place are classical points in traditional marketing and will similarly apply to aquaculture products. The product refers to the degree of processing undergone by the fish or shellfish. Producers promote their products to create customers. When deciding which species of fish or shellfish to farm, choose a species which is recognized as being marketable. Regulations for marketing aquaculture products locally focus on permits to retail market and use the Hazard Analysis Critical Control Point (HACCP) for inspecting seafood to control the quality. Similarly setup and use of small scale processing facilities also add value.

Reference

1. Avault, James W. (1991), "Analyzing the market and your market position." *Aquaculture Magazine*, Asheville, NC. July/August: pp. 56-75,
2. Avault, James W. (1991), "Analysing the market and your market position". *Aquaculture Magazine*, Asheville, NC. July/August. pp. 56-75.
3. Avault, James W. (1991), "Marketing in aquaculture—product, price, promotion and place". *Aquaculture Magazine*, Asheville, NC. May/June. pp. 68-75.
4. Iceland trade directory, (2011). <http://www.icelandexport.is/icelandexport2/english/>

5. Keller (2007) Keller Fay Group 24, 1/6p <http://www.indiaonestop.com/foodprocessing.htm>
 6. Ministry of Food Processing Industries,(2006), Annual Report
 7. Newman A.J. & Cullen P. (2002), "*Retailing: Environment & Operations*", New Delhi, Vikas Publishing House Pvt. Ltd, pp7-8.
 8. Porter, M.E. (1990). *The Competitive Advantage of Nations*. New York: Free Press.
 9. Riepe, Jean Rosscup and Marshall A. Martin. Unpublished, *Finfish purchasing behavior and perception of farm-raised species: Indiana restaurant survey*. Department of Agriculture Economics, Purdue University, West Lafayette, In.
 10. Stores Magazine; Jan (2007), Vol. 89 Issue 1, p24-24, 1/6p <http://www.indiaonestop.com/foodprocessing.htm>
 11. Wendy Lynes, Harte-Hanks Inc.(March 30, 2007) Ten steps to improving retail marketing performance in a multichannel world, DMNews.
 12. <http://www.randburg.com/is/icelandexport/>
 13. <http://www.fao.org/DOCREP/004/Y2792E/y2792e0e.htm> <http://www.thefishsite.com/fishnews/4718/mpeda-to-introduce-pathogenfree-shrimp> (08/04/2008)
 14. http://www.shellfish.org.uk/shellfish_diet.htm(8/4/2008)
 15. http://aquanic.org/publicat/state/il-in/ces/ces-240_direct.htm
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EMBEDDED MICROPROCESSOR PERFORMANCE EVALUATION- A CASE STUDY OF THE LEON3 PROCESSOR

Nabil Litayem*
Bochra Jaafar**
Slim Ben Saoud***

Abstract : *In this paper we propose a performance evaluation methodology based on three complementary benchmarks. This work is motivated by the fact that embedded systems are based on very specific hardware platforms, measuring the performance of such systems become a very important task for any embedded system design process. In a classic case hardware performance is a basic result reported by the hardware manufacturer. For the FPGA based embedded systems designer, the personalization of hardware configuration is a fundamental task of this kind of systems, and then the designer must measure the hardware performance itself. This paper will focus on hardware performance analysis of FPGA based embedded system. We used in our study two embedded systems (Mono-processor and Bi-Processor) based on LEON3MMU processor and eCos RTOS.*

Keywords : *Embedded Systems, Performance, Benchmark.*

Introduction

The human activity becomes more and more reliant to embedded systems that are actually present in many products like PDA, camera, telephones etc. Designing this kind of systems can take many approaches depending on the used platform. In a classic approach General Purpose processor (GPP), Application Specific Processor (ASIP) or Application Specific Integrated Circuit (ASIC) can be used as a heart of the embedded system. Each one of precedent solutions has its advantages and weaknesses.

Actually we assist to the Field Programmable Gate Array (FPGA) based embedded systems emergence. This kind of solution can allow rapid embedded systems' generation (Peddersen et al., 2005), easy personalization of hardware configuration using pre-designed Hardware

IPs (Sheldon D. et al., 2006), future evolution of

embedded system and cost reduction. To design embedded system on FPGA based platform we need to choose an embedded processor and embedded operating system.

Embedded processor can be Hard-Core (built in silicon level) or Soft-Core (netlist or as HDL source). Hardcore embedded processor has the advantage of computing performance but limit the system in terms of portability and scalability. Soft-Core embedded processor offer less computing possibility if the final platform is an FPGA, but is greatly enhanced in term of configurability, portability, customization and scalability (L'Hours L., 2005) & (Huerta P. et al., 2007).

Embedded operating system can be shared time or real-time, proprietary or open source. The adoption of an embedded operating system depends on the available memory, developers' strategy, real-time requirements, operation fields' certification etc. On the

*Mr. Nabil Litayem Department of Electrical Engineering - INSAT, University of Carthage, TUNISIA,
Email id: nabil.litayem@gmail.com

**Ms. Bochra Jaafar Department of computer Technology, ISET, General Direction of technological Study, TUNISIA,
Email id : bochra.jaafar@gmail.com

***Dr. Slim Ben Saoud Department of Electrical Engineering, INSAT, University of Carthage, TUNISIA,
Email id: slim.bensaoud@gmail.com

other hand, the hardware resources limitation for embedded software requires that the developer must have a clear idea about the hardware computing performance. Actually, many studies focus on hardware performance evaluation or estimation of customized architecture (Groâschâdl J. et al., 2007).

In this paper we present an approach to measure hardware performance of FPGA based embedded system using freely available benchmark solutions. This work is divided into five parts. The first part is an overview about the performance evaluation. The second part presents an overview about the used platform. In the third part we will present the adopted benchmarks. This is followed by the experimental results part. The last part summarizes our position and future works.

Overview of Performance Evaluation Tools and Techniques

Evaluating performance in computer (Kurian L. et al., 2006) system will always be a true challenge for designer of this kind of systems due to the constant evolution of such systems, especially for embedded system field where the architecture tend to be more and more complex Wolf W., (2007). The performance analysis of embedded system has multiple aspects depending on the application that the system is made to and several design decisions are a direct result of performance evaluation.

The first evaluation method was based on the number of operations per second. This approach quickly became deprecated and traditional benchmark was developed and adopted to measure special performance aspects. Actually we have too many solutions to measure hardware performance. The most part of solutions are based on standard algorithms.

In generally the MIPS unit in its literal meaning millions of instructions per second is used to measure the processor hardware performance. This unit became insignificant when RISC computer architectures appeared. Which lead to the MIPS redefinition as VAX MIPS which is the factor for a given machine relative to the performance of a VAX 11/780. Other redefinitions are later proposed such as Peak MIPS, and EDN MIPS.

Due to the fuzziness of performance unit definition, several benchmarks are proposed that can be executed under various architectures to report their

execution speed. The most recognized solutions are Dhrystone which report the performance of the architecture in Dhrystone MIPS, Stanford which computes different algorithms and report the performance of the architecture in every computation field covered by the benchmark, and Paranoia who is able to report the characteristics of the floating point unit.

Nowadays, there are several benchmarks Each one of these benchmarks tries to reflect the most of the hardware performance aspects. Mibench (Guthaus et al., 2001) is the most popular implementation of this combination since it can measure the performance of a studied architecture in several application fields.

We can also find other commercial benchmarking solutions more efficient and more specialized like SPEC (Standard Performance Evaluation Corporation) which cover different computing field or EEMBC (Embedded Microprocessor Benchmark Consortium) designed especially for embedded systems.

In this paper we will present a hardware performance analysis of mono-processor and bi-processor embedded systems using three benchmarks, each one cover one side of computing system. Our platform is based on two open source components (LEON3 Processor and eCos RTOS) allowing us to be independent to any FPGA or RTOS vendor.

Presentation of the used platform

A. Overview of LEON3 microprocessor

LEON3 (Ahmed S.Z., et al. 2009) presented in Figure 1 is a synthesizable VHDL model of a 32-bit processor compliant with the SPARC V8 (Gaisler J., Sept. 2002) architecture. The model is highly configurable, and particularly suitable for system-on-a-chip (SOC) designs. The full source code is available under the GNU GPL (General Public License), allowing free and unlimited use for research and education. LEON3 is also available under a low-cost commercial license, allowing it to be used in any commercial application for a fraction of the cost of comparable IP cores. On the other hand, Gaisler research offers a fault tolerant version of the LEON3 for a very competitive cost.

The LEON3 processor is distributed as a part of the GRLIB IP library, allowing simple integration into complex SoC designs. GRLIB also includes a configurable LEON multi-processor design, with up

to 16 CPU's attached to AHB bus, and a large range of on-chip peripheral blocks. The GRLIB library contains template designs and bitfiles for various FPGA boards from Actel, Altera, Latice and Xilinx (Figure 1).

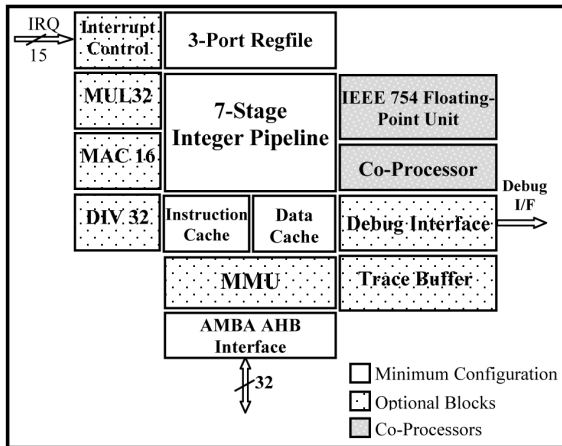


Figure 1 : Different templates for FPGA

B. Overview of eCos RTOS

eCos is an abbreviation of Embedded Configurable Operating System (Massa A.,2003) He is an open source, royalty-free, real-time operating system intended for deeply embedded applications. The highly configurable nature of eCos allows the operating system to be customized to precise application requirements, delivering the best possible run-time performance and an optimized hardware resource footprint. A thriving net community has grown up around the operating system ensuring on-going technical innovation and wide platform support. Figure 2, show the layered architecture of eCos.

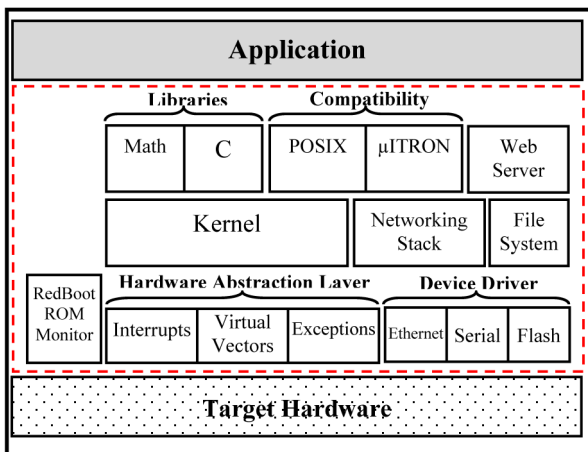


Figure 2 : Layered Architecture of eCos

The main components in eCos architecture are the HAL (Hardware Abstraction Layer) and eCos Kernel.

The purpose of eCos HAL is to allow the application to be independent of hardware target. It can manipulate the hardware layer using the HAL API. This HAL is also used by others upper OS layer which make porting eCos to a new hardware target a simple task consisting of developing the HAL of the new target. eCos kernel is the core of eCos system, it includes the most part of modern operating system components: scheduling, synchronization, interrupt, exception handling, counters, clocks, alarms, timers, etc. It is written in C++ language allowing application written in this language to interface directly to the kernel resources. The eCos kernel also supports interfacing to standard μITRON and POSIX compatibility layers.

C. Combination eCos – LEON3

The choice of these two components allows us to be independent from any FPGA constructor or RTOS vendor since eCos is available for a wide range of embedded processors and LEON is ported for XILINX, ALTERA, ACTEL and LATICE FPGA. In the other hand eCos allow a smooth migration to embedded Linux. We can also use Open RISC as processor and RTEMS or embedded Linux (Yagmour K., 2003) as OS.

The performance measure will be presented using the three benchmarks that we will present, and the hardware platform will be simulated using tsim-leon3 for a mono-processor architecture and grsim-leon3 for the bi-processor platform in SMP (synchronous multi-processing) configuration.

These two simulation tools are able to represent very closely the LEON3 architecture with many other very important enhanced features for system prototyping.

Used Benchmarks

In our work we have chosen to adopt three complementary benchmarks that can mirror a complementary performance side of the studied embedded system. Each one of the obtained results of these benchmarks can be used to evaluate a special performance aspect of the hardware platform.

A. Dhrystone

Dhrystone (Stitt G. et al., 2003) is a synthetic

benchmark developed in 1984 by Reinhold P. Weicker in ADA, Pascal and C languages. It is intended to be representative of integer system performances. Dhrystone is constituted from 12 procedures included in one measuring loop with 94 statements. The Dhrystone grew to become representative of general processor (CPU) performance until it was outdated by the CPU89 benchmark suite from the Standard Performance Evaluation Corporation (Henning J. L., July 2000), today known as the "SPECint" suite.

B. Stanford

The Stanford Benchmark (Assmann U., April 1996) Suite is a small benchmark suite that was assembled by John Hennessy and Peter Nye around the same time period of the MIPS R3000 processors. The benchmark suite contains ten applications, eight integer benchmarks and two floating-point benchmarks. The original suite measured the execution time in milliseconds for each benchmark in the suite. The Stanford Small Benchmark Suite includes the following programs:

- **Perm:** A tightly recursive permutation program.
- **Towers:** the canonical Towers of Hanoi problem.
- **Queens:** The eight Queens Chess problem solved 50 times.
- **Integer MM:** Two 2-D integer matrices multiplied together.
- **FP MM:** Two 2-D floating-point matrices multiplied together.
- **Puzzle:** a compute bound program.
- **Quicksort:** An array sorted using the quicksort algorithm.
- **Bubblesort:** An array sorted using the bubblesort algorithm.
- **Treesort:** An array sorted using the Treesort algorithm.
- **FFT:** A floating-point Fast Fourier Transform program.

This kind of benchmark is very interesting in terms of exploration of various architecture behaviors.

