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The impact of training on organisation performance in manufacturing industry

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Abstract

Training is inevitable irrespective of any industry in which manufacturing industry is not of any exception for the enrichment of the organization. The outcome of training is seen faster in manufacturing industry. The literature available is reviewed. The need for the study is found and the training in Visakhapatnam steel plant and manufactures of parts supplied to Visakhapatnam Steel Plant are taken for study through the primary and secondary sources of data and analyzed the data with statistical tools like Annova, Regression and F Test. Hypotheses are framed and tested with statistical tools and the outcome of the study ensured suggestions to the training practices in Visakhapatnam steel plant.

Keywords: manufacture sector, training, effect on employees, work and organisation

1. Introduction

Training, a very strongly associated with business or firms and its role in business is debated because of its irrational relationship between the cost and Return on Investment (ROI). A study states that training is positively related to human resource outcomes and organizational performance but is only very weakly related to financial performance. More than half of India's manufacturing companies do not return their cost of capital. India's manufacturers have long performed below their potential. Although the country's manufacturing exports are growing (particularly in skill-intensive sectors such as auto components, engineered goods, generic pharmaceuticals, and small cars) its manufacturing sector generates just 16 percent of India's GDP—much less than the 55 percent from services. Moreover, a majority of India's largest manufacturers don't return their cost of capital, a factor that dampens investment in the sector and makes it less attractive than its counterparts in competing economies, such as China and Thailand. Indeed, China's manufacturers captured nearly 45 percent of the global growth in manufacturing exports from low-cost countries between 2001 and 2010, whereas India accounted for a paltry 5 percent.

Table 1: Relationship between ROIC and WACC for top 1000 Manufacturing Companies in India

S. NO	Over All	ROI	WACC	N=1000
		54	46	
By Sector				
1	Durables and Textiles	79	21	156
2	Utilities	74	26	19
3	Paper Products	72	28	47
4	Auto	59	41	87
5	Food and Beverages	56	44	98
6	Metals and Mining	54	46	92
7	Energy	54	46	26
8	Chemicals	48	52	133
9	Pharma	46	54	72
10	Capital Goods	41	59	233
11	Construction Materials	24	76	37

Source: Mc Kinsley Analysis, 2016

Training, according to business dictionary, is defined as *organized activity* aimed at imparting *information* and/or *instructions* to *improve* the recipient's *performance* or to help him or her attain a required level of *knowledge* or *skill*. Training is an instructor-lead content-based intervention leading to the desired change in the behavior of an individual, for specializing the person in performing a given task more effectively and efficiently.

Training is one of the crucial strategies for organizations to assist employees to gain those necessary knowledge and skills needed to meet the challenges (Goldstein and Gilliam 1990, Rosow and Zager 1988) ^[16]. More recent studies indicated that today's organizations will face two oncoming trends, the increasing age of the workforce and the increasing introduction of new technologies, and suggested that training is especially critical, as the workplace introduces further new technologies, such as web-based operation, computerized intelligent systems, and other task technologies (Colquitt *et al* 2000, Howard 1995, Quiñones 1997) ^[5].

The role of training is impeccable in spite of its irrational relationship to the returns on the investment which could be seen in the words of global leading manufacturers.

2. Need for the Study

Little work has examined the extent to which trainees effectively apply the knowledge, skills and attitudes acquired in a training context once they are back in the job (Tannenbaum and Yukl 1992, Tracey *et al* 1995) ^[6, 7]. Clearly the success with which individuals apply new skills in the workplace is of importance both to those attending training programmes and to the employing organizations who continue to invest heavily in such development activities. Several research studies have studied the effect of training, taking only a few variables like increase in confidence (Devins 2004) ^[8], empowerment (Siegel *et al* 1997) ^[9], success of teams (Banker *et al* 1996) ^[10], return of participation in a training programme (Krueger and Rouse 1998), competitiveness of the organization (Caudron 1991) ^[12], improvement in performance (Swierczek and Dhakal 2004) ^[13], achievement of company objectives (Gordon and Sohal, 2001) ^[14] and productivity (Denison 1984, Carnevale and Goldstein 1990) ^[15, 16]. However, there is a need for a comprehensive study of the effect of technical training. A study of the effect of technical training is needed with particular reference to the automobile manufacturing companies as they spend a considerable amount of time and money to train their employees.

