

Impact of Information and Communication Technology (ICT) on Training Process

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Abstract: Gradually, it has become tough to think any business activity without Information and Communication Technologies (ICT). ICT is considered as catalyst for change in working systems, handling and exchanging information, learning and teaching methods, research, etc. Hence, ICT is essential for organizational processes as well as development and learning of workforce. With the continuous changes and development in technologies, processes, policies, strategies and systems, it is essential for professionals and employees to undergo a process of ICT based training regularly in order to remain updated, work smarter, efficiently and productively. Not only training process can prevent employees from falling behind in this frequently changing business and digital worlds but also encourage to participate in innovative and creative activities of businesses. The rapid changes in the field of technologies and processes need such employees who enhance their skills, effortlessly adjust and re-qualify themselves through ICT based training, like e-learning. Although there is sufficient literature on the efficiencies, innovations and applications of ICT, yet its impact on training process at workplace requires further in-depth exploration. Hence, the purpose of this research is to study the impact of Information and Communication Technology on training process of one of the leading Petroleum and Gas Companies in India. In this study, Multiple Linear Regression Analysis is used to analyze the overall impact of ICT on training process. Results of this research have identified the various factors of ICT that impact the training process. These factors include better interaction and collaboration, rapid and systematic learning, flexible, convenient, independence, quick communication and improves competencies. This study concludes that providing ICT based training to employees improves individual as well as organizational efficiencies and performances. This also leads to smooth functioning of organization and reduces time wastage. Finally, the study concludes that ICT is vital for everyone, every time and every place.

Keywords — Employees, Human Resource, Human Resource Management (HRM), Information and Communication Technology (ICT), Learning, Organization, Organizational Development, Petroleum and Gas Company, Technologies, Training, Training Process

I. INTRODUCTION

The Information and Communication Technology (ICT) is the driving force for the huge extraordinary economic development since the past few decades. It supports in creating the knowledge society, stimulates new and unique development, creates economic value, brings the world nearer by enhancing the knowledge distribution, accelerates research, and facilitates collaboration [6]. Moreover, the entry of internet, broadband connection, collaboration of open sources and fast enhancing computing capability, have significantly changed the economy worldwide [32].

Fable-1:	Tools	and	Techno	logies
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Information	Technologies		
Creation	Personal Computers, Di Smartphone	gital camera, Scanner,	

Processing	Calculator, PC, Smartphone	
Storage	CD, DVD, Pen drive, Microchip, Cloud, Hard Disk, Secure Digital Card (SD Card)	
Display	PC, TV, Projector, Smartphone, LCD, LED	
Transmission	Internet, Teleconference, Video conferencing, Mobile technology, Radio	
Exchange	E-mail, Cellphone, Social Media, Social Networking	

According to [11], the term 'Information and Communication Technology (ICT)' is defined as "the forms of technology that are used to transmit, process, store, create, display, share or exchange information by electronic means". Addition to this, ICT refers to wide range of equipment or technologies (hardware: computers, laptops, scanners, palmtops, digital cameras, etc.) and computer



programs (software: databases, applications, multimedia programs and information system) and telecommunication technologies (telephone, smartphones, modems, faxes, video-conferencing tools and digital/web cameras) that helps to access, recover, store, disseminate, organize, edit, present, update, transfer information and communicate worldwide through digital sources [18].

Table-1 provides information related to different tools or technologies that fall under different category of ICT. Hence, latest enterprises cannot function without these hardware and software technologies along with operating networks such as LAN, MAN, WAN and Internet [24].

On the other hand, the principal goals of HR in organizations are to attract, select, motivate, and retain talented employees in their roles [7]. Within the HR processes the term 'Training' refers to the systematic development of personnel's knowledge, skills and attitudes that are highly needed for the success of every organization [29]. Training programs are the important features for the organizational development [30]. Such programs are also considered as essential processes enhance to competitiveness of the organization in such an unpredictable environment, where learning is key to success [5].