C. Paranoia

Designed by William Kahan the first IEEE 754 standardization team, Paranoia (Hillesland K.E. et al., 2004) has as the essential purpose to characterize

floating-point behavior of computer system.

Paranoia does the following test:

- Small integer operations.
- Search for radix and precision.
- Check if rounding is done correctly.
- Check for sticky bit.
- Test if $\frac{1}{Z}$ for a number of integers.

If it will pass monotonicity.

If it is correctly rounded or chopped.

- Testing power Z^i , for small Integers Z and i.
- Searching for underflow threshold and smallest positive number.
- Testing power Z^Q at four nearly extreme values.
- Searching for overflow threshold and saturation.
- Tries to compute 1/0 and 0/0.

Performance Measures

After preparing the environment in terms of configuring and building eCos for LEON3MMU architecture, testing some applications examples running under eCos like multithread application. We build the three different benchmarks for our two platforms.

The first hardware configuration for the future test consists of:

Mono-processor Configuration

- 16 Mbyte of SDRAM memory in 1 bank.
- 2048 Kbyte ROM memory.
- The size of instruction cache and data cache is booth at 1*4 Kbytes, 16 bytes/line.

The second hardware configuration for the future test consists of:

Bi-processor Configuration:

- 16 Mbyte of SDRAM memory in 1 bank.
- 2048 Kbyte ROM memory.
- For the two processors the size of instruction cache and data cache is booth at 1*4 Kbytes, 16 bytes/line.

$$\sqrt{X^2} = X$$

- The two processors are connected in SMP configuration.

It should be noted that the benchmarks are loaded and executed from SDRAM.

A. Results obtained using Dhrystone benchmark

After executing Dhrystone benchmark under our platforms simulators we have the reported values of our chosen system.

Figure 3 show the performance of studied architecture in term of Dhrystone MIPS. The gain in performance is about 33% with the bi-processor configuration.

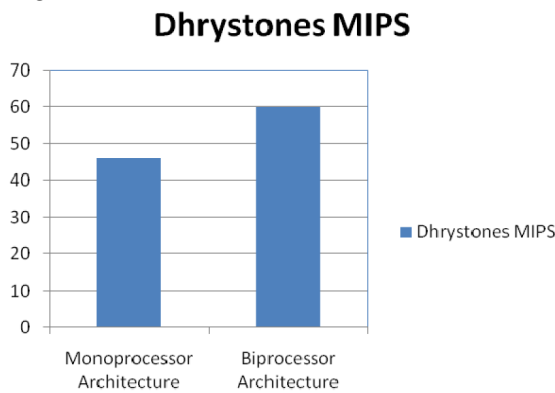


Figure 3 :

MIPS of the two architectures (Refer Table 1)

Table 1: Results Obtained With The two Platform Simulator for Dhrystone Benchmark

	Mono-processor Architecture	Bi-processor Architecture
Cycles	247650694	189292275
Instructions	156822447	156860966
Overall CPI	1.58	1.21
CPU performance (50.0 MHz)	31.66 MOPS (31.66 MIPS, 0.00 MFLOPS)	41.43 MOPS (41.43 MIPS, 0.00 MFLOPS)

B. Results obtained using Stanford benchmark

After executing Stanford in our platform simulator we collected the performance report plotted in Figure 4 and Figure 5. These results show a little enhancement made by the multiprocessor architecture, especially for complex algorithms such as Puzzle and Intmm. These results can be explained

by the fact that Stanford benchmark was not written to exploit parallel architectures.

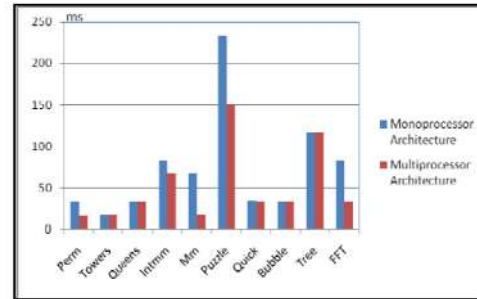


Figure 4: Execution Time in millisecond of the ten algorithms included in Stanford benchmark

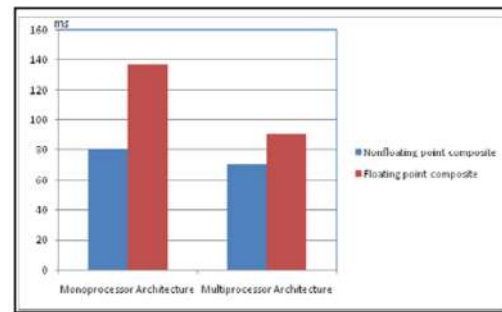


Figure 5: Composite performance of the two architectures for Nonfloating and floating point applications

The composite performance report shows that the Nonfloating point enhancement by multiprocessor adoption is about 14 %. On the other hand the enhancement made by multiprocessor adoption fore floating point application is about 55%. These results can be justified by the complexity of floating point algorithms that can exploit the multiprocessor architecture (Table 2).

Table 2: Result Obtained with the Two Platform Simulator for Stanford Benchmark

	Mono-processor Architecture	Bi-processor Architecture
Cycles	36873110	26063953
Instructions	22181699	22218991
Overall CPI	1.66	1.17
CPU performance (50.0 MHz)	30.08 MOPS (29.49 MIPS, 0.59 MFLOPS)	42.62 MOPS (41.79 MIPS, 0.83 MFLOPS)
Cache hit rate	96.5 % (99.8 / 75.1)	93.5 % (99.8 / 60.2)
Simulated time	737.46 ms	521.28 ms

After examining the simulator report we conclude that we have a gain of performance of 12 % for integer operation, and 32 % for floating point operations while using bi-processor configuration.

This gain of performance is not equally distributed between the ten algorithms included in Stanford benchmark. The adoption of one of these two architectures will depend on the final application.

C. Results obtained using paranoia benchmark

After executing paranoia benchmark under the two platform simulators we conclude that the FPU operation is correctly executed for the two architectures. But the benchmark reports that we have:

Addition/Subtraction neither rounds nor chops.

Sticky bit used incorrectly or not at all.

FLAW: lack(s) of guard digits or failure(s) to correctly round or chop (noted above) count as one flaw in the final tally below.

This type of failure is not so dangerous for the system functionality but can cause some precision loss. The source of this failure is certainly caused by the code generation in the soft-float parameters of GCC compiler.

Conclusion and Perspective

The reported benchmarks results cover three computing system performance fields. Dhrystone is used to compare integer unit performance. Stanford is able to compare different standard algorithm performance execution booth in integer and floating point computing. Paranoia is able to characterize floating point operations.

We observed that the performance gain for multicore architecture is not so considerable since the used benchmarks were not designed to exploit the multicore architecture. The same approach can be used to compare performance of other architectures, but this kind of work can be done carefully since a few studies report some fragility's of SPEC CPU95 and CPU2000 (Vandierendonck, H., et al., 2004) which is a superset of our used benchmarks.

In our work we focused on hardware execution speed evaluation in the embedded system design flow. Modern embedded system has other performance aspects and factors that must be considered such as multiprocessor impact and RTOS overhead. This work can be extended by multithreading these benchmark or use multi-

processor benchmark to compare the studied architectures (Joshi A. M. et al. 2009).

In our future work we will focus on multiprocessor and operating system overhead. Multiprocessor performance evaluation can be done using a specific multicore and parallel benchmark such as SPLASH2 and NPB or by adapting standard benchmarks (Joshi A. M. et al. 2009) & (Amine Jerraya A. et al., 2003). In the other hand real-time overhead and RTOS comparison can be evaluated using standard benchmarks that evaluate the overall performance after the adoption of a specific operating system or by adopting dedicated benchmarks such as thread-metric (Proctor F.M. at al. 2001) & (Fletcher B. H. 2005).

For this reason we attempt to extend our study by measuring the performance of eCos and comparing it with others RTOS such as RTEMS, uC/OS and VxWorks using the same platform.

References

- Ahmed, S.Z., Eydoux, J., Rougé, L., Cuelle, J.B., Sassatelli, G., Torres, L. (2009). Exploration of power reduction and performance enhancement in LEON3 processor with ESL reprogrammable eFPGA in processor pipeline and as a co-processor.
- Amine, J.A., Yoo, S., Ver-kest D., Wehnn, N.(2003). Embedded Software for SOC, Kluwer Academic Publishers, eBook ISBN: 0-306-4870.
- Assmann, U., (1996, April). How to uniformly specify program analysis and transformations with graph rewrite systems, In Proceedings of the CC'96. 6th International Conference on Compiler Construction, pages 121-135. Springer-Verlag.
- Fletcher, B. H. (2005). FPGA Embedded Processors Revealing True System Performance, Embedded Systems Conference, San Francisco.
- Gaisler J. (2002, September). A Portable and Fault-Tolerant Microprocessor Based on the SPARC V8 Architecture, Proc. Int'l Conf. Dependable Systems and Networks, pp. 409-415.
- Groâschâdl J., Tillich S., Szekely, A.(2007). Performance Evaluation of Instruction Set extensions for Long Integer Modular Arithmetic on a SPARC V8 Processor, IEEE DSD.
- Guthaus, MiBench M. R. (2001). A free, commercially representative embedded

- benchmark suite. In IEEE 4th Workshop on Workload Characterization.
- Henning J. L., (2000, July). SPEC CPU2000: measuring cpu performance in the new millennium, IEEE Computer, 33(7):28–35.
 - Hillesland K.E., Lastra A.(2004). GPU floating point paranoia, In: Proc. 1st ACM Workshop General-Purpose Computing on Graphics Processors (GP2'04).
 - Huerta P., Castillo J., Jgnacio Martinez J., Pedraza C., (2007). Exploring FPGA Capabilities For Building Symetric Multiprocessor Systems, Programmable Logic, 2007. SPL '07. 3rd Southern Conference, pp. 113-118, IEEE.
 - Joshi A. M., Eeckhout L., John L. K., (2007). Exploring the Application Behavior Space Using Parameterized Synthetic Benchmarks, Parallel Architecture and Compilation Techniques. PACT 2007. 16th International Conference, pp-412 – 412.
 - Kurian L., Lieven Eeckhout J.(2006). Performance evaluation and Benchmarking, CRC Press, ISBN 0-8493-3622-8.
 - L'Hours L. (2005). Generating Efficient Custom FPGA Soft-Cores for Control-Dominated Applications, Proceedings of the 16th International Conference on Application-Specific Systems, Architecture and Processors (IEEE ASAP'05).
 - Massa A. (2003). Embedded Software developpement with eCos, ISBN 0-13-035473-2 Prentice Hall.
 - Peddersen, J., Lin Shee S., Janapsatya, A., Parameswaran, S., (2005). Rapid Embedded HW/ SW System Generation," In Proceedings of the 18th International Conference on VLSI Design help jointly with 4th International Conference on Embedded Systems Design (VLSID'05), IEEE.
 - Proctor, F.M., Shackelford, W.P. (2001). Real-time Operating System Timing Jitter and its Impact on Motor Control, SPIE Conference on Sensors and Controls for Intelligent Manufacturing II.
 - Sheldon, D., Kumar, R., Vahid, F., D. Tullsen, Lysecky R., (2006, November). Conjoining Soft-Core FPGA Processors, ICCAD'06, San Jose, CA, pp. 694-701.
 - Stitt, G., Lysecky, R., Vahid, F. (2003). Dynamic Hardware/Software Partitioning: A First Approach, Proc. of the 40th Design Automation Conference (DAC).
 - Vandierendonck, H., De Bosschere, K. (2004). Eccentric and Fragile Benchmarks, International Symposium on ISPASS, pp. 2 – 11, IEEE .
 - Wolf W. (2007). High-performance embedded computing, ISBN 13: 978-0-12-369485-0, Elsevier.
 - Yaghmour, K. (2003). Building Embedded Linux Systems, ISBN: 0-596-00222-X, O'Reilly.



IMPLEMENTING TOTAL QUALITY MANAGEMENT IN INTERNAL CUSTOMER SATISFACTION AT KUWAIT NATIONAL PETROLEUM COMPANY (KNPC)

Ahmad Assaf Alfadly*

Abstract: Kuwait National Petroleum Company (KNPC) is one of the largest petroleum production companies and refineries in the world. But its employees lack adequate training, especially in quality techniques and systems. This makes it difficult for them to understand the customer/supplier relationship. All employees are involved in the institution's quality improvement program. This study aims to understand Total Quality Management (TQM) at Kuwait National Petroleum Company (KNPC).

Keywords : TQM, internal customer satisfaction, training and motivation

Introduction

Kuwait National Petroleum Company (KNPC) was assigned the responsibility for oil refining and gas liquefaction projects in Kuwait, in addition to domestic distribution of petroleum products. The wide availability of oil led to an oil-led and oil-dominated economy in which the lack of other resources historically has led to an economy that left a very insignificant role for other industries. In addition, the increase in population together with energy intensity and the rise of globalization, all have led to an extraordinary increase in the use of energy locally. The growing demand for oil, being one of the most important conventional sources of energy, will require the use of traditional and nontraditional methods to meet such demand. Officials and professionals in the industry possess the experience that tells them how price volatility and economic cycles of fluctuating economic periods have adversely affected the industry and all levels of consumption.

The challenge that lies before KNPC, just like other companies in the industry, whether local, regional, or international, is to meet such needs, within applicable global standards, besides coping with the rising demands that grow almost on a daily basis. The key to competitive success is about focusing on and stressing product and service quality. With companies

dealing with added value highly informed consumers, tense global competition, and increasing deregulation, they now are considering implementation of Total Quality Management (TQM) as a solution to keep the business on track. This new management trend has generated significant interest in various sectors of the country, and growing awareness at the senior management level has created an important focus throughout the whole company. Customer-driven processes are recommended for adoption and usage by KNPC to run businesses and achieve quality goals by mobilizing appropriate human and physical resources. Numerous studies argue that an internal customer-supplier relationship is the basic principle behind this approach. Mitchell (1998) referred to this as a "series of internal supplier-customer chains contributing to the company-wide quality involvement in the company." Additionally, as customer satisfaction is getting more central and critical for practitioners with more service orientation within public organizations, enhancing the level of customer contact becomes imperative.