2.1 Problem Statements

It is important to study the effect of technical training in Indian automotive manufacturing companies because training has become one of the major activities and enormous investment is made to train the personnel. The industry will benefit by understanding the effect of training. The responses, regarding technical trainings from the shop floor supervisors are important because they are closer to the daily operations and customers. What are the effects of technical trainings on the organizations, the employees and work practices? How are employee improvement and improvements in the work practices contribute to the organizational benefits? Are the effects different between the different types of companies? These questions have greatly influenced the current study on the effect of

technical training in Indian automotive manufacturing companies.

3. Objectives

The following are the objectives of the study:

1. To find the outcomes of technical training on the organization, the employee and work practices.
2. To find the nature of relationship between the organizational benefits of training and the following two effects: (1) employee improvement and (2) improvements in the work practices.
3. To test the hypothesis in the light of survey data and analyse with statistical tools.

4. Methodology

The effect of training in automobile manufacturing companies has been selected as the broad field of research. A literature survey has been conducted to investigate the research work already carried out in this area. The effect of training in automobile manufacturing companies has not been studied fully in any literature. An attempt has been made in this study to find the effect of training in automobile manufacturing companies. Based on the review of the results, conclusions have been drawn. Finally, the scope for further research has been projected.

Survey: The research is based on a survey, to find out the effect of technical training on the organization, employee and work practices. The relationship between the organizational benefits of training, employee improvement and the improvements in the work practices are also investigated.

Survey Methodology: In order to measure the effect of technical training, a survey instrument consisting of 150 items has been developed. Since there was no prior instrument available to measure the effect of technical training from the viewpoint of supervisors, a new instrument was developed on the basis of an exhaustive review of literature, brainstorming with employees and a pilot survey among the employees. The instrument underwent refinements based on the pilot survey and the suggestions from the experts from the academic field and industry. The instrument has been designed to maximally capture the effect of technical training on the capabilities of the employees.

The following are the stages of the survey:

1. Questionnaire design
2. Pilot survey
3. Revision of questionnaire
4. Survey
5. Data analysis
6. Results and findings

The items in the questionnaire are jumbled and arranged in a random order in the instrument. The random sampling procedure was followed to get the responses. The respondents were approached personally and were explained the purpose of the project. The respondents were requested to indicate their perception of the effect of technical trainings with respect to each item on a seven-point Likert scale. The survey was conducted in Visakhapatnam Steel Plant, Visakhapatnam, India. A total of 305 candidates were approached and all of them returned correctly completed questionnaires, yielding a response rate of 100%. The high response rate was due to personal contact approach. A

combination of factor analysis, multiple regression analysis, analysis of variance (ANOVA) and independent sample t-tests will be used to analyze the data and to check for the differences among companies. Factor analysis will be performed on the responses with the objective of reducing many variables that belong together and having overlapping measurement characteristics to a manageable number. Reliability analysis will be conducted on the factors. Multiple regression analysis will be used as a descriptive tool to develop a self-weighting estimating equation to predict values for a criterion variable (dependant variable) from the values for several predictor variables (independent variables). ANOVA and independent sample t-tests will be performed to analyze the data and to check for the differences among companies. The results obtained from the above-mentioned techniques will be discussed further.

5. Analysis and Interpretation

This part of the paper deals with the analysis and the data interpretation of the tests of hypotheses. Reliability analysis was conducted on the factors and the alpha values were calculated. The factor analysis resulted in 17 factors in which five factors on the effect on the organization, seven factors on the effect on the employee and five factors on the effect on the work.

Models of multiple regression models are used. The five factors of the effect on the organization are the dependent variables and the effect on the employee and the work are independent variables. The dependent and independent variables are to find the contributing factors for the effect on the organization.

To find if there are differences between the companies in the seventeen factors of the effect of technical training, analysis of variance test was conducted. Independent sample t-test was used to find the differences between companies and component supplying companies.