[29] states that in this era of digital information, effective implementation of ICT in organizations has become inevitable which assists staff in performing their activities most proficiently. The application of ICT fosters a novel environment where trainer and learner or trainee could interact and work together to acquire new skills required for performing the assigned job, develop cognitive skills, promote favorable learning environment as well as organize discipline [3]. Moreover, [20] also explains that trainers need to use ICT for providing training in order to enhance the learning of learners, for problem solving and decisionmaking process. Hence, this infers that ICT is essential for quick, easy and convenient training or learning process in organizations. Furthermore, according to [8], it is the responsibility of HR professionals to manage knowledge workers. Like all other countries, in the same way, India also extremely depends on the enormous capacities of technology to develop its knowledge society [14]. Hence, the integration of technology and HR is highly needed for harmonious co-existence, enhancing and complementing each other.

This study has, therefore, investigated the benefits of integrating ICTs in the training processes of one of the leading petroleum and gas companies in India. These companies are process-based companies, which require exploration and extraction capabilities, where the employees have to face harsh conditions. Thus, employees remain a valuable asset for this industry. Furthermore, the petroleum and gas industries are cyclical in nature, which depends greatly on the commodity prices and the health of the overall economy. Therefore, petroleum and gas companies are required to maintain the control on the learning processes. They are also required to maintain consistent performance of the employees through efficient interaction and retain them as long as possible as they significantly impact the organization's bottom line. It is, therefore, important for the petroleum and gas companies to implement ICT specifically, in the training processes, which can help remote operated employees in safety and technical standards compliance.

ICT has bigger role to play in communicating effectively various standards, processes and new skill sets requires to deal with uncertainties in the businesses. This study has developed and tested nine hypotheses using Multiple Linear Regression Analysis. This study concludes that training employees using ICT improves efficiency, performance, makes functioning of organization easy and reduces time wastage

The organization of this paper is as follows: Section-II reviews the literature for the topics; Section-III explains the research methodology used, hypotheses developed, and results obtained by using multiple linear regression; Section-IV deals with data analysis and interpretation of the results. Lastly, in Section-V, conclusion has been discussed.

II. LITERATURE REVIEW

This section discusses various studies that are broadly conducted in the field of ICT and HRM. Information and Communication Technologies (ICT) is about "electronic means of capturing, processing, storing and disseminating information" [12]. In order to manage and deploy technology effectively in the organizations, knowledge workers are required. [31] have investigated the impact of ICT on the firm's performance. They found that ICTs impact the scale of the firms i.e. size of the firm. [21] has analyzed the impact of ICT on knowledge management processes within the organizations. The results showed that ICTs develop both tacit and explicit knowledge. Moreover, it helps in developing product as well as process innovation within the firm. Furthermore, there are various studies conducted at the firm-level, that are providing empirical evidence of the substantial impact of ICT on the firm's performance in terms of labor productivity [28], [27], multifactor productivity and output growth [9].

[7] have highlighted that developing and enhancing the knowledge, skills, and abilities of the employees as one of the key goals of HR. The authors have emphasized on implementing information technologies to develop 'e-training' or 'e-learning', which ranges from online training materials to technologies that help in delivering courses such as videoconferencing, virtual simulations etc.). [26] has suggested that as technology and HRM influence each



other, HR professionals must be able to adopt technologies, which re-engineer the HR functions; be ready to handle changes in work-design and organization caused by technologies; and be able to support innovative and knowledge-based environment. Such technological developments are being driven mainly by robust demands from human resource professionals for enhancing cost containment, speed and effectiveness [25]. [8] have also specified that leveraging technologies for HR functions would mean digitizing and automating the transactional activities. HR (like payroll processing, benefits administration, etc.) activities and other office activities such as recruitment, training, career planning, performance management etc. [31]. [16] have stated that the technologies have acquired a leading position in training and learning processes. [17] has estimated that over 25% of the training hours in an organization are online with 40% of these hours is supported by technologies. According to the [19], implementing technologies in the training processes have helped Cisco in reducing 40-60% of the operational costs. Furthermore, IBM was able to provide 500% more training at one-third of the costs [4]. In order to be successful and get the best from employees, every organization needs to get involved in continuous training and development [29]. [15] have described the various benefits of ICT especially related to Training Process includes saving on publication; easy updation; reduction in answering to repetitive questions of employees/trainees; instant communication; hassle-free announcements of events, assignments, tests, jobs and messages; access to limitless reference materials, training materials, procedures, manuals, etc. [22] have tried to integrate ICTs with leadership theory to develop eleadership in the businesses. The study has provided a framework that investigates the impact of leadership characteristics on the ICT adoption processes.