Human resources play a major role for any Kuwaiti company, including KNPC. And there are expectations for more significant employment challenges in the local market, some of them external due to the competitiveness outside in the market and

*Ahmad Assaf Alfadly, Assistant Professor, Faculty of Business Studies, Arab Open University, Kuwait. E-mail: dr_fadly@hotmail.com

within the global recruitment markets, and others internal, related to updating recruitment policies. Accordingly, the company will have to make sure that systems and processes are updated and integrated within its organizational practices, getting them more engaged with its business practices and operations, and adding value in every product or business goal they carry out.

TQM (Total Quality Management) Issues at KNPC

In spite of the reestablishment that took place internally over the years, with many skilled leaders compromised and new young leaders coming into power from 1994 till today, some problems occur within higher and middle management levels, especially in prioritizing the business essentials showing that newly-appointed managers and the way the company was driven does not have the owner/customer at heart. The competition that continued to pose more risks within the marketplace made KNPC management turn to reform the company by bringing in and applying new process systems to the company; however, the empty slogans showed there still is a lack of understanding of the internal customer satisfaction concept. Still, the middle management level lacks the required experience of the internal customer requirements and how to route these requirements to action (Neil et al., 2003).

Though there have been previous tasks and plans (even actual attempts) to implement TQM philosophy through higher management meetings and efforts, there still is a huge gap between understanding by this management level of what TQM is and the actual efforts made to force it on lower management processes and operations.

Total Quality Management

The basic parts of the TQM concept have been part of human actions for so long, and some historical traces bear the application of total quality management even long before its conceptualization.

The current interest in Total Quality Management lies in the widely diverse sub-domains contained within that ensure the application of quality, rather as a philosophy and not merely as an abstract concept. The concept is not always well understood and often is used mistakenly, as seen in the case of KNPC herein. Perhaps the reason was due to the absence of a well-

understood and commonly approved concept that affects the application. This is clear in the literature provided here, where different applications contributed to such errors on the part of companies and businesses. The inability to find and agree on a definition that could be applied by everyone and to be abided by, together with the inability to understand the TQM terminology in particular, may well contribute to the problems experienced by managers during implementation (Neil et al., 2003).

TQM bears reference in the work of Dr. W. Edwards Deming and Dr. Joseph M. Juran during the rebuilding of the Japanese economy in the aftermath of World War II. American companies discovered TQM adopted by their Japanese counterparts in the late 1980s, and later successfully implemented it in a number of well-known corporations in the United States when they realized their constant regression for the sake of the Japanese (Capezio, 1995).

TQM is defined as "a cooperative form of doing business that relies on the talents and capabilities of both labor and management to continually improve quality and productivity using teams." This definition carries three inherent systems for TQM: "(1) participative management, (2) continuous process improvement, and (3) the use of teams" (Jablonski, 1991, p. 4). There is an additional definition of six other basic principles of the term: "customer focus, focus on the process as well as the results, prevention versus inspection, mobilizing the workforce, fact-based decision making, and feedback" (Jablonski, 1991).

The usage of TQM in the public sector has been limited to the basic concepts of working with suppliers, constant process improvement, and interaction with customers. Suppliers give material the organization provides added-value, and ultimately the product is delivered to customer(s). Constant process improvement permanently analyzes work processes to enhance the organization. Interaction and communicating with the customer is very important in determining their needs and wants (Cohen, 1993).

According to Arthur Tenner, TQM consists of three fundamental quality principles that "support the objective of continuous improvement." Backing the quality notions are the basic components of leadership by example, giving training to enhance personal skills and knowledge, open and honest communication, programs for labor recognition, providing a supportive environment through department

managers, and data usage for decision-making (Tenner, 1992).

In addition, Warren Schmidt provides another five key TQM competencies: trust, teamwork, management by fact, employee recognition, and creating a continuously improving organization. An organization applying TQM fully and truthfully is characterized by more flexibility. Employees are authorized to make decisions and work in multiple, interrelated teams with seniors and team leaders. Bosses here are just facilitators with their member employees being the valuable asset. Customers set the type and level of quality whereas the organization develops procedures to meet those customer's expectations. Decisions are encapsulated based on fact (Schmidt, 1993).

According to Capezio, (2005) the main asset of TQM is the customer-supplier interaction, both externally and internally, which is set above for KNPC as a major requirement, and at each level of interaction there are several processes. The heart of TQM should be surrounded by "commitment to quality, communication of the quality message, and recognition of the need to change the culture of the organization to create total quality."

Customer Focus

The ultimate aim of providing any goods or service is to satisfy a certain need on the part of customers. Quality management (QM) is about this issue, where the final aim is to gain the customers' satisfaction (Neil et al., 2003). Without the ability to do so, QM implementation would be unsuccessful. All measures are to be planned and carried out, with customer satisfaction as the main basic issue. With such consideration, many of the product (or service) characteristics will be made according to those criteria (e.g., its price, quality, shelf life, etc.). The supreme quality of all these traits may only be carried out with full obligation given by all workers from different departments, like manufacturing, finance, and business development (Tari, 2005). This obligation might seem contrary to the general opinion that customer focus is only for front-desk staff, those dealing directly with the customers. By contrast, all sections are expected to cooperate, and the notion of quality improvement being only the responsibility of the quality department shall cease to be the general case.

Continuous Improvement

Constant improvement means making continuous enhancements, without stop. It is something like an everlasting process. Each constituent of an organization, i.e., merchandise, process, and production, should be incessantly improved (Fornell, Claes, and Briger Wernerfelt, 1987). The term seemingly is striking but hard to be accurately cut out, because of the illusiveness of the process of constant improvement. The process of setting out the definition and applying it to the full organizations might seem slow, but the results are worth waiting for.

Employee Empowerment

Employee empowerment means "giving authority to an employee as much as possible" ((Fornell, Claes, and Briger Wernerfelt, 1987), yet with an overall "allowable and justifiable framework." Here, employees are equipped with enough opportunity to accomplish any of the corporate objectives. Empowerment is about the opportunity given to the staff members for fast and relevant action to deal with any customer-related issue (e.g., complaint, request, etc.). It is to be noted here that the application of empowerment shall truly be made, not merely provided with no spirit of satisfying employees and customers alike. There may be several problems if no clear-cut definitions and lines are set between what is said and what actually is done, between freedom of work and violating the rules, as empowerment might lead to the employee being laid off. Any confusion in the level of empowerment may result in more confusion in practice and more serious mistakes regarding where to transgress the rules and where to abide, which might cause conflicts within the one team.

Employee Awareness

The completion of Quality Management requires dedication from all organizational members "across all departments and all managerial levels" (Juran, 1988). In most companies, top management introduces corporate rules and procedures to follow regarding quality (Hayes and Dredge, 1999), whereas the quality department is the secretariat for controlling the implementation. Based on this, carrying out QM is the agenda only for certain known employees. Others will be left unaware of how to carry out their assigned roles in delivery of quality. QM has been discussed

consistently in the literature since it requires organization-wide efforts for its successful execution. The level of employee awareness would alleviate the level and degree of implementing QM.

Service concepts

Fitzsimmons (2001) and Wisniewski (2001) argue that managers of service-oriented organizations agree that total quality can be said to be the customers' judgment of the total superiority or excellence of the service. Service quality involves a comparison of customers' expectations with customers' perceptions of the actual service performance (Geralis & Terziovski 2003). Delivering quality service means conforming to customer expectations on a consistent basis. The service concept has two components, firstly the degree to which customer needs are satisfied and secondly the added value that the customer receives.

A service is intangible as, in most cases; it cannot be seen or touched. Customers only experience that the service has been rendered and therefore the customer's perception of service is of utmost importance. People are continuously striving for a better standard of life, accompanied by a better quality of life. The last aspect is closely related to the whole concept of customer service. Customers expect quality service that considers their needs and improves their quality of life (Geralis & Terziovski 2003). The fact that the auto bank could not succeed in completely replacing human tellers in a bank is proof of the fact that customers require personal service.

In order to obtain an understanding of service quality, the three well-documented characteristics of service must be acknowledged (Karwan & Scribner 2003), namely:

- **Intangible.** Service relates to performance and is not an object. Most services cannot be counted, measured, tested, stored, or verified before being rendered.
- **Heterogeneity.** Customers have heterogeneous needs. Consumers of the same services do not all have the same priorities.
- **Inseparability.** For the purposes of determining quality, the production and consumption of services cannot be separated as in the case of manufacturing. This means that during production, attention cannot be paid to quality before it is delivered to the customer, as is the case with manufacturing. Quality therefore can be determined only during the rendering of the

service, usually during the interaction between the customer and the contact person of the service provider. The customer's input in respect of quality, therefore, becomes important only during the consumption of the service.

Each dimension is viewed as being self-contained and distinct with a degree of overlap recognized. However, Zeithaml & Berry (1994) point out that research has shown that the above dimensions of service quality may be reduced to five general dimensions. These are tangibles, reliability, responsiveness, assurance, and empathy.

Service process

Hammer & Champy (2000) consider service to be a process that goes through various stages. In each stage, certain inputs are required from the service provider. If the quality of the service is inferior at any stage, it will result in the end product - the service - not meeting the customer's expectations. According to Hammer & Champy (2000), the reason is that a typical service process includes a number of steps in which various people from various departments are involved.

The service process in most cases is the result of interaction between the provider of the service and the customer. Customers usually experience this interaction as extremely personal. The level of interaction will determine whether the customer will be satisfied or not. In the service interaction, the customer plays a key role in the outcome of the service.

Service strategy

Chang, Yang, & Sheu (2003) states; that each institution that renders services must have a service strategy that provides a focus point to which all in the institution can direct their efforts to render a customer-oriented service that will satisfy the customer. Such a strategy must emphasize the fact that the customer is important. Institutions therefore must determine clearly what the customer needs and what he or she expects of them. The aim of a service strategy must be to develop a method according to which the institution can give the customer exactly what he or she needs and expects to receive. (Chang, Yang, & Sheu 2003)

Service standards

According to Pycraft, Singh, & Phihlela (2000), a

quality standard is that level of quality that defines the boundary between acceptable and unacceptable. Such standards may be constrained by factors such as the state of technology in an institution. However, at the same time, they need to be appropriate to the expectations of customers. According to Evans & Dean (2003), service standards should be indicators of performance to determine whether the service meets the customer's expectations or not. Therefore, service standards should be established in the entire institution on the basis of which measuring can be done. For example, base members should know that all members of the base are internal customers of one another. By setting service standards, service management is facilitated and employees can form a clear image of exactly what is expected of them.

Measuring a service should be a continuous process and each employee should accept responsibility for such a process. The quality component of a service is related to complying with certain requirements. Once the customer's requirements have been determined, standards can be set according to which the service can be evaluated and measured (Kuo 2003).

In recent years, the concept of zero defects (error-free work) has become popular as management pursues a climate in which all members of their institution will dedicate themselves to the idea of zero defects in service rendering. Even though zero defect is not always possible, an institution should cultivate such an attitude and should discourage its employees from not complying with requirements, thereby deviating from set standards (Vroman & Luchsinger 1994).

Challenges of TQM implementation

When KNPC begins trying to implement TQM principles, it will be difficult to compare documented company procedures or processes with their command model counterparts (where workers are accustomed to following instructions without questioning them) in order to find the necessary application changes. The implementation of TQM, instead, works best when it evolves over time, and work force understanding of the principles is the first step in implementation. Showing the principles of TQM to those who are on the shop floor in measurable and easy to understand ways is problematic because the workers are accustomed to clearly stated demands.

Monitoring of Intern suppliers

This method of implementing TQM treats each stage in a manufacturing process as a receiving agent (customer) of the previous stage and as a supplier for the following stage. Using this system of work organization requires that the person leading the implementation of TQM train the work force, particularly managers of each stage, in quality concepts and tools. The work force has to be assured that this implementation will not have any negative effect on remuneration and is not a subterfuge for qualification testing. All managers should accept responsibility for TQM implementation within their areas of responsibility, just as if they were the top managers of individual companies. They have the right and duty to demand the highest quality product from their suppliers and the responsibility for the quality of what their departments manufacture for their customers.

Training and motivation

The application of this method obviously requires work force training, particularly in companies at the beginning of the long path to quality in a free market. It also is important to adequately motivate the production work force to engage it in moves leading toward the use of TQM principles. It is assumed that the following may be the basic qualities of the method:

- Speedy information feedback regarding product quality.
- Use of continual ratings to motivate the work force.
- Enhanced work force engagement at any stage that can be stimulated by bonuses.
- Highlighting of stages that are particularly prone to problems.
- Increased customer quality expectations.
- The possibility of using this method in another process.
- Increased error and problem recognition.
- Recognition and monitoring of key parts of a manufacturing process.
- Increased bottom-to-top communication.

The application of the proposed method may be endangered if the work force fears constant evaluation and attempts to boost ratings in ways that make final

product quality unrelated to ratings at individual stages. Used correctly, this method should help determine the most vital variables affecting the quality of a finished product and should indicate those process stages that need special attention. As quality situations change and problems are eliminated, the criteria used in the evaluation of quality levels may change, and the ratings should increase.

Conclusion

It has been stated clearly that the abilities, talents, and judgment of employees should be trusted so that they can obtain the right to make their own decisions. In KNPC, there are no opportunities for employees to develop in their work situation, which has an important affect on their levels of work satisfaction. KNPC has not adopted a better training tool for its employees and training not provided to employees in quality techniques and systems. This prevents a better understanding of the customer/supplier relationship. All employees are involved in the institution's quality improvement program. Finally the philosophy and principles of TQM provide a valuable tool in the quest for institutional excellence. This case study found that KNPC should implement TQM and in particular, explained how it is to be achieved.