Testing Of Hypotheses

Analysis of variance (ANOVA) is a statistical method for testing the null hypothesis that the means of several populations are equal. To check for the differences among the companies with respect to the seventeen effects of technical training, the following hypotheses have been formulated:

- H01:** There is no significant difference between the companies with respect to business improvement because of technical training.
- H02:** There is no significant difference between the companies with respect to cultural improvement because of technical training.

- H03:** There is no significant difference between the companies with respect to continuous improvement because of technical training.
- H04:** There is no significant difference between the companies with respect to cost reduction because of technical training.
- H05:** There is no significant difference between the companies with respect to initiative and knowledge dissemination because of technical training.
- H06:** There is no significant difference between the companies with respect to quality improvement because of technical training.
- H07:** There is no significant difference between the companies with respect to Modernisation of work because of technical training.
- H08:** There is no significant difference between the companies with respect to work process improvement because of technical training.
- H09:** There is no significant difference between the companies with respect to improved performance because of technical training.
- H010:** There is no significant difference between the companies with respect to career improvement because of technical training.
- H011:** There is no significant difference between the companies with respect to improvement in technical expertise because of technical training.
- H012:** There is no significant difference between the companies with respect to skill improvement because of technical training.
- H013:** There is no significant difference between the companies with respect to clarity in work because of technical training.
- H014:** There is no significant difference between the companies with respect to increase in motivation because of technical training.
- H015:** There is no significant difference between the companies with respect to understanding the present work because of technical training.
- H016:** There is no significant difference between the companies with respect to remedy in the past poor performance because of technical training.
- H017:** There is no significant difference between the companies with respect to self and time management because of technical training.

The hypotheses pertaining to the above variables are tested in this section regarding the differences between MANUFACTURING Companies using ANOVA.

Table 2: Multiple regression analysis - Costreduction

Model		Unstandardized Coefficients	Std. Error	Standardized Coefficient	t	Sig.	Correlations	Part	2
		B		Beta			Partial	P	P
4	(Constant)	1.39	0.21		6.52	0.00			
	Improvement in Technical expertise	0.22	0.07	0.25	2.89	0.00	0.16	0.12	0.015
	Work process improvement	0.17	0.06	0.17	2.70	0.01	0.15	0.11	0.013
	Modernisation of work	0.13	0.05	0.16	2.71	0.01	0.15	0.11	0.013
	Quality improvement	0.17	0.07	0.21	2.40	0.02	0.14	0.10	0.010
R ² = 0.47; Adjusted R ² = 0.46;					F = 65.31; Sig. = 0.000				

Differences between the manufacturing companies

H₀₁ and H₀₁₁: The null hypotheses are accepted with the significance levels above 0.05. There is no significant difference between the three MANUFACTURING companies with respect to business improvement and improvement in technical expertise because of technical training. These two variables are close to the expected results of technical training.

H₀₂, H₀₃, H₀₄, H₀₅, H₀₆, H₀₇, H₀₈, H₀₉, H₀₁₀, H₀₁₂, H₀₁₃, H₀₁₄, H₀₁₅, H₀₁₆ and H₀₁₇: The null hypotheses are rejected with the significance levels below 0.05. There are significant differences between the three MANUFACTURING companies with respect to cultural improvement, continuous improvement, cost reduction, initiative and knowledge dissemination, quality

improvement, modernisation of work, work process improvement, improved performance, career improvement, skill improvement, clarity in work, increase in motivation, understanding the present work, remedy the past deficient performance, and self and time management. The differences are due to the varied nature of the manufacturing companies. Out of the three manufacturing companies, two are more than 40 years old. They have old and new equipment. They are modernizing rapidly. The third company is less than ten years old. However, it was started as a most modern facility. Due to the above differences, it seems that the focus of training is higher in the older companies. Hence there is a substantial difference in perception in the effect of training between the manufacturing companies.