The Spanish telecommunications firm, Telefonica identified certain success factors during the implementation of ICT-based training programmes which include flexible learning; active participation of learners/trainees; ensured training effectiveness through controlled mechanisms; high-quality learning materials; easy and quick interaction between trainers and trainees [15]. This firm also implemented a system for distance training which by using ICT and with the combination of different pedagogic techniques providing geographical and time flexibility to a great extent.

A considerable amount of research on the topic of ICT and training processes has been conducted worldwide. However, till date these areas are studied in complete isolation that resulted in partial understanding of interrelationships among these concepts. There is so far extremely little in-depth, non-survey-based empirical research work on this connection is done. Further, literature lacks the research that has empirically examined the degree of effectiveness of ICTs on the training process of petroleum and gas companies. Hence, this research study bridges this gap and considered the interaction among these areas by analyzing the impact of ICT on one of the key components of HR i.e. training process. Although several existing studies related to ICT and HRM have supported to develop the strong and sound foundation for this research but as ICT HRM functions are inter-related, its impact on various processes of HRM has to be analyzed closely. After reviewing the literature, it is identified that literature lacks sufficient research on impact of ICT in training process at an organizational level, which encouraged to conduct this research. Hence, this study tries to provide practitioners or professionals an understanding about the significant role of ICT in training processes to ultimately enhance organization's performance and competitiveness.

III. RESEARCH METHODOLOGY

This section elaborates objective of the study, hypotheses developed, research design used, data collection and presentation processes used in this study. The major objective of this research is to study the impact of ICT on training processes in one of the leading petroleum and gas companies of India. It is expected that this study will support the proper applications of ICT in training process of employees in the organizations that may eliminate time and resources wastages as well as enhance the performance of the organizations. A combination of both exploratory and conclusive research (descriptive and causal research) has been adopted to study the impact of ICT on training process of one of the leading petroleum and gas companies of India.

Based on the research objective, the following main hypothesis of the study has been developed after comprehensive literature by keeping in view the objective of this research. Table-2 shows the mapping of research objective with its hypothesis.

Table-2: Mapping of Research Objective with Hypothesis

R. O	Research Objective	Hypothesis
1.	To study the impact of ICT on training process of one of the leading petroleum and gas companies of India.	H1: Applications of ICT significantly impacts the overall organizational performance.

The research data has been obtained from two different sources i.e. Primary Data and Secondary Data. At the first phase of the study, an exploratory research was conducted in the form of literature review, because it assisted in formulating the research problem, developing the objectives of the study, understanding the present scenario and planning the future course of actions. This research focuses on the understanding and analysis of literature about ICT and training process to provide a base for the study and to make it more credible. In the second phase of the study, the questionnaire was developed and floated among the experts



to conduct empirical investigation. Further, structured interviews were conducted with these experts to collect the primary data for this research.

The flowchart of research design for this research has been shown in the Figure-1. Data is collected and presented systematically in order to give answers to the research questions in a clear and logical manner. In this study, the Likert Scale, which is a type of itemized rating scale that is used as a measurement scale having five response categories ranging from "Strongly Disagree to Strongly Agree", which needs the respondents to indicate a degree of agreement or disagreement with every series of statements related to the stimulus objects [23].



Figure-1: Research Design Flowchart

In this study, a sample size of 550 respondents is chosen from the selected population working in one of the leading petroleum and gas companies operating in India. The sample size selected and accurately represents the personnel strength of the various departments and appropriately represents the population as well as sufficient to draw and conclusions. Structured results close ended questionnaire has been developed and distributed randomly among 550 executives working in one of the leading petroleum and gas companies of India. Out of these 550 executives, 525 responses were received. Out of these 525 responses only 501 responses were found complete and valid. Hence, the simple random sampling technique was used in this study to select the respondents. This is mainly to remove any biasness in the opinions by providing equal chance of participation and selection to the population.

IV. DEMOGRAPHIC ANALYSIS AND Reliability Test

The collected data have been analyzed statistically by using the Statistical Package for Social Sciences Software (SPSS) as it is the most suitable instrument for identifying, comparing, describing and reaching to conclusions.

Furthermore, the reliability analysis is used to find the degree to which the elements in the questionnaire of this study are linked to each other. The results of the reliability tests have been summarized in Table-3. The table shows the dataset in terms of the valid, excluded cases and the total cases. If the cases are excluded, the SPSS output provides the reasons for such exclusions. It also offers the percentage wise statistics of the valid, excluded and the total cases

calculated by SPSS. The table shows all the 501 responses are valid and no sample was excluded from the study.