References

- Capezio, (1995). The Antecedents and Consequences of Customer Satisfaction for Firms, *Marketing Sci.* 12(2) 125-143.
- Chang, Yang, Sheu (2003). Customer Loyalty, Toward and Integrated Conceptual Frame. *Journal of the Academy of Marketing Science* 22, pp. 99-114.
- Cohen, (1993). Understanding Nursing Research, Philadelphia: W. B. Saunders Company.
- Evans, Dean (2003). Americans Can't Get any Satisfaction Fortune: 186-193.
- Fornell, Claes, Briger, W .(1987). Defensive Marketing Strategy by Customer Complaint Management: A Theoretical Analysis. *Journal of Marketing Research.* 24(4), 337-346.
- Geralis, Terziovski (2003). Understanding Nursing Research, 3rd Ed. Philadelphia: W. B. Saunders Company.
- Hammer, Champy (2000). An Experimental Study of Consumer Effort, Expectations and Satisfaction, *Journal of Marketing Research*, 2(3), pp. 491-504.
- Hayes, Jenny, Dredge, Frances. (1999). *Managing Customer Service*, pp.16-66.
- Jablonski, (1991). The Past, Present and Future of Customer Access Centers. *International Journal of Service Industry Management*, 11(2), 120-130.
- Karwan, Scribner (2003). The PIMS Principle, New York: The Free Press.
- Kennedy, Peter. (2001). A Guide to Econometrics, Cambridge, MA: MIT Press.
- Kuo, (2003). Defensive Marketing Strategy by Customer Complaint Management: A theoretical Analysis. *Journal of Marketing Research.* 24(4) 337-346.
- Mitchell, P.J. (1998). Aligning Customer Call Centers for 2001, Telemarketing and Call Center Solutions, 16(10), 64-69.
- Neil, W., Merlin, S., Bryan, F. (2003). Customer Management Score, Measurement System and Data, 174-199.
- Pycraft, Singh, Pihlela (2000). *How to Conduct Interviews by Telephone and in Person*, Thousand Oaks, CA: Sage.
- Schmidt, (1993). From Branches to Call Centers: New Strategic Realities in Retail Banking. *Service Industries Journal*, 24 (3), 43-62.
- Tenner, (1992). Systems and Relationships for Construction Quality. *International Journal of Quality & Reliability Management.* 17(4/5), 377-392.
- Vroman, Luchsinger (1994). The Importance of Customer Satisfaction. *Direct Marketing*, pp. 23-26.
- Zeithaml, Berry, (1994). The Call Center Dictionary, Telecom Books, New York.

STUDY OF THE MARKET EFFICIENCY OF INDIAN COMMODITY MARKET WITH REFERENCE TO FUTURE MARKET OF GOLD

Anand Sharma**
Anurag Agnihotri*

Abstract: This paper aims to study market efficiency in commodity derivative segment with specific reference to gold futures. For this study data has been collected from the websites of the commodity exchanges and Forward market commission. The study reveals that market quality need not be compromised with contract separation. Standard gold futures contracts on the MCX remain the key source of price discovery and liquidity. It also provides that Future market lead the spot market prices except certain period when market is not efficient. Further this study also explored the relationship between domestic and International gold futures prices.

Key words: Market efficiency, Future and Spot market, NCDEX, MCX, NMCE

Introduction

The trading in commodity market has a long history in India and could be traced back to the early days of human civilization. The commodities market in India has seen a total turn-around after the liberalization of the economy in the 1991 at the time when the need was felt for futures trading in commodities. India has a long history of futures trading in commodities. The origin of commodity derivative markets is as old as USA and UK. The Chicago Board of Trade (CBOT) was the first commodity exchange in the world where organized trading in commodity derivative started. Further the commodity derivative markets started in India in Cotton trade association Ltd. in 1875 and in oilseeds in 1900 at Bombay with the establishment of the *Gujarati Vyapari Mandali*, which carried on futures trading in groundnut, castor seed and cotton. Forward trading in raw jute and jute goods started at Calcutta in 1912. Forward Markets in Wheat had been functioning at Hapur in 1913 and in Bullion at Bombay since 1920. In 1919, the Government of Bombay passed Bombay Contract Control (War Provision) Act and set

up the Cotton Contracts Board. In 1943, the Defense of India Act was utilized on large scale for the purpose of prohibiting forward trading in some commodities and regulating such trading in others on all India basis. In the same year oilseeds forward contracts prohibition order was issued and forward contracts in oilseeds were banned. With a view to evolving the unified systems of Bombay enacted the Bombay Forward Contract Control Act 1947.

Indian Gold Futures Markets

India in spite of being a large consumer, India is a price seeker in world gold market. Gold futures trading debuted at the Winnipeg Commodity Exchange (Comex) in Canada in November 1972. On December 31, 1974, the Commodity Exchange, the Chicago Board of Trade, the Chicago Mercantile Exchange and the Mid-America Commodity Exchange introduced gold futures contracts. The National Commodities and Derivatives Exchange, NCDEX and the Multi Commodity Exchange, MCX were launched independently in 2003 by a consortium of Banks, Technology providers and other institutions.

*Dr. Anurag Agnihotri, Assistant Professor, CVS, Delhi University, Delhi,
Email: anurag_agnihotri@yahoo.com, mobile-9310155599

**Dr. Anand Sharma, Associate Professor, Central University of Haryana, Mahendergarh
Email: anandsharma@gmail.com, mobile: 9810476378

The new exchanges are demutualized and are highly computerized to promote commodity trading via computerized medium. The Futures market helps to determine gold prices dependent upon local demand factors. Price risk management is invaluable for the various interest parties in the market to hedge against adverse price variations. The benefits of hedging flow from the relationship between the prices of contracts for physical delivery and those of futures contracts. So long as these two sets of prices move to converge on the maturation of the contract, and display a parallel (or closely parallel) relationship, losses in the physical market are offset, either fully or substantially, by the gains in the futures market.



Figure 1 : Gold spot and future prices at MCX
Source: www.mcxindia.com

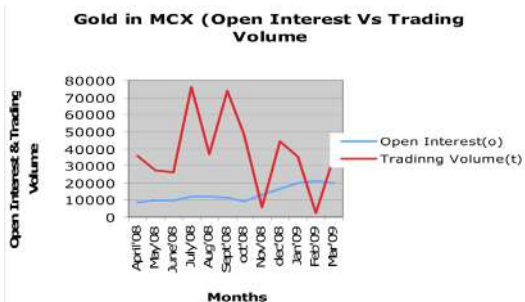


Figure 2 : Open Interest V/s trading volume for MCX Gold
Source: www.mcxindia.com

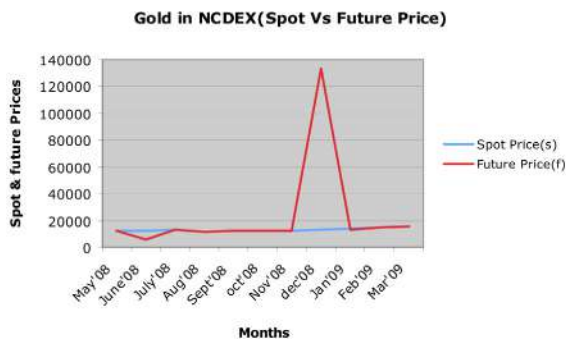


Figure 3: Gold spot and future prices at NCDEX
Source www.ncdex.com

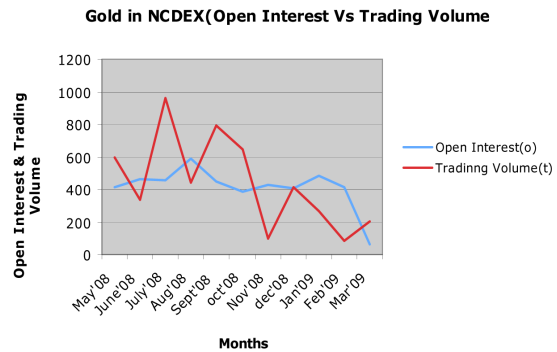


Figure 4: Open Interest V/s trading volume for MCX Gold
Source: www.ncdex.com

Review of literature

The history of the random walk dates back to the beginning of 20th century, when Bachelier (1900) found Brownian motion in stock prices, implying that stock price movements are random and does not follow any systematic patterns. Following Bachelier’s study, Cowels (1933) attempted to study the behavior of stock market prices and supported the findings of Bachelier and observed that their returns were higher than the return of a normal investor but was poorer than the returns from an outright investment in representative stocks for the period.

Alexander (1961) was consistent to that of Kendall with few variants and stated that a series obtained by cumulating random numbers, will for brevity and clarity be called usually a random-difference series, since it is the first difference of the series and not the series itself, which are random number. Further Alexander (1961) quoting the study of Kendall (1953) and Osborne (1959) observed that in an efficient speculative market, the price movements are random. But he holds the view that price move, once initiated tends to persist until the market reverses by same proportion. He has further observed that if the stock price has moved x percent, it is likely to move up more than x percent further before it moves down by x percent. Defining the random movements in stock markets, he observed unbiasedness in stock price movements.

Fama (1970) provides that all publicly available information has been incorporated into the prices of the assets and there will be no change in the price of commodity if there is no new information for public. This also means that given the risk neutrality and rationality assumptions, there is zero expected return to speculative activity Thus in an efficient market, the

futures price acts as an unbiased predictor of future spot prices. Several studies have been carried out to test the efficiency hypothesis. Engle and Granger (1987) provided a new technique for testing market efficiency through the *co integration technique* when prices are non-stationary.

Lai and Lai (1991) had co-integrated result combined with unbiased hypothesis of future predicting spot establishes that the market is efficient and further recommended Johansen's method of co integration. Johansen developed a co integration technique using maximum-likelihood method.

Kawaller et al. (1987), and Stoll and Whaley (1990) in the equities market, found that S&P500 futures price lead spot price. Chan et al. (1991) found bi-directional causality between S&P500 futures and stock index, but note that the futures market has a stronger lead effect. In the commodities futures also like the equity futures it was observed that the prices are to lead spot prices.

Evans (1968) studied price movements of 470 securities listed in Standard & Poor Index over a period of 1958-1967. Applying the filter rule, he found that irrespective of the degree of randomness or form characterizing the empirical distribution of security price changes, employment of "Fixed Investment Proportion Maintenance" strategy yields returns which are significantly superior to those yielded by a naïve buy-and-hold strategy.

Chen Ping (1996) using autocorrelation, spectral analysis and filter techniques studied the price movements in FSPCOM (S & P 500 Stock Price Composite Monthly Index) and FSDXP (S & P Common Stock Composite Dividend Yield). He found that 70% of fluctuations in S & P stock price Indexes, detrended by filter, could be explained by deterministic color chaos.

Anshuman and Goswami (2000) examined the day-of-the-week-effect in Indian stock market and found that weekday anomalies persist in Indian stock market. Rauser and Carter (1983) also held cost element responsible for futures market inefficiency and found the existence of arbitrage opportunity in Soyabean complex. Singh (2001) found that Indian commodity market is efficient especially when the time of maturity comes closer. He observed that Gur and Potato futures market, confirmed to efficient market hypothesis throughout. Whereas, he found efficiency in Castroseed, Hapur and Turmeric futures market was sensitive to period for maturity. On the

whole, since strong cointegration in spot market and the futures market was identified thus, Singh concluded that Indian commodity futures market was efficient.

Dimson and Mussavian (1998) found that during its heyday, a growing body of empirical research, supported the efficient market hypothesis by demonstrating the difficulty of beating the market, whether by analyzing publicly available information or by employing professional investment advisors.

Silvapulee and Moosa (1999) found that the futures prices of crude oil and castor seed lead spot prices. The most common explanation why a lead-lag relationship between the two markets is observed is that it is less costly for traders to exploit information in the futures market since transaction cost is lower and the degree of leverage attainable is higher. Garbade and Silber (1982) examined seven types of agriculture and precious metals commodities and show that futures markets account for 75% of new information and dominate spot markets in price discovery.

Objective and Theoretical framework of the study

This paper aims to study level of efficiency of Commodity derivative market in India with special reference to Gold. According to EMH, the futures price of an asset should be equal to the expected value of asset's spot price in future i.e.

$$E_t(\ln S_T) = \ln F_{t,T} \quad (1)$$

Where S_T is spot price at time T, $F_{t,T}$ is price at time t of futures contract maturing at time T. This is same as stating that in an efficient market futures price differs from spot price at time of contract maturity only by a random zero mean error. Hence, efficient market also implies that on an average the error given by

$$\hat{a}_t = E_t(\ln S_T) - \ln F_{t,T} \quad (2)$$

has a mean equal to zero i.e. \hat{a}_t is stationary. If this relationship is not true, arbitragers will make profits repeatedly by employing some trading strategy. Conceptually, the relationship in (1) or (2) and consequently EMH is tested using the following relationship.

$$\ln S_T = \hat{a}_0 + \hat{a}_1 * \ln F_{t,T} + \hat{\sigma}_T \quad (3)$$

where \hat{a}_0 and \hat{a}_1 are constants and $\hat{\epsilon}_T$ is random disturbance.

If the market participants have rational expectations and are risk neutral, \hat{a}_0 should be 0 and \hat{a}_1 should be 1. The tests for market efficiency then essentially involve examining whether the values of \hat{a}_0 and \hat{a}_1 are 0 and 1 respectively. Initial studies of market efficiency used Ordinary Least Squares (OLS) technique to find out \hat{a} 's and used the t-test to establish if these values were significantly different from the ones required for market efficiency. But this approach has two problems. The first problem is that asset prices have been found to contain unit root. In other words, spot prices can always be written as

$$\ln S_T = a_1 + \ln S_{T-1} + e_T \quad (4)$$

This renders the use of OLS on such prices ineffective.

Secondly, the time series of spot and futures prices are non-stationary in nature. Thus, they bias the conventional OLS estimates towards rejecting efficiency.

Methodology Data Collection

The Spot prices from MCX and NCDEX for every working day for the last 32 months were collected. Similarly the daily Futures prices of every contract launched on gold were collected. The MCX future contracts are one-year contracts and are launched once in 2 months. Whereas, at NCDEX future contracts are 3-month contracts and are launched once every month. We perform our analysis for 5 forecasting periods at both exchanges, i.e. 1 week, 2 week, 1

month, 2 month and 3 month. Hence, the spot price on the delivery date is matched with the corresponding month's contract price 1 week, 2 week, 1 month, 2 month and 3 month earlier. The MCX data contains 16 data points and NCDEX data contains 32 data points. In this paper, Augmented Dickey Fuller test is used to test for Unit roots in the time series data to establish Non-stationary nature of the spot and Future prices. Subsequently Johansen approach is employed to test for cointegration between spot and futures prices.

The software namely sys-stat and E-views 5.0 was used for the purpose of data analysis and finding out the results of various tests.

Result Discussion and Interpretation

After the collection of data, various models were applied on the data of MCX and NCDEX.