Table 3: Comparison of manufacturing Companies

Variable		Sum Of Squares	DF	Mean Square	F	Sig.
Business Improvement	Between Groups	3.4	2	1.7	2.68	0.077
	Within Groups	38.13	60	0.64		
	Total	41.53	62			
Cultural Improvement	Between Groups	6.93	2	3.47	6.06	0.004
	Within Groups	34.33	60	0.57		
	Total	41.26	62			
Continuous improvement	Between Groups	5.13	2	2.57	5.85	0.005
	Within Groups	26.34	60	0.44		
	Total	31.47	62			
Cost reduction	Between Groups	3.98	2	1.99	4.81	0.012
	Within Groups	24.77	60	0.41		
	Total	28.75	62			
Initiative and knowledge dissemination	Between Groups	4.45	2	2.23	3.42	0.039
	Within Groups	39.05	60	0.65		
	Total	43.5	62			
Quality improvement	Between Groups	6.41	2	3.2	4.65	0.013
	Within Groups	41.31	60	0.69		
	Total	47.72	62			
Modernisation of work	Between Groups	12.48	2	6.24	12.05	0
	Within Groups	31.08	60	0.52		
	Total	43.56	62			
Work process improvement	Between Groups	4.24	2	2.12	4.49	0.015
	Within Groups	28.34	60	0.47		
	Total	32.58	62			
Improved performance	Between Groups	7.62	2	3.81	4.6	0.014
	Within Groups	49.69	60	0.83		
	Total	57.31	62			
Career improvement	Between Groups	5.19	2	2.59	4.82	0.011
	Within Groups	32.32	60	0.54		
	Total	37.51	62			
Improvement in Technical expertise	Between Groups	3.59	2	1.8	2.92	0.062
	Within Groups	36.99	60	0.62		
	Total	40.59	62			
Skill improvement	Between Groups	3.55	2	1.77	3.66	0.032
	Within Groups	29.06	60	0.48		
	Total	32.61	62			
Clarity in work	Between Groups	6.53	2	3.26	7.98	0.001
	Within Groups	24.56	60	0.41		
	Total	31.09	62			
Increase in motivation	Between Groups	9.07	2	4.54	7.71	0.001
	Within Groups	35.29	60	0.59		
	Total	44.36	62			
Understanding the present work	Between Groups	6.6	2	3.3	6.49	0.003
	Within Groups	30.53	60	0.51		
	Total	37.13	62			
Remedy in the past poor performance	Between Groups	10.89	2	5.44	11.5	0
	Within Groups	28.38	60	0.47		
	Total	39.27	62			
Self and time management	Between Groups	17.22	2	8.61	9.93	0
	Within Groups	52.05	60	0.87		
	Total	69.27	62			

In order to check for the differences among the manufacturing companies and contract employees with respect to the seventeen effects of technical training, the following hypotheses have been formulated:

- H018:** There is no significant difference between the manufacturing companies and contract employees with respect to business improvement because of technical training.
- H019:** There is no significant difference between the manufacturing companies and contract employees with respect to cultural improvement because of technical training.
- H020:** There is no significant difference between the manufacturing companies and contract employees with respect to continuous improvement because of technical training.
- H021:** There is no significant difference between the manufacturing companies and contract employees with respect to cost reduction because of technical training.
- H022:** There is no significant difference between the manufacturing companies and contract employees with respect to initiative and knowledge dissemination because of technical training.
- H023:** There is no significant difference between the manufacturing companies and contract employees with respect to quality improvement because of technical training.
- H024:** There is no significant difference between the manufacturing companies and contract employees with respect to modernisation of work because of technical training.
- H025:** There is no significant difference between the manufacturing companies and contract employees with respect to work process improvement because of technical training.
- H026:** There is no significant difference between the manufacturing companies and contract employees with respect to improved performance because of technical training.
- H027:** There is no significant difference between the manufacturing companies and contract employees with respect to career improvement because of technical training.
- H028:** There is no significant difference between the manufacturing companies and contract employees with respect to improvement in technical expertise because of technical training.
- H029:** There is no significant difference between the manufacturing companies and contract employees with respect to skill improvement because of technical training.
- H030:** There is no significant difference between the manufacturing companies and contract employees

with respect to clarity in work because of technical training.