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Case Processing Summary			
N %			
	Valid	501	100.0
Cases	Excluded	0	.0
	Total	501	100.0

A. SPSS Output for Cronbach's Alpha

Cronbach's Alpha denoted as ' α ' (also known as Coefficient Alpha) simply delivers an overall reliability coefficient for a set of variables. This reliability test is for checking whether multiple question using Likert scale in the surveys are how much reliable.

Table 4 shows that the Cronbach's Alpha is 0.926, which shows a high level of internal consistency for the mentioned measurement scale with this particular sample. This is beyond the recommended threshold of 0.7 [13]. Hence, it is concluded that the instrument is of good reliability.

Table 4: Reliability Statistics

Reliability Statistics			
Cronbach's Alpha	Cronbach's Alpha Based on N of It Standardized Items		
0.92 <mark>6</mark>	0.926	93	

V. DATA ANALYSIS AND INTERPRETATION

This section also provides the descriptive statistics of the sample considered in the study. To collect the demographic data, questions were asked on gender, designation, department and experience.

A. Gender Distribution

In dealing with gender description, among 501 respondents, the male executives were 366 and female executives were 135. Table-5 shown below reflects the cross tabulation for the Gender.

From Table-5, it was concluded that 366 of male respondents are representing 74% of the total number of participants while 135 of female respondents are representing 27% of the total number of participants. This clearly depicts that there are more male participants than female in this survey.

Gender	Frequency	Percentage (%)
Male	366	74
Female	135	27
Total	501	100



B. Department Distribution

This distribution is to find out the percentage of respondents in the sample from each department of the Petroleum and Gas Company participated. Table-6 details about how many respondents belong to each department of the company and who have participated in this survey.

Table-6: Department Distribution

S. No.	Departments	Frequency
1	Biotech Project	8
2	Chemical	5
3	Chemist	1
4	Civil	2
5	Corporate Communication	9
6	Crisis Management	4
7	Drilling	36
8	Electrical	25
9	Energy Centre	4
10	Energy Crisis	2
11	F & A	61
12	Fire	5
13	Geophysical Services	7
14	HR	92
15	Hydrogen Project	1
16	Instrumentation	^{ti} TD1
17	Internal Audit	5
18	Legal	¹⁰ r p8
19	Logging	5
20	Logistics	26
21	Maintenance	3
22	Marketing	2
23	Material Management	37
24	Mechanical	19
25	Medical 12	
26	Operations 6	
27	Production 9	
28	Quality Control 1	
29	Reservoir Services 9	
30	Security 4	
31	Solar Thermal Project	12
32	Sub Surface 11	
33	Surface	42
34	Survey	8
35	Training and Development	2

36	Well Services	5
37	Workshop	2
	TOTAL	501

C. Evaluating Impact of ICT on Training Process and Interpretation by Using Multiple Linear Regression Analysis

This section evaluates the impact of ICT on the overall training process of one of the leading petroleum companies operating in India. It tests the sub-hypotheses which are the part of the major hypothesis (H1) and are developed based on the literature review. There are total seven Independent Variables (IV_n) ranging from IV₁ to IV₇ that predict the impact of ICT on training process (refer question no. - 6, refer Appendix). The improvement in the overall performance of training process after implementing ICT in the organization acts as a Dependent Variable (DV_1) in this study. These independent variables include systematic and rapid learning (IV₁), better interaction and collaboration (IV₂), quick communication (IV₃), online training materials foster trainee's independence (IV₄), e-learning are flexible and convenient (IV_5) , accurate evaluation of trainee (IV_6) and improves competencies (IV₇). The alternative subhypotheses developed under the major hypothesis (H_1) for testing the impact of ICT on training process have been listed below in Table-7.

Table-7: Alternative Hypotheses for Impact of ICT on Training Process

	ž	
S. No.	Sub- Hypotheses No.	Sub-Hypotheses (ICT has a positive impact on training process)
1	H1 _(f1)	ICT delivers systematic and rapid learning.
ring24P	H1 _(f2)	ICT provides better interaction and collaboration between trainer and trainees.
3	H1 _(f3)	ICT helps to have quick communication.
4	H1 _(f4)	ICT gives freedom to trainees to learn through online training materials.
5	H1 _(f5)	ICT provides flexible and convenient e-learning facility.
6	H1(f6)	ICT helps trainer to evaluate trainees properly and quickly.
7	H1 _(f7)	ICT based training enhances competencies of employees.