Results - MCX

The results of Augmented Dickey Fuller unit root tests on 1 year MCX futures contracts and spot are summarized in the Table 1. Each of the series consists of 16 data points. 1-week futures price is price of the nearest trading contract 1-week prior to expiry. Similarly, the 2 week, 1 month, 2 month and 3 month futures prices are obtained. The null hypotheses for all the futures and spot prices cannot be rejected. Hence, all the futures and spot prices are non-stationary.

The results of Trace cointegration tests (Johansen's method) between 1 year MCX futures and spot prices are summarized in the Table 2. The results show

Table 1: Results of Augmented Dickey-Fuller unit root tests on 1 year MCX gold futures and spot

Results of Augmented Dickey-Fuller unit root tests on 1 year MCX gold futures and spot						
Futures	t-Statistic	1% Critical Value	5% Critical Value	10% Critical Value	Prob.	Unit Root Present/ Not Present
1 week	-1.057078	-4.728363	-3.759743	-3.324976	0.9024	Present
2 week	-1.251353	-4.728363	-3.759743	-3.324976	0.8597	Present
1 month	0.028924	-4.992279	-3.875302	-3.38833	0.9899	Present
2 month	-0.191331	-4.728363	-3.759743	-3.324976	0.9858	Present
3 month	1.561599	-4.80008	-3.791172	-3.342253	0.9999	Present
Spot	-1.239106	-4.728363	-3.759743	-3.324976	0.8627	Present

Table 2 : Results of co-integration of 1 year MCX futures with spot using trace test

Results of cointegration of 1 year MCX futures with spot using trace test							
Futures	Number of CE = None			Number of CE = 1			Conclusion
	0.05 Critical			0.05 Critical			
	Statistic	Value	Prob	Statisti	Value	Prob	
1 week	30.74355	25.87211	0.0114	7.810452	12.51798	0.2675	Cointegrated
2 week	24.79002	25.87211	0.0677	7.319173	12.51798	0.3124	Not Cointegrated
1 month	18.12517	25.87211	0.3356	4.391858	12.51798	0.6849	Not Cointegrated
2 month	73.84198	25.87211	0.0000	5.791078	12.51798	0.4873	Cointegrated
3 month	34.26622	25.87211	0.0036	5.858667	12.51798	0.4785	Cointegrated

the presence of cointegration between all spot and futures prices except prior 1 week and 2 week prices.

The results of Max Eigen value Cointegration tests

(Johansen's method) between 1 year MCX futures and spot prices are summarized in the Table 3. The results show the presence of cointegration between all spot and futures prices except prior 1 week and 2 week prices as is the case with the Trace test results above.

Table 3: Results of co-integration of 1 year MCX futures with spot using Eigen value test

Results of cointegration of 1 year MCX futures with spot using trace test							
Futures	Number of CE = None			Number of CE = 1			Conclusion
	0.05 Critical			0.05 Critical			
	Statistic	Value	Prob	Statisti	Value	Prob	
1 week	22.9331	19.38704	0.0146	7.810452	12.51798	0.2675	Cointegrated
2 week	17.47085	19.38704	0.0929	7.319173	12.51798	0.3124	Not Cointegrated
1 month	13.73331	19.38704	0.2725	4.391858	12.51798	0.6849	Not Cointegrated
2 month	68.05090	19.38704	0	5.791078	12.51798	0.4873	Cointegrated
3 month	28.40756	19.38704	0.0019	5.858667	12.51798	0.4785	Cointegrated

Results - NCDEX

The results of Augmented Dickey Fuller unit root tests on 1 year NCDEX futures contracts and spot are summarized in the Table 4. Each of the series consists of 32 data points. 1-week futures price is price of the nearest trading contract 1-week prior to expiry. Similarly, the 2 week, 1month, 2 month and 3 month futures prices are obtained. The null hypotheses for all the futures and spot prices cannot be rejected. Hence, all the futures and spot prices are non-stationary.

The results of Trace cointegration tests (Johansen's

method) between 3 months NCDEX futures and spot prices are summarized in the Table 5. The results show the presence of cointegration between all spot and futures prices till 1 month. The 2 month and 3 month futures prices are not cointegrated with the spot.

The results of Max Eigenvalue Cointegration tests (Johansen's method) between 3 month NCDEX futures and spot prices are summarized in the Table 6. The results show the presence of cointegration between spot and all futures prices till 1 month. Cointegration doesn't exist between 2 month/ 3month futures prices and spot. The results are same as that obtained from trace tests above.

Table 4: Results of Augmented Dickey-Fuller unit root tests on 3 month NCDEX gold futures and spot

Results of Augmented Dickey-Fuller unit root tests on 3 month NCDEX gold futures and spot						
Futures	t-Statistic	1% Critical Value	5% Critical Value	10% Critical Value	Prob.	Unit Root Present/ Not Present
1 week	-1.498567	-4.296729	-3.568379	3.218382	0.8076	Present
2 week	-1.648825	-4.28458	-3.562882	-3.215267	0.7495	Present
1 month	-0.928974	-4.323979	-3.580623	-3.225334	0.9382	Present
2 month	-2.018751	-4.28458	-3.562882	-3.215267	0.5686	Present
3 month	0.433061	-4.28458	-3.562882	-3.215267	0.9985	
Spot	-2.141692	-4.28458	-3.562882	-3.215267	0.5036	Present

Table 5: Results of cointegration of 3 month NCDEX futures with spot using trace test

Results of cointegration of 3 Months NCDEX futures with spot using trace test							
Futures	Number of CE = None			Number of CE = 1			Conclusion
	0.05 Critical			0.05 Critical			
	Statistic	Value	Prob	Statisti	Value	Prob	
1 week	46.74229	25.87211	0.0000	5.789309	12.51798	0.4875	Cointegrated
2 week	62.16657	25.87211	0	5.81021	12.51798	0.4848	Cointegrated
1 month	124.3278	25.87211	0	5.278083	12.51798	0.557	Cointegrated
2 month	23.27632	25.87211	0.1017	6.794144	12.51798	0.3665	Not Cointegrated
3 month	18.35291	25.87211	0.3207	6.048541	12.51798	0.4542	Not Cointegrated

Table 6: Results of co-integration of 3 month NCDEX futures with spot using Eigen value test

Results of cointegration of 3 Months NCDEX futures with spot using trace test							
Futures	Number of CE = None			Number of CE = 1			Conclusion
	0.05 Critical			0.05 Critical			
	Statistic	Value	Prob	Statisti	Value	Prob	
1 week	40.95298	19.38704	0.0000	5.789309	12.51798	0.4875	Cointegrated
2 week	56.35636	19.38704	0	5.81021	12.51798	0.4848	Cointegrated
1 month	119.0497	19.38704	0.0001	5.278083	12.51798	0.5570	Cointegrated
2 month	16.48217	19.38704	0.1258	6.794144	12.51798	0.3665	Not Cointegrated
3 month	12.30437	19.38704	0.3873	6.048541	12.51798	0.4542	Not Cointegrated

Result Analysis and Data Interpretation

It was found by us that all the futures prices from MCX and NCDEX and all the spot prices contain a unit root. The presence of a unit root implies that the each of these processes can be expressed as $x_t = \hat{a} * x_{t-1} + \hat{a}_v$, where \hat{a} is very close to 1. Hence, all the time

series examined are generated by non-stationary random walk processes. Further it was also observed that 1 week, 2month and 3 month prior MCX future prices are cointegrated with spot whereas the 2 week and 1 month prior futures prices are not. The cointegrating relationships can be summed up by the following equations.

- a. $\ln(\text{Spot}) = 0.946668 * \ln(\text{futures 1 week}) - 0.003335 * t + \hat{a}_t$ (Holds)
- b. $\ln(\text{Spot}) = -1.001367 * \ln(\text{futures 2 week}) + 0.001959 * t + \hat{a}_t$ (Doesn't hold)
- c. $\ln(\text{Spot}) = -0.944686 * \ln(\text{futures 1 month}) - 0.004053 * t + \hat{a}_t$ (Doesn't hold)
- d. $\ln(\text{Spot}) = -1.021044 * \ln(\text{futures 2 month}) - 0.000837 * t + \hat{a}_t$ (Holds)
- e. $\ln(\text{Spot}) = -1.831422 * \ln(\text{futures 3 month}) - 0.001224 * t + \hat{a}_t$ (Holds)

This indicates the MCX futures market is efficient with respect to 1 week, 2 month and 3 month expiry periods. But some market disturbances such as intense speculative market activity disturb this efficiency for 15 days and 1 month periods. But analysis on MCX data is carried out using only 16 data points and this could be one of the reasons for the anomaly in the results obtained.

Further it was also found that the NCDEX futures prices are cointegrated for 1 week, 2 week and 1 month prior durations. But there exists no cointegration for 2 month and 3 month prior durations. This indicates that the market is efficient in the short run and the cointegrating equations can be used to predict spot values from the prior future values. The cointegrating equations are as follows:

- f. $\ln(\text{Spot}) = -1.013114 * \ln(\text{futures 1 week}) - 0.000519 * t + \hat{a}_t$ (Holds)
- g. $\ln(\text{Spot}) = -1.071088 * \ln(\text{futures 2 week}) + 0.000610 * t + \hat{a}_t$ (Holds)
- h. $\ln(\text{Spot}) = -1.019811 * \ln(\text{futures 1 month}) + 0.000798 * t + \hat{a}_t$ (Holds)
- i. $\ln(\text{Spot}) = -0.977373 * \ln(\text{futures 2 month}) + 0.002057 * t + \hat{a}_t$ (Doesn't hold)
- j. $\ln(\text{Spot}) = -4.126932 * \ln(\text{futures 3 month}) + 0.001896 * t + \hat{a}_t$ (Doesn't hold)

But for 2 month and 3 month duration such a prediction cannot be made. This indicates there in longer run prior future prices are not able to take to factor the long run deviations. It was observed that the presence of cointegrating relationship indicates that international spot and Indian spot move together in the long run although their might be short term deviations. This explains that the India is price taker despite being the largest consumer of gold. The domestic prices are governed by the International spot

prices rather than domestic supply demand mechanisms. Hence, the factors determining the Indian gold prices are same as those determining International gold prices such as global gold mining output, sale/purchase of gold by central banks, movement in dollar/ Euro, price of oil and risk from crises in oil producing countries etc.

Further this study analyses MCX and NCDEX data available from their inception. Cointegration studies generally require at least 5 years data to comment on the long run equilibrium observed in the market. Given that our study employs comparatively a short period of 32 months data. This study may have some limitations in explaining the cointegration between the spot and future price.

Conclusion

Indian gold futures markets are in relatively new as compared to the developed markets. On the regulations part, few recommendations are made based on the products/policies prevalent in the more developed markets such as introduction of Gold Exchange Traded Funds (GETFs) and contracts after the trading hours. The study of efficiency of MCX provides inconclusive results due to availability of small number of data points. The other commodity exchange NCDEX is found to be efficient in the one month period prior to contract expiry, although the cointegrating equations cannot be used to predict futures prices 2 or 3 months. We expect this to be a consequence of efficient transmission of information among traders in small contracts as they tend to trade more frequently. The study reveals that market quality need not be compromised with contract separation. Standard gold futures contracts on the MCX remain the key source of price discovery and liquidity. The study also explored the relationship between domestic and International gold futures prices. These were found to be cointegrated reaffirming the status of India as a price taker.

Reference

- Alexander, S. S. (1961). Price Movements in Speculation Markets: Trends or Random Walk. *Industrial Management Review*, (2) 7-26.
- Anshuman, R., Goswami, R. (2000, December). Day of the Week Effects on the Bombay Stock Exchange, UTI Indian Capital Market Conference 1-33.
- Bachelier, Louis (1900). *Theorie de la Speculation*

- (Paris: Gauthier-villars, 1900) and reprinted in English by Cootner P. (1964), *The Random Character of Stock Market Prices*, Cambridge: M.I.T.
- Chen, Ping (1996). A Random-Walk or Color-Chaos on the Stock Market?- Time-Frequency Analysis of S & P Indexes. *Studies in Nonlinear Dynamics & Econometrics*, 1(2), 87-103.
 - Cowels, A. (1933). Can Stock Market Forecasters Forecast?, *Econometrica*, 1,(3), 309-324.
 - Dimson, E. & Mussavian, M. (1998). A Brief History of Market Efficiency. *European Financial Management*, 4(1), 91-104.
 - Dorfman, H. J. (1993). Bayesian Efficiency Tests for commodity Futures Markets. *American Journal of Agriculture Economics*, 75(5) 1206-1210.
 - Engle, R, Granger, C. (1987). Cointegration, and error correction representation, Estimation and Testing. *Econometrica*, 55: 251-276.
 - Evans, L. J. (1968). The Random Walk Hypothesis, Portfolio Analysis and the Buy-and-hold Criterion. *Journal of Financial and Quantitative Analysis*, 3, (3), 327-342.
 - Fama, E.F. (1970). Efficient capital markets: a review of theory and empirical work. *The Journal of Finance* 25, 383–417.
 - Kamara, A. (1990). Delivery Uncertainty and the Efficiency of Futures Markets. *The Journal of Financial and Quantitative Analysis*, 25(1), 45-64.
 - Kawaller IG, Koch PD, Koch TW (1987) The temporal relationship between S&P 500 futures and the S&P 500 Index. *Journal of Finance* 42: 1309 – 1329.
 - Kellard Neil (November, 2002) Evaluating Commodity Market Efficiency: Are Cointegration Tests Appropriate?, *Journal of Agricultural Economics* ¾ Volume 53(3), ¾ 513-529.
 - Lai, K.S. and Lai, M. (1991). A cointegration test for market efficiency. *The Journal of Futures Markets* 11, 567–575.
 - Moosa IA, Silvapulle P (2000). The price volume relationship in the crude oil futures market: Some results based on linear and nonlinear causality testing. *Review of Economics and Finance* 9: 11-30.
 - Rauser, C. G. and Carter, C. (1983). Futures Market Efficiency in the Soyabean Complex. *The Review of Economic and Statistics*, 65, (3), 469-478.
 - Singh, J. R. (2001, December,). Weak Form Efficiency of Indian Commodity Futures, UTI Indian Capital Market Conference, 3-23.
 - Stevenson, A. R. and Bear, M. R. (1970). Commodity Futures: Trends or Random Walks?, *The Journal of Finance*, 25(1), 65-81. Stoll, H.R, Whaley, R,E .(1990). The dynamics of stock index and stock index futures returns. *Journal of Financial and Quantitative Analysis* 25: 441"468.