- H031:** There is no significant difference between the manufacturing companies and contract employees with respect to increase in motivation because of technical training.
- H032:** There is no significant difference between the manufacturing companies and contract employees with respect to understanding the present work because of technical training.
- H033:** There is no significant difference between the manufacturing companies and contract employees with respect to remedy in the past poor performance because of technical training.
- H034:** There is no significant difference between the manufacturing companies and contract employees with respect to self and time management because of technical training.

Differences between the manufacturing companies and contract employees

The hypotheses pertaining to the above variables are tested in this section regarding the differences between manufacturing Companies and contract employees using Independent sample t-tests.

H03, H05, H07, H08, H09, H10, H12, H13, H14, H15, H16 and H17: There are no significant differences between the MANUFACTURING companies and contract employees with respect to continuous improvement, initiative and knowledge dissemination, modernisation of work, work process improvement, improved performance, career improvement, skill improvement, clarity in work, increase in motivation, understanding the present work, remedy in the past poor performance, and self and time management. Most of the above factors in which there is no difference belong to effect on employee and work. From this, it can be concluded that the effect of technical training is uniform on the employee and work in manufacturing companies and contract employees. H01, H02, H04, H06 and H11: There are significant differences between the manufacturing companies and contract employees with respect to business improvement, cultural improvement, cost reduction, quality improvement and technical expertise. Three of the five factors in which there are significant differences between manufacturing companies and contract employees belong to the effect on the organization. The nature and scale of production widely vary between manufacturing companies and component suppliers. The contract employees usually produce products for supplying to different manufacturing companies. The fluctuation in the market of any one of the products produced by any manufacturing affects the component suppliers. Hence, the significant differences between the manufacturing companies and contract employees are observed in the effect on the organization.

Table 4: Comparison between the manufacturing companies and component suppliers

	Levine's Test for Equality of Variances		T-Test for equality of means						
	F	Sig.	T	DF	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
								95% Confidence	Interval of the Difference
Business Improvement	0	0.97	-3.26	303	0	-0.36	0.11	-0.58	-0.14
Cultural Improvement	0.51	0.48	-2.81	303	0.01	-0.34	0.12	-0.58	-0.1
Continuous improvement	0.03	0.87	-1.74	303	0.08	-0.17	0.1	-0.36	0.02
Cost reduction	0	0.96	-3.36	303	0	-0.32	0.09	-0.51	-0.13
Initiative and knowledge dissemination	2.16	0.14	-1.54	303	0.13	-0.17	0.11	-0.38	0.05
Quality improvement	0.53	0.47	-2.91	303	0	-0.35	0.12	-0.58	-0.11
Modernisation of work	0.13	0.72	-1.87	303	0.06	-0.22	0.12	-0.45	0.01
Work process improvement	0.33	0.57	-1.02	303	0.31	-0.1	0.1	-0.29	0.09
Improved performance	0.01	0.94	-0.29	303	0.77	-0.04	0.14	-0.31	0.23
Career improvement	0.07	0.8	-1.07	303	0.28	-0.12	0.11	-0.33	0.1
Improvement in Technical expertise	0.64	0.42	-2.55	303	0.01	-0.28	0.11	-0.5	-0.06
Skill improvement	1.8	0.18	-0.83	303	0.41	-0.08	0.1	-0.27	0.11
Clarity in work	0.63	0.43	-1.43	303	0.15	-0.14	0.1	-0.32	0.05
Increase in motivation	1.03	0.31	-1.87	303	0.06	-0.21	0.11	-0.44	0.01
Understanding the present work	0.15	0.7	-1.72	303	0.09	-0.19	0.11	-0.41	0.03
Remedy in the past poor performance	0.19	0.66	0.14	303	0.89	0.01	0.11	-0.2	0.23
Self and time management	0.65	0.42	-0.97	303	0.33	-0.13	0.14	-0.41	0.14

6. Conclusion

The results show that the improvements in technical expertise, performance, work process and quality play a significant role in influencing many organizational benefits. It is also shown that improvements in skill, career, motivation, modernisation of work, and self and time management also significantly contribute to the organizational benefits. This work has demonstrated how the organizational improvement in the companies was influenced by employee and work practice improvements because of technical training.

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