Figure-2 briefly depicts the graphical representation of sub-hypotheses that are developed and various interactions among IV_n and DV_1 . Based on the established hypotheses, the final research model is presented as shown below.





Figure-2: Research Model for ICT Impact on Training Process

In this section, the data collected from 501 sample respondents have been analyzed and measured against the established hypotheses. Multiple Linear Regression Analysis has been used for examining the causal relationship among IV_n and DV_1 . In short, the regression analysis model has been developed to test the impact of ICT on training process. This model further details the predicting power of established IV_n on the DV_1 and tests whether the established hypothesis has been accepted or rejected. Thus, the regression equation can be written as:

$$\begin{split} \widehat{Y} = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 \\ X_7 \end{split}$$

where, *Y* = *Dependent Variable*

- $X_n = Independent Variable$
- $\alpha = Intercept$
- $\beta_n = Slope of the Line$

This regression model has total 7 predictors to ensure its robustness in predicting the performance of training process. According to [1], each predictor should at least contain 10-15 respondents. This study has used 7 predictors and total sample size of 501 respondents, which means that

there are 501/7 = 71.57 respondents per predictor. This further supports the strength of the regression model. The results of the multiple linear regression have been shown as follows.

Variables Entered/Removed ^a					
Model	Variables	Variables	Method		
	Entered	Removed			
1	$IV_7, IV_1,$		Enter		
	IV ₄ , IV ₃ ,				
	$IV_2, IV_6,$				
	IV ₅ ^b				
a. Dependent Variable: DV ₁					
b. All requested variables entered.					

Table-8 shows the total number of variables considered or removed while running the regression model. The first column of the Table 8 shows the number of models considered in the analysis. There is a provision in SPSS to specify multiple models in a single regression analysis. Since, this study runs single regression equation, the table reports only single model. The IV_n can be added stepwise or whole at a one go. Thus, the second and third column of the table shows the total variables entered or removed in the current regression model.

In our case all the IV_n acting as predictors of performance of training process are considered and not a single variable has been removed from current regression. The 'Enter' method used to run regression analysis means each variable is entered using normal approach.

Table-9: Model Summary

Model Summary						
Model	R	R	Adjusted	Std.		
		Square	R Square	Error of		
		(\mathbf{R}^2)		the		
				Estimate		
1	.709 ^a	.503	.496	.374		
a. Predictors: (Constant), IV ₇ , IV ₁ , IV ₄ , IV ₃ , IV ₂ , IV ₆ , IV ₅						

Table-9 shows the overall model fit of the regression model. It basically details about the percentage of total explained variations in the dependent variable using all IV_n using R, R² and adjusted R² values. The R value shows the correlation between predictors and outcome of model. The value of R for this study has been computed as 70.9%, which indicates higher correlation among IV_n and DV_1 . The value of R², which is known as Coefficient of Determination, is a measure of variability in the dependent variable accounted by manipulating IV_n .

In other words, this value is proportion of variance in DV_1 explained by IV_n considered in the model. It overall



measures the strength of association. In this study, the value of R^2 is computed as 50.3%. This means that the 50.3% of the total variations in DV₁ are explained by all seven IV_n. This is quite an acceptable value. The adjusted R^2 value gives an indication that how well the model can be generalized to population. Ideally, its value must be close to R^2 . The difference in the final model can be computed as 0.503 - 0.496 = 0.007 (0.7%). A 0.7% of shrinkage indicates that if the model is derived from the population rather than sample it would bring variations of 0.7% less in the outcome as compared to sample data.

Table-10: ANOVA

ANOVA ^a						
Model		Sum of	df	Mean	F	Sig.
		Squares		Square		
1	Regr	69.750	7	9.964	71.197	.000 ^b
	essio					
	n					
	Resid	68.997	49	.140		
	ual		3			
	Total	138.747	50			
			0			
a. Dependent Variable: DV ₁						
b. Predictors: (Constant), IV ₇ , IV ₁ , IV ₄ , IV ₃ , IV ₂ , IV ₆ , IV ₅						
c. df: degree of freedom						

The next part of the outcome comprises of Analysis of Variance (ANOVA) as shown in Table-10. This table tests the strength and significance of association between IV_n and DV_1 . This is another equivalent test to examine the significant linear relationship among IV_n and DV_1 . The first column of the Table-10 is labeled as Regression, Residual and Total. This shows that total variance has been divided into two parts. First part details about variations explained by independent variables considered in the model and second part details about the unexplained variations by independent variables. The second column of the table calculates the sum of squares for both explained and unexplained variations by summing the difference of estimated and actual responses by mean of the responses.