GOING BEYOND THE CODES OF CORPORATE GOVERNANCE A CASE STUDY OF TEXTILE INDUSTRY IN INDIA

Sudhi Ranjan Dash*
Anil Kumar Rajoria **

Abstract: *Corporate Governance is concerned with maintaining the balance between economic and social goals and between individual and community goals. Corporate Governance framework is to encourage the efficient use of resources and to require accountability for the stewardship of those resources. The aim is to align the interest of individuals, corporations and society. It is a system of structuring, operating and controlling an organization (with a view to achieve long term strategic goals to satisfy shareholders, creditors, employees, customers and suppliers) and complying with the legal and the regulatory requirements apart from meeting environmental and local community needs. Corporate Governance is concerned with ethics, values and morals of a company and its directors.*

This paper explores the intricacy of different internal and external factors on organization environmental ethics of large textile industry vis-à-vis its relationship with different stakeholders, and its performance.

Key words: *Stakeholder, Board of Directors, and Environmental Ethics*

Introduction

Corporate Governance is a system of structuring, operating and controlling an organization (with a view to achieve long term strategic goals to satisfy shareholders, creditors, employees, customers and suppliers) and complying with the legal and the regulatory requirements apart from meeting environmental and local community needs. Corporate Governance is concerned with ethics, values and morals of a company and its directors. Internal corporate governance deals with organization and its management viz, CEO, top management, Board of Directors and its employees, where as external corporate governance deals with different pressure groups i.e. NGOs, regulatory authority(government), business associations (CII, FICCI,PHD) and Academicians.

The Indian textile industry is one of the most important segments of Indian economy in terms of output, foreign exchange earning and employment generation. It contributes 4% of GDP and around 22% of foreign exchange earning and is the largest employer after agriculture employing close to 35 million workers. The industry's turnover is estimated at Rs.1, 30,000 crores. With effect from 1st January 2005, the quota system has been dismantled and trade in these products is under multilateral disciplines. According to WTO estimates between 1990 and 2002, global trade in textiles expanded at a yearly rate of 3.2% and trade in clothing at an annual rate of 5.3%. The developing countries, during this period recorded higher growth rates of 5.3% in textile and 6% in clothing compared with the developed countries. With the dismantling of quota regime, it is expected that India along with China would gain market shares in world trade.

*Dr. Sudhi Ranjan Dash, Professor, Tecnia Institute of Advanced Studies, Rohini, Delhi, Mobile-9818036561,
email id : dashsudhi123@rediffmail.com*

*Mr. Anil Rajoria, Asso. Professor. Tecnia Institute of Advanced Studies, Rohini, Delhi, Mobile,
email id: rajoria_anil@rediffmail.com*

Environmental Issues

Significant environmental degradation has accompanied rapid economic growth. This is an increasing problem for the Asian and developing countries. In India the issue of environment and the sustainable use of natural resources started from the early nineties. Apart from specific environmental enactment, there are numerous provisions which address the issue related to environment and industrial pollution. Industry and business in India are required to respond to a variety of growing environmental imperatives. Pressure to demonstrate corporate environmental stewardship are not only increasing but are emerging from all sides. Several states have introduced amendments to their constitution that grant to their citizens an "environmental right". The people have a right to clean air, pure water, and to the preservation of the natural scenic, history and aesthetic values of the environment. Environmental damage inevitably threatens the welfare of human beings as well as of plants and animals. Threats to the environment come from two sources: resource depletion and pollution. In the textile industry (dyeing and processing) maximum pollution is caused by the effluent, when it flows through water without any proper effluent treatment process.

Perspectives on Environmental Ethics

Utilitarian Theory

A utilitarian approach argues that the morality of an action is best judged by its consequences: the maximum benefit to the maximum number of people. Thus managers should protect the environment when doing so will bring greater aggregated benefits to the society at large. These benefits can be monetary or less tangible forms of utility (i.e.; from relaxation or beauty). A fundamentally utilitarian approach to environmental problems is to see them as market defects. If an industry pollutes the environment, the market prices of its commodities will no longer reflect the true cost of producing the commodities; the result is a misallocation of resources, a rise in waste and an inefficient distribution of commodities. Consequently society as a whole is harmed as its overall economic welfare declines (Scott, 1984). Utilitarian therefore argues that individuals should avoid pollution because they should avoid harming society's welfare.

Justice to Future Generation

According to John Rawls-each generation must

not only preserves the gains of culture and civilizations, and maintain intact those just institutions that have been established, but it must also put aside in each period of time a suitable amount of real capital accumulation. If we can't add more resources, at least we must preserve what we have inherited.

Stakeholder Theory

This theory suggests that when management acts, it needs to consider the interest of all constituencies-owners, employees, customers and society at large. If management sees its objective as providing goods and services that best satisfy the customer, the company will achieve financial rewards. The management must be accountable to all its stakeholders for any wrong doing. Either directly or indirectly, they must involved in the decision making process.

Justice

Utilitarian way of dealing with pollution (that is by internalizing costs) seems to be consistent with the requirements of distributive justice. If a firm pollutes, its stakeholders benefit because their firm does not have to absorb the external costs of pollution and this leaves them with greater profits, and those customers who purchase the firm's products also benefit because the firm does not charge them for all the costs involved in making the product. The external costs of pollution are borne largely by the poor. Pollution violates distributive justice. Internalizing the costs of pollution would rectify matters by removing the burdens of external costs from the backs of the poor and placing them in the hands of the wealthy: the firm's stakeholders and its customers.

Factors Affecting Environmental Ethics

Board of Directors (BOD)

At the lower end of the scale, a normal board would perform its basic duties and stay clear of prosecutions, but a growing company at the top of the industry would have a board with very high professional standards and have a very low level of violations of law, but most important, it wouldn't stop with maximizing shareholder value, but will adopt in reaching its corporate goals such means as are consistent with current requirements of social responsibility (Ramappa, T 1997). In the case of most private sector companies, we have relatively passive boards in the country with low degree of involvement. Ideally, the board of directors should be the heart and soul of a company. Whether or not a company grows

or declines depends very much upon the sense of purpose and direction, the values, the will to generate customer satisfaction and the drive to achieve, develop and learn, that emanate from the board and the extent to which it is visibly committed to them. The board is accountable in various ways to a number of different stakeholders in a company. The directors are required to achieve a balance between competing interests. There should not be conflict of interests between shareholders, customers, lenders, promoters and directors. Fair representation should be given to women member in BOD. The number of external members should be more. The non-interest members are external members. One expert in environmental management should be in the BOD. The following parameters were set for the evaluation of the best boards-

Accountability to Shareholders- the *raison d'être* of the board is to ensure that the company can constantly justify its use of shareholders funds, as well as its actions, methods, systems and results to owners. Only a board that is aware of this responsibility and considers it to be its primary mission can deliver results.

Transparencies of Disclosures- disclosure norms in the country are still too undemanding for shareholders to have a complete knowledge of the activities and performance of their companies.

Quality and Diversity of Directors- the identities of the members of a board are crucial to its excellence. Their individual competencies, experience and track records must match the business that the company is in.

Independence of Decision Making- the employees must have the freedom in discharging their respective duties without any interference or pressure.

CEO Beliefs

The four types of beliefs are:

- **Productivism-** productivists say the corporation's social responsibility in terms of rational self-interest and the direct fulfillment of stakeholder interests. The free market values the basis of rewards and punishments in the organization. This ethic drives internal and external vision, mission, values, policies and decisions including salaries, promotions and demotions. Productivists believe that the major mission of business is to

obtain profit. Tax reduction and economic incentives that boost private industry are policies that productivists advocate as socially responsible policies. Ronald Reagan's "trickle-down" economic policies, i.e., seeking social benefits from private sector wealth, are a recent example of this view. Robert Nozick advocates for a market based environmental ethic. He makes a market-based principle of justice and entitlement in his book *Anarchy, State and Utopia* (1974).

- **Philanthropy-** philanthropist's view is in favor of social responsibility in terms of moral duty toward helping less advantaged members of society through organized, tax-deductible charity and stewardship.
- **Progressivism-** Reinhold Niebuhr is a progressivist who advocated for the involvement of the church in politics to bring about reform. Progressivists support policies such as environmental protection, affirmative action, employee's stock option programs and energy conservation.
- **Ethical Idealism-** ethical idealists believe that social responsibility is justified when corporate behavior directly supports stakeholder interests from moral duty motives. Ralph Nader, hold that, to be fully responsible, corporate activity should help in transforming business into institutions where workers can realize their full human potential. Employee ownership, cooperatives, community-based and community-owned service industries are example of this. Corporate profits are to be shared for humanitarian purpose to help bring about a moral human society.

The responsibilities of the Board

The corporate governance framework should ensure the strategic guidance of the company, the effective monitoring of management by the board, and the board's accountability to the company and the shareholders.

- Board members should act on a fully informed basis, in good faith, with due diligence and care, and in the best interest of the company and the shareholders.
- The board should apply high ethical standards. It should take into account the interest of stakeholders.
- The board should monitor the effectiveness of the

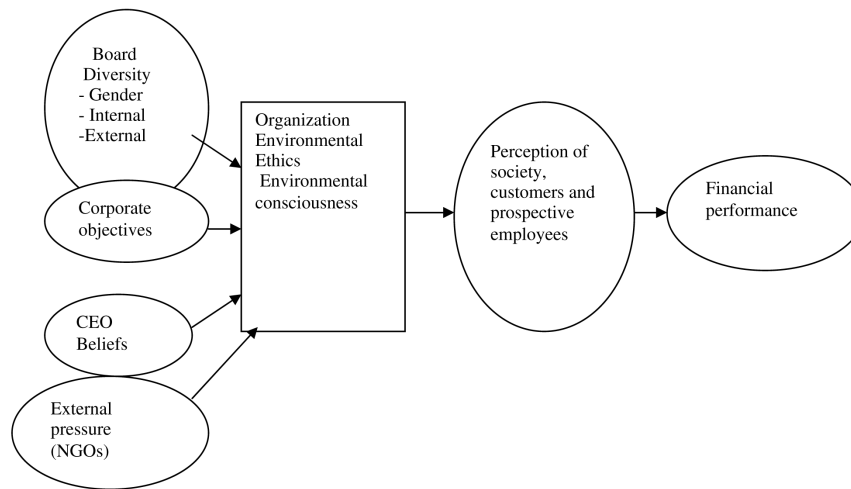


Figure-1 internal & external stakeholders of organization

company's governance practices and making changes as needed.

- The board should oversee the process of disclosure and communications.
- Boards should consider assigning a sufficient number of non-executive board members capable of exercising independent judgment to tasks where there is a potential for conflict of interest.

Methodology

The sample of thirty large textile organizations whose annual turnover is two hundred crore and above has been taken from CMIE (Center for Monitoring Indian Economy) database. Surveys were done for thirty large textile companies through interview and structured questionnaire. After extensive literature review, the different facilitators and drivers are chosen. The responses are taken in a five-point scale (least important-1 to most important-5). Sixteen including one from the top management respondents are taken from each organization. The mean and standard deviation of each of the organizations responses are calculated. The mean and standard deviation of facilitators, drivers and combined (facilitators plus drivers) are taken. The rank order correlation of facilitators, drivers and combined are calculated by the following formula.

Rank order correlation (\tilde{r}) = $1 - \frac{6 \sum D^2}{N(N^2-1)}$

$N(N^2-1)$

Where D is the difference of rank between two organizations

N is the number of facilitators

We have taken six facilitators and four drivers to know the environmental responsiveness of the organizations. By calculating the rank order correlation of different external stakeholders i.e. FICCI, PHD, CII, TERI, CSE, GREEN PEACE, MOE&F AND MINISTRY OF TEXTILE, it has been found that all of them have given most importance to management policies relating to environment as the facilitator for environmental responsiveness. Second priority is given to audit committee for environmental reporting and disclosures. Third priority has given to clean technology. It has been found that the NGOS has given first priority to audit committee for environmental reporting and disclosure where as the business chambers has given priority to management policies relating to environment. The ministries, which act as a regulator given priority to audit committee for environmental reporting and disclosure. Organization culture supporting the environmental concerns is the fourth priority. Similarly all of them have given first importance to environmental laws and their enforcement as a driver for environmental responsiveness. Where as NGOs given second priority to NGO/ pressure groups working on the environmental issue. There is a significant correlation

between MOEF and CII, GREEN PEACE and Academics, MOEF and TERI as facilitators. There is a significant correlation between GREEN PEACE and CSE, MOEF and CSE, GREEN PEACE and MOEF, MOT and FICCI, MOT and PHD as drivers. The board consists of two third of its total members as independent members. Very few organizations have women member in the board. Three organizations have one environmentalist each in their board. By content analysis of mission and vision statements of each of the thirty organizations, we found that CEOs beliefs have also greater importance in the environmental responsiveness of an organization.

Conclusion

From the above analysis and discussion it has been found that only adhering to rules and regulations, the organizations will not able to reflect sound corporate governance practices for organizational environmental ethics on their business activities. The other factors which influence the governance mechanism for practicing organizational ethics are the external stakeholders and pressure groups. They are NGOs, Government, Academicians (professionals associated with environmental activities) and prospective employees. Management policies relating to environment is the top priority as a facilitator for organizational environmental ethics. Clean technology is the second, ISO14001 is third and audit committee for environmental reporting and disclosure is the fourth facilitator. The drivers are environmental laws and their enforcement, NGO/ Pressure groups working on the environmental issues and the third one are concern shown by the board of directors. This helps the organizations to think beyond the codes of rules and regulations and adopt a proactive role in practicing organizational ethics. .

References

- Aravanan, S, (2001), "Corporate Governance: A Three Dimensional Network", Corporate Governance, Excel Books, New Delhi, pp114-120.
- Basu, Prahlad K, (2002), "Corporate Governance", The Hindustan Times, 10thAug.
- Bhalayam Srikala, Brian Burrows (1993), (essay review) -The greening of Business and its Relationship to business ethics, *Long Ranges Planning*, Vol-26, Issue 1, pp 130-139.
- Buhr, N. (1994). Environmental Disclosure: An Empirical study of Corporate Communications in Canada and the Role of Accounting. Ontario, University of Western Ontario.
- Corporate Social Responsibility, 24thSept.2002,The Financial Times,
- Das J. K., (2000), "responding to green concerns: the roles for govt. and business", *Vikalpa*
- Gopal, K, (1998), "Emerging Trends in Corporate Governance", *The Management Accountant*, June, pp 420-425.
- Gray, R., D. Owen, et al. (1996), "Accounting and Accountability, Changes and Challenges in corporate social and environmental reporting. London", UK, Prentice Hall.
- Narasimhan C.R.L., The Corporate Governance, *The Hindu*, 10th Jan.200. Nyati K.P (2002), ISO14001 in India- boon or blackmail, *FICCI Report*
- Rangarajan, C, (2000), "Corporate Governance- some issues", *Indian Management*, vol.39, No.2, February, pp18-21.
- Raju, R, S, (2000), "Corporate Governance in a Changing Environment", *Indian Management*, March, pp 42-47.
- Ready, P, L, Sanjeev (2002) "Corporate Governance- Emerging Trends", *Journal of Corporate Governance*, vol.1, No.1, pp21-32.
- Sekhar R.C. (1995), *Ethical choices in Business*, New Delhi: Sage Publication.
- Sachdeva Sujata Duty, Ecological Balance and Pollution, *The Times of India*, 22Feb.2002.
- Sharma H.C., (1994) "Environmental Pollution Compliance", CBS Publishers, New Delhi, India.
- Stead W. Edward (1990), towards an operational model of corporate social performance, *Journal of SAM Advanced Management*.
- Spash.Clive L. (1997), Ethics and environmental attitudes with implications for economic valuation, *Journal of Environmental Management*, Vo1.50, Issues 4,pp403-416.
- The Hindu-Business Line, Sept.1, 1996, p.6.
- TERI vision (2002), *TERI'S Eco-rating system, evaluating corporate environmental performance*
- Ulrich (1998), *Corporate Strategy & Environment*, Macmillan.

Vittal N, (2002, July 14).Corporate and Social Responsibility The Indian context, The Hindu.

Velosquez.Manue1 G. (1998), concepts and cases, 4th edition, *Business Ethics*, NJ: Pentice Hall.

Wiseman, J, (1982), "An Evaluation of Environmental

Disclosures Made in Corporate Annual Reports, "Accounting, Organizations & Society 7(1): 53-63.

Zabihollah, R., Szendi, J, Z, and Aggarwal, R, (1999), "Corporate Governance and Accountability for Environmental Concern", *Managerial Auditing Journal*, Vol, 10, No, 8, pp22.



TOTAL PRODUCTIVE MAINTENANCE

APPLICATION TO MEDIUM/SMALL/MICRO ENTERPRISES

Rajesh Bajaj*

Abstract: Total Productive Maintenance, shortly termed as TPM, is the concept originated and developed by Japan Institute of Plant Maintenance (JIPM) Tokyo, since late sixties. JIPM-TPM is the key for the operational excellence for many Japanese Industry. TPM means to achieve high level of productivity, through total participation of all people inside the organization and then maintaining these by developing self managing abilities in people and practices. Productivity, in JIPM-TPM requires increasing production and reducing cost simultaneously.

TPM envisages productivity improvement by maximizing the plant and machinery utilization. This is achieved by ensuring zero failure and zero accidents. This requires deployment of additional resources for long period. Large enterprises have the flexibility allocate resources for implementation of this tool. However, for medium, small and micro enterprises; where resource pool keeps shrinking as the size of the enterprise becomes smaller, application of TPM in totality becomes very difficult. This exercise is an effort towards identifying the specific TPM activities, which can be implemented for a particular type of enterprise and achieve the benefits; without investing the resources.

Introduction

What is Total Productive Maintenance (TPM)?

Total Productive Maintenance (TPM) is a maintenance program, which involves a newly defined concept for maintaining plants and equipment. The goal of the TPM program is to markedly increase production while, at the same time, increasing employee morale and job satisfaction.

To define TPM in most simplistic manner:

- TPM can be considered as the medical science of machines.
- TPM is a maintenance program which involves a newly defined concept for maintaining plant and equipment.
- Total Productive Maintenance (TPM) refers to

a management system for optimizing the productivity of manufacturing equipment through systematic equipment maintenance involving employees at all levels.

Similarities and differences between TQM and TPM :

The TPM programme closely resembles the popular Total Quality Management (TQM) programme. Many of the tools such as employee empowerment, benchmarking, documentation, etc. used in TQM are used to implement and optimize TPM also.

Following are the similarities between the two:

- Total commitment to the program by upper level management is required.
- Employees must be empowered to initiate corrective action.

Prof. Rajesh Bajaj, Prof. in Management, Tecnia Institute of Advanced Studies Email: rbajaj1234@yahoo.co.in, Tel. No. +919818562027

- A long range outlook must be accepted as TPM may also take a year or more to implement and is an on-going process. Changes in employee mind-set toward their job responsibilities must take place, as is in the case of TQM.

The differences between TQM and TPM are as follows:

- Under TQM, Quality output and its effects are relevant, whereas under TPM, Equipment acquires more importance.
- Under TQM, management has major role to play, whereas under TPM, Employee participation is the focal point.
- Under TQM Quality levels in PPM are the targets, whereas under TPM, elimination of losses and wastes is main objective.

TPM application - Large vs. MSME : Constraints

The implementation of TPM involves enormous activities and it is necessary to work in a structured fashion. Having TPM is like a culture, therefore it is necessary to have a structure for the implementation of TPM. Generally it is a 3 year project.

With such a long drawn, highly committed approach and needing immense amount of resources in terms of dedicated time, machines and technical and managerial capabilities of a very high standard, before any real benefits are viable from this approach; needs patience, belief and dedication on the part of management.

For large enterprises, where allocation of all these resources may not be a difficult proposition. However for a medium or small or micro enterprise, which are always under constraint due to resource paucity, application of Total Productive Maintenance in totality may not be feasible. Next best alternative is to identify pillar wise activities, which can be undertaken by the medium, small or micro enterprises to achieve the benefits from TPM.

LITERATURE REVIEW

The origin of TPM can be traced back to 1951. The management of Nippon Denso - Japan decided that the routine maintenance of equipment would be carried out by the line operators and the

maintenance group were to take up only essential maintenance works. Having spared of this routine activity, the maintenance crew went in for the equipment modification for improving reliability. The modifications were made or incorporated in new equipment. This led to maintenance prevention. Thus *Preventive maintenance* along with *Maintenance Prevention* and *Maintainability Improvement* gave birth to **Productive maintenance**.

One of the characteristics of TPM is that the manufacturing staff participates in maintenance activities. With the increased competition, the maintenance activities (for effective utilization of assets) has become important and hence the review of Operator’s role becomes necessary. Under these circumstances, QC circles and ZD activities have spread widely. This approach has developed into Jishu Hozen concept of “Maintain One’s Own Equipment By Oneself”.

TPM Targets:

- Overall Production Efficiency e” 80%.
- Overall Equipment Effectiveness e” 80%.
- Run the machines even during lunch hour.
- No customer complaints.

TPM is based on zero-loss concept viz., zero breakdown, zero accidents, zero defects etc., primarily to achieve high reliability / flexibility of equipment and reduce costs through minimizing wastage of man hours, raw material, power, tools etc. JIPM-TPM paves way for excellence in planning, organizing monitoring and controlling practices through its unique 8 pillar method. JIPM-TPM provides an easy way of deploying activities through its TPM promotion organization involving 100% of employees on continuous basis.

Total Productive Maintenance (TPM)

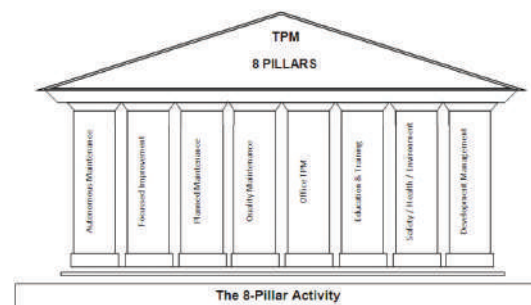


Figure 1 : TPM PILLARS

Table-1: PILLAR ACTIVITIES

Autonomous Maintenance	Maintaining Basic Conditions on Shop floor and in Machines All over participation through TPM Circles
Focused Improvement	Improvement is everyone's activity Improvement is to eliminate Production losses and reduce cost
Planned Maintenance	Logical analysis "real causes for real counter measures" Focus on Prevention and Improvements in Reliability, Maintainability and cost
Quality Maintenance	Developing Perfect Machine for Perfect Quality Eliminating In-Process defects and customer complaints
Office TPM	Office oriented for Excellent support for manufacturing Improving Offices Man-hour efficiency
Education and Training	Skills Development for Uniformity of work practices on machines Skills for zero defects, zero breakdowns and zero accidents Multi-skilled employees in all departments
Safety, Health & Environment	To achieve zero accidents, zero health hazards at work To maintain zero pollution plant and Environment
Development Management	Developing machines for "high equipment effectiveness" Quick process for developing new product

Objectives of the Study

Basic objective of this research project is to identify TPM dimensions, which can be implemented for medium / small / micro industrial or business set up without much complex planning, exhaustive resource demands and do not require extensive time frames for the results to be visible. Such like activities are intended to be merged with TQM dimensions, so as to work out easily implementable models for medium / small / and micro Business and Industrial units.

Focus area would be to concentrate on elimination of resource wastages in overall perspective, encompassing human, material and machine capacity resources. Generalised Check Lists and Thumb Rules, as applicable and easily understandable by small units are intended to be evolved, for usage by small set ups.

Research Methodology

Research Design

Research was a combination of exploratory and descriptive study. Exploratory part was basically to identify the applicable functional areas in medium, small and micro (MSM) units; where TPM activities can be fruitfully and optimally implemented.

Descriptive study was data based, which helped to transplant the objective functional models from large industrial units to MSM units. The present study was exploratory in the beginning, so as to identify most suitable variables. Subsequently, with the development of a questionnaire, study was based on the descriptive research. Suitable Hypothesis were developed, which were tested by data interpretation and analysis; using SPSS-14 tool.

Hypothesis

For development of suitable Hypothesis, all the TPM variables as applicable to Large size units were taken as reference. This premise is based on the fact that implementation of TPM requires considerable amount of spare machine capacity and knowledge based application over a long period of time, before the results are visible and large units can afford this experimentation. For a medium, small and micro unit, where resource availability in terms of capital, experienced and qualified manpower becomes a constraint.

Step wise Hypothesis were formulated to Identify correlation between Large vs Medium, Large vs. Small and Large vs. Micro in totality.

- H0(ML) - Resources available for applying TPM in Medium units are same as in Large units.
- H1(ML) - Resources available for applying TPM in Medium units are lesser than in Large units
- H0(SL) - Resources available for applying TPM in Small units are same as in Large units.
- H1(SL) - Resources available for applying TPM in Small units are lesser than in Large units
- H0(μ L) - Resources available for applying TPM in Micro units are same as in Large units.

- H1(μ L) - Resources available for applying TPM in Micro units are lesser than in Large units

This hypothesis verification helped in ascertaining the resource paucity as the size of the unit reduces from large to medium to small to micro.

Identified the correlation between Grouped parameters of Large vs MSM individually.

- H0(G1-ML) - Resources available for applying group 1 (SHE) activities of TPM in Medium units are same as in Large units.
- H1(G1-ML) - Resources available for applying group 1 (SHE) activities of TPM in Medium units are lesser than in Large units

Similarly for all the other seven groups (QM, KK, FI, E&T, PM, OFF and JH) of ML and for eight groups each SL and μ L combinations, thereby generating a total of 24 null hypothesis and 24 alternate hypothesis. These hypothesis verification helped in ascertaining the particular group of TPM activities which can be implemented for medium, small and micro units.

Identified the Correlation between individual parameter of Large vs individual parameter of Medium, Small and Micro units.

Legend :

M- Medium enterprises, S- Small enterprises, μ - Micro enterprises, Y – Feasible, N – Not feasible, Y/N – Feasible with certain extra efforts, N/Y – Considerable extra efforts required, (N) – Not feasible, but critical area with high gain possibility.

Summarised Results of Group Comparison: Large vs Medium / Small / Micro

Table 2 : Summarised Results of Group Comparison: Large vs Medium / Small / Micro

Sl. No.	Pillar Name	Statistical Verification of Hypothesis			Subjective verification of Hypothesis			Remarks
		M	S	μ	M	S	μ	
1.	SHE	N	N	N	Y	Y	(N)	Critical Area, special efforts required for μ
2.	JH	N	N	N	Y	Y/N	N	Extra efforts required by S
3.	PM	N	N	N	Y	Y	N	
4.	QM	N	N	N	Y	Y	N	
5.	KK	N	N	N	Y	Y/N	N	Extra efforts required by S
6.	FI	N	N	N	Y/N	N	N	Extra efforts required by M
7.	OFF	N	N	N	N/Y	N/Y	(N)	Considerable efforts required by M & S. For μ -critical area with high gain possibility
8.	E&T	N	N	N	Y/N	Y/N	N	Extra efforts required by M & S

Summarised Results of Question Wise Comparison in a Particular Group (Large vs Medium / Small / Micro)

- H0(P1-ML) - Resources available for applying Parameter 1 activities of TPM in Medium units are same as in Large units.

- H1(P1-ML) - Resources available for applying Parameter 1 activities of TPM in Medium units are lesser than in Large units.

Collection of Data

A questionnaire was designed, which contribute towards productivity enhancement in an industrial unit and to ascertain the availability of resource base in MSM units.

This questionnaire was circulated to various manufacturer associations, who in turn requested their members from the industry to provide the required information. Necessary contact details about the various association was obtained from Ministry of Micro, Small and Medium Enterprises, Government of India; Delhi. Out of the responses received, 40 responses were picked up randomly from each category for further analysis.

Data Reduction, Interpretation and Analysis

Data obtained from the respondents was tabulated and each group data was named. This facilitated in application of SPSS-14 software. Tools

used for Data analysis were Mean and two tailed t-test. This helped to ascertain the correlation with data from Large units as reference point and compare with field data recorded for medium, small and micro units. Based on this analysis, truthfulness of various hypothesis was established.