At this stage, the test for significance of the coefficient of determination is conducted. The null hypothesis states that R^2 of population is equal to 0 and the alternate hypothesis states that R^2 of population is greater than 0. To calculate the F statistics, the sum of squares for both regression and residual is divided by the degrees of freedom to get mean square. The ratio of mean square computes the F statistics. In this case, the value of F statistic also known as F ratio i.e. 71.197 indicates that the calculated F ratio exceeds the critical value of 2.01 determined from F-distribution table for (7 and 493) degrees of freedom at $\alpha = 0.05$. The association between IV_n and DV_1 can be further strengthened by the significance value, which is less than 0.05 indicating rejection of null hypothesis and acceptance

of alternate hypothesis.

Table-11: Coefficients

Coefficients ^a								
Model		Unstandardized Coefficients		Standardi zed Coefficie nts	t	Si g.	95.0% Co Interva	onfidence al for β
		β	Std Err or	Beta			Lower Bound	Upper Bound
1	(Const ant)	1.405	.28 8		- 4. 88 4	.0 00	-1.970	840
	IV ₁	.224	.04 4	.177	5. 04 1	.0 00	.137	.311
	IV ₂	.154	.03 4	.170	4. 53 9	.0 00	.087	.221
	IV ₃	.184	.04 3	.160	4. 27 8	.0 00	.099	.268
	IV ₄	.127	.03 9	.125	3. 27 1	.0 01	.051	.204
	IV ₅	.152	.04 5	.144	3. 37 9	.0 01	.064	.241
	IV ₆	.220	.04 2	.216	5. 20 3	.0 00	.137	.303
	IV ₇	.191	.04	.170	4. 01 3	.0 00	.097	.284
a. b	a. Dependent Variable: DV ₁ b. Sig.: Significance Value							

The first set values of the Table-11 forms the estimated regression equation indicated by $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7$.

$$\tilde{X} = -1.405 + 0.224 X_1 + 0.154 X_2 + 0.184 X_3 + 0.127 X_4 + 0.152 X_5 + 0.220 X_6 + 0.191 X_7$$

The negative value of intercept i.e. -1.405 does not have much relevance in this study. It simply indicates the expected mean value of DV_1 when all the independent variables are zero. The major implication can be drawn from this value is that the performance of Training process is relatively negative before implementation of ICT in the company. The standard error indicates the range of the confidence in the intercept and coefficient values of regression equation.

For example, in case of IV_1 the coefficient value β_1 is 0.224. Thus, the confidence interval can be calculated using standard error as shown in Figure-3. In other words, it can be said that at the confidence interval of 95% with critical value of t = 1.64 in a standard two-tailed t-test table, the data is between 0.154 and 0.294. Therefore, the confidence intervals for other IV_n can be calculated in the similar way.



Figure-3: Confidence Interval for IV₁

These ranges for each IV_n along with the intercept are indicated in the last column of 95% confidence interval as lower and upper bound values. The positive value of coefficient for all IV_n indicates the positive relationship between IV_n and DV_1 . It indicates that the ICT implementation in the training process in the organization has positive impact in the performance. The degree of the impact can be estimated by the value of coefficient of each IV_n. For instance, systematic and rapid learning is possible due to implementation of ICT has 22.4% impact on the performance of training process. Similarly, due to ICT implementation in the training process has improved the evaluation of employees or trainees accurately and immediately by 22%. It can also be observed that, the competencies of trainees/employees have improved due to ICT based training in the organization.

The t-value shown in the output Table-11, is the coefficient divided by its standard error and generally, tries to find the evidence of difference between population and sample means. The t-value is computed by dividing coefficient with standard error and the t-value is mapped in the Z-distribution. If the t-value is greater than 1.64, then the null hypothesis is rejected. In output table below, the higher value of t-value than the critical value of 1.64 at 95% confidence interval indicates that the null hypothesis in case of all IV_n considered have been rejected and alternate hypotheses stating relationship between DV₁ and all IV_n have been accepted. Further, the p-value or significance value determines the IV_n to be kept in the regression model. A low p-value (< 0.05) specifies that null hypothesis can be rejected. In other words, a low p-value suggests that the predictor variable is not statistically significant at 95% confidence interval or at $\alpha = 0.05$ and does not show any relationship with DV1. In the output below, it can be observed that all predictor variables are significant as the pvalues are below 0.05. Therefore, all seven IV_n considered under training process, significantly predicts the performance of the training process in organization.

All the alternative sub-hypotheses considered in this section and results obtained after running the regression analysis have been summarized below in the Table-12.

Table-12: Summary of Results

S. No.	Hypothesis	Result *
H1 _(f1)	ICT delivers systematic and rapid	Accepted
	learning.	

H1 _(f2)	ICT provides better interaction and	Accepted		
	collaboration between trainer and			
	trainees.			
H1 _(f3)	ICT helps to have quick	Accepted		
	communication.			
H1 _(f4)	ICT gives freedom to trainees to	Accepted		
	learn through online training			
	materials.			
H1 _(f5)	ICT provides flexible and	Accepted		
	convenient e-learning facility.			
H1 _(f6)	ICT helps trainer to evaluate	Accepted		
	trainees properly and quickly.			
H1 _(f7)	ICT based training enhances	Accepted		
	competencies of employees.			
*: - Criteria for accepting the hypothesis is that the				
significance values for all independent variables (IV_1 to IV_2) given in Table 11 must be below 0.05				
1, // 811				

It was found that the impact of ICT on training practices is significant and positive. It is beneficial not only for the activities of human resource management but also for the overall organization. Traditionally, HR personnel used to work manually and had to manage huge files and data entry which used to take lot of time but now because of adopting ICT, organization can reduce their overall costs as well as time. ICT provides the technological infrastructure such as computers, clouding, broadband, internet, wireless, etc. which are used as tools to support and enhance the existing training or learning process of the organization.

VI. CONCLUSION

This study empirically investigates the overall impact of integrating ICTs into the training process using Multiple Linear Regression Analysis. In this study, seven hypotheses were developed and tested. It was found that integrating ICTs into the training process delivers systematic and rapid learning, provides better interaction and collaboration between trainer and trainees, helps to have quick communication, gives freedom to trainees to learn through online training materials, provides flexible and convenient e-learning facility and helps trainer to evaluate trainees properly and quickly and improves the overall competencies of the employees.

The following Figure-4 explains briefly what and how ICT impacts on training process by providing different inputs to training process.



Figure-4: Impact of ICT on Training Process

The advancements in ICT have brought transformation and encouraged innovative developments in training



activities such as paperless activities, databanks, automation tasks, e-recruitment, CBT (Computer Based Training), SAP, WBT (Web Based Training), etc. The impact of ICT has improved the effectiveness of the training process in the organization.

Petroleum and Gas sector is considered to be the biggest sector in terms of profitability, number of employees working and contribution towards the economic growth. The processes and end-products of this sector are relatively different from other manufacturing sectors. The processes in a particular petroleum and gas company require absolute integration as it is operating globally and is generally defined as multi-nationals. This sector is evolving as new technologies are being used to improve economic, environmental and social performances. Skill set enhancement programs can open various avenues for this sector in terms of their developing competitive advantages. Thus, continuous training process must be employed to develop highly skilled workers within this industry. Further, e-training programs can reach to those employees who are operating in remote and harsh conditions. E-learning can further help in maintaining safety and environmental standards during the exploration and extraction processes. Thus, it is important to provide ICT based training to employees for enhancing their performance.

APPENDIX



6. Evaluation of the impact of ICT on training process? *

Mark only one oval per row

wark only one oval per tow.	Strongly		Neither Aaree Nor		Strongly
	Agroo	Agree	Diagraa	Disagree	Disaaraa
(i) ICT facilitates systematic and rapid learning.		\bigcirc		\bigcirc	
(ii) ICT encourages better interaction and collaboration between trainer and trainees.	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc
(iii) ICT establishes quick communication both formally and non-formally.	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc
(iv) Use of internet for providing training materials may foster trainee independence.	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc
(v) ICT enabled e