Results obtained for individual group and each question is compiled and are given below in summarized form. These details also indicate whether Null or Alternate hypotheses are valid for each group (pillar).

Table 3 : PILLAR – Safety, Health & Environment (SHE)

Qn. No.	Question Statement in brief	Statistical Verification of Hypothesis			Subjective verification of Hypothesis			Remarks
		M	S	μ	M	S	μ	
1.	Building construction/ modification as per manufacturing process	N	N	N	Y	Y	N	
2.	Frequency of serious/fatal accidents.	N	N	N	Y	Y	Y	
3.	Power disruptions	N	N	N	Y	Y	Y/N	Extra efforts required for μ
4.	.Staff Medical Check – up	N	N	N	Y	Y/N	N	Extra efforts required for S. For μ - not feasible
5.	5.Canteen Facility	N	N	N	Y	N	N	

Table 4 : PILLAR – Autonomous Maintenance (JH)

6..	Ownership of Individual machines	N	N	N	Y	Y/N	N	Extra efforts required for S
7.	First level Inspection and Maintenance on the machines	N	N	N	Y	Y/N	N	Extra efforts required for S
8.	Condition of the machines, which are in use for more than three years	N	N	N	Y	Y	Y/N	Extra efforts required for μ

Table 5: PILLAR – Planned Maintenance (PM)

9.	Record keeping for routine and break-down maintenance	N	N	N	Y	Y	N	Extra efforts required for μ
10.	Machine break-down time as a percentage of available production time	N	N	N	Y	Y/N	(N)	Extra efforts required for S. For μ -critical area with high gain possibility
11.	Standardization of machines	N	N	N	Y	Y/N	N	Extra efforts required for S
12.	Modification of the General Purpose machines not done, done by the machine manufacturer or done locally with internal resources	N	N	N	Y/N	Y/N	N	Extra efforts required for M and S.

Table 6: PILLAR – Quality Maintenance (QM)

13.	Shop floor rejections attributed to poor performance of machines	N	N	N	Y	Y	Y/N	Extra efforts required for μ .
14.	Rejection in the market due to poor quality	N	N	N	Y	Y/N	N	Extra efforts required for S.
15.	Customer Complaint resolution time	N	N	N	Y	Y	Y	
16.	Contribution to cost due to quality rejections on the production line	N	N	N	Y	Y/N	N	Extra efforts required for S.
17.	Existence of Technical capability to identify the source of quality defects and carry out required corrections	N	N	N	Y	Y/N	Y	Extra efforts required for S. For μ , product complexity being less, defect analysis is relatively easy.

Table 7: PILLAR – Kobetsu Kaizen (KK)

18.	Importance to employee suggestions towards functional improvements	N	N	N	Y	Y/N	Y/N	Extra efforts required for S and μ .
19.	Existence and functioning of Quality Circles in the enterprise	N	N	N	Y	Y/N	N	Extra efforts required for S.

Table 8: PILLAR - Focused Improvement (FI)

20.	Goal setting and Empowerment of the employees at micro level	N	N	N	Y/N	N	N	Extra efforts required for M.
21.	Capability in terms of time taken to introduce new product in the market	N	N	N	Y/N	Y/N	N	Extra efforts required for M & S.

Table 9: PILLAR - Office TPM (OFF)

22.	Storage of raw material, components, tools, machine spares and finished goods	N	N	N	Y/N	N	N	Extra efforts required for M.
23.	Physical check of tools issued to workers	N	N	N	Y/N	N	N	Extra efforts required for M.
24.	Parking of special purpose mobile m/cs.	N	N	N	Y	Y	Y	
25.	Inventory holding in number of days	N	N	N	Y/N	N	N	Extra efforts required for M.
26.	Retention of Suppliers.	N	N	N	Y	Y/N	N	Extra efforts required for S
27.	Retention of Buyers.	N	N	N	Y/N	Y/N	Y	Extra efforts required for M & S
28.	Delays in payments to suppliers	N	N	N	Y	Y/N	N	Extra efforts required for S.

Table 10: PILLAR - Education & Training (E&T)

29.	Annual employee turn over rate	N	N	N	Y/N	N	N	Extra efforts required for M.
30	Training for the new employees, on their joining the organization	N	N	N	Y	Y	N	
31.	Refresher training: Number of days per year	N	N	N	N	N	N	
32	Training organization and resource persons	N	N	N	N	N	N	

Legend:

M- Medium enterprises, S- Small enterprises, μ - Micro enterprises, Y – Feasible, N – Not feasible, Y/N – Feasible with certain extra efforts, N/Y – Considerable extra efforts required, (N) – Not feasible, but critical area with high gain possibility.

Further for analysis purpose, subjective assessment was done by using the 75% of the mean of the particular group data for large enterprise as reference. Feasibility to implement specific pillar for medium, small and micro enterprises was inferred from this data. Certain cases, where marginal deficiency was observed; it has been indicated under remarks column that “Extra efforts required by M/S/ μ ” enterprise to qualify for implementation of particular pillar.

Efforts have made identify such critical pillars / areas, where capability does not exist with a particular category of the enterprise, but gains can be appreciable, but of course efforts required also be considerably high. Such cases have been annotated as “(N)” under the Hypothesis verification column and brief explanation is given under the remarks column.

Findings and Recommendations**Medium Enterprises**

For medium enterprises, adequate resources are available and TPM can be implemented at par with Large enterprises, except for Focused Improvement and Office TPM related activities. With marginal resource augmentation, the deficiencies in these areas also can be bridged easily.

Small Enterprises

For small enterprises, limited scope exists for

TPM implementation. SHE and QM related activities can be implemented at par with large or medium enterprises. However, in respect of activities related to JH, KK and E&T pillars, considerable efforts would be required to be put in. Since all these pillars are the basic to the introduction of TPM in an enterprise, small enterprises attempting to introduce TPM must strive to work on these pillars with extra efforts.

For Office TPM activities, which can generate considerable amount of savings for an enterprise; no serious attention is being paid. Consequently, there is a wide gap in professional practices being pursued by large enterprises and Small enterprise. There is an urgent need to restructure the administrative processes and procedures and follow these in a disciplined manner; which would definitely yield rich dividends for TPM practicing enterprises.

In respect of FI, activities can be postponed to the second phase of TPM implementation; since capabilities, culture and resources do not exist for this pillar with small enterprises.

Micro Enterprises

For micro enterprises, there is paucity of resources in general, which is a major constraint in implementation of TPM activities. However certain activities related to QM, E&T and OFF TPM can be introduced, without much drain on the resources and these efforts can result into improved yield

performance and higher returns for such enterprises.

Conclusions

Based on the objective analysis of the field data and subjective rationalization, following conclusions can be drawn from the study.

- Resource constraint increases as the size of the enterprises gets smaller in relation to large enterprises.
- For medium enterprises, introduction of TPM activities is feasible with the same convenience; as can be done for large enterprises.
- For small enterprises, TPM implementation would have to be carried out in a phased manner. As elaborated in recommendations above, first phase should include activities related to SHE and QM, JH, KK and E&T. Once these basic activities are embedded in the organizational culture, then it would be quite easy to include other pillar activities.
- For micro enterprises, resource paucity is a major constraint in TPM introduction. However certain critical activities related to OFF and QM, if initiated; are likely to yield competitive advantage for such enterprises.

References

- Nakajima, Seiichi (1989), *"Introduction to TPM"* Cambridge, Mass.: Productivity Press.
- Hartmann, Edward George (1992), *"Successfully Installing TPM in a Non-Japanese Plant: Total Productive Maintenance."* TPM Press. ISBN 1882258002.
- Nakajima, Seiichi (1989), *"TPM development program: implementing total productive maintenance."* Cambridge, Mass.: Productivity Press. ISBN 0-915299-37-2.
- Japan Institute of Plant Maintenance. *"TPM for Every Operator (Shopfloor Series)."* Cambridge, Mass.: Productivity Press. ISBN 978-1-56327-080-2.
- Leflar, James A. (2001), *"Practical TPM: successful equipment management at Agilent Technologies."* Portland, Or.: Productivity. ISBN 978-1-56327-242-4.
- Campbell, John Dixon; James V. Reyes-Picknell, *"Uptime: Strategies for Excellence in Maintenance Management (2nd edition)."* Cambridge, Mass: Productivity Press. ISBN 978-1-56327-335-3.
- Seiichi Nakajima, *"Introduction to TPM"*, Japan Institute of Plant Maintenance Reprinted in India by Productivity Press, Chennai, ISBN 81-85985-15-48.
- Suchiro Kunio, *"Eliminating Minor Stoppages on Automated Lines"*, Productivity Press, Cambridge, Massachusetts. Joiner Associate Consulting Group, The Team Hand Book Joiner Associates Inc. Madison, U.S.A., 1988
- S. Nakajima [1989] *"TPM Development Program"*, Productivity Press
- K. Shirose [1996], *"TPM New Implementation Program in Fabrication & Assembly Industries"*, JIPM
- Seiichi Nakajima, *"Introduction to TPM"*
- Tokutoro Suzuki, *"TPM in Process Industries"*
- Kunio Shirose, *"TPM for Workshop Leaders"*
- Seiji Tsuchiya, *"Quality Maintenance"*
- Kunio Shirose, *"TPM New Implementation Program in Fabrication and Assembly Industries"*
- Kikuo Suehiro, *"Eliminating Minor Stoppages on Automated Lines"*



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As a temple of learning of professional & technical education, we subscribe to, in dealing with membership and the public include which Integrity, honesty, openness, personal excellence, constructive self-criticism, continual self-improvement, and mutual respect, professionalism, quality in service and standards, innovation, accountability, objectivity. We are committed to our students and corporate partners and have a passion for use of technology in education. We take on challenges, and pride ourselves on seeing them through. We hold ourselves accountable to our students, corporate collaborators, Board members, Statutory bodies, Alumni and employees by honoring our commitments, providing results, and striving for the highest quality excellence.



TECNIA INSTITUTE OF ADVANCED STUDIES

Approved by AICTE, Ministry of HRD, Govt. of India Affiliated To GGSIPU University, Recognized under Sec 2(f) of UGC ACT 1956

Institutional Area, Sector 14 Extn. Madhuban Chowk, Rohini, Delhi- 110085

Tel: 91 11 27555121-24, Fax No: 91 11 27555120, E-Mail: directortias@tecnia.in; Website: www.tecnia.in



ISO 9001:2008

India's Premier ISO 9001:2008 Certified, Category 'A' by JAC of GGSIPU and DHE, Govt. of NCT of Delhi; 'A' Category Institute by SFRC, Govt. of NCT of Delhi; Rated "A++" Best Business School by AIMA; featured in Top 100 B & IT Schools by reputed publications. The Institute has Ultra Modern infrastructure and imparts Value Based Quality Education, conducts Training, Research & Consultancy since 1998. Applications are invited for the following programs.



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Faculty with rich experience drawn from Industry and Academia alike, viz., FMS, Main University Campuses, IITs, MNCs, PSUs, having Ph.D, M.Tech, M.Phil., NET/GATE qualifications.

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PUBLICATIONS

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PROFESSIONAL CLUBS MEMBERSHIP

BJMC Deptt.:- Photography Club; Radio Club; Press & Media Club; Online Video and Film Club; Advertising Club.

MCA Deptt.:- Live Projects Club; Software Testing Club; Web Technologies Development Club; Software Engineering Club; IT Security Club; Database Mgt. Club; Networking Club; Multi Media Club; Operating System Club; SEO Club; CMS & ERP Club.

Management Deptt.:- Corporate Governance Club; Business Econometrics Club; Project Viability Club; Family Business Club; Venture Development Club; Public Speaking and Negotiation Skills Club; HR Development Club; Industrial Relations & Labour Law Club; Advertising Club; Publication Cell; Entrepreneurship Development Club; Soft Skill Development Club; Social Responsibility Club

CORPORATE RESOURCE CENTER

Members get subsidized copy of Business Newspaper, Book Bank, Corporate Interaction.

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Assured quality teaching through technology for achieving new benchmarks.

FDPs

To keep abreast with contemporary Knowledge, regular FDP is being conducted in collaboration with Min. of Sc.&Tech., GoI - NSTEDB.

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IBM, Wipro, HCL, J&J, ACC, Asian Paints, India Bulls, HDFC, Aircel, Dainik Bhaskar, Tech Solution, ICICI, I-Gate. NIIT, Trident, Genpact, IBN-7, Tech Mahindra.

FEES* & ELIGIBILITY

As per GGSIPU University Norms.



Chief Guest H.E. Sh. Jagannath Pahadia, Governor of Haryana, being felicitated by Mr. R. K. Gupta, Chairman, Tecnia Group and Mr. Gireesh Sanghi National President AIVF, Ex-MP at International Conference



Ms. Datinder Kaur (MBA) receives Gold Medal from Delhi's Lt. Governor Sh. Tejendra Khanna for topping the merit list of University

Glimpses of Tecnia Events



TECNIA Mega Job Fair 2013... 16-17th February

Venue : Tecnia Institute of Advanced Studies, Madhuban Chowk, Rohini, Delhi - 85
MBA, MCA, BBA, BJ(MC) & BCA



50 companies participated, 1300 candidates registered from 7 Universities and 21 Institutes, 290 Candidates placed.



Vision

To emerge as one of the world's leading institutes by adhering to the highest academic standards, by developing strong industry-academia bond and playing a pioneering role in R&D, so as to serve the society by way of shaping professionals to conquer the present and future challenges, to the socio-economic fabric of our society by dissemination of relevant knowledge through structured learning system.

Mission

To build and nurture a new generation of well-rounded professionals who can work as positive change agents in the new millennium by helping the Indian industry attain and sustain global leadership. It will be our endeavor to assimilate and disseminate practical strategies to future professionals, to sharpen their strategic perception and thereby equipping them for the fast changing global business environment. We are committed to make significant contribution to society by providing opportunities to deserving candidates through world class professional education and to inculcate amongst them the feelings of fraternity and patriotism.



Where Dreams are Chiselled into Reality



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Madhuban Chowk, Rohini, Delhi-110 085

Ph.: 011-27555121-124, Fax: 011-27555120

E-Mail: journal.tecniaindia@gmail.com, Website: www.tecniaindia.org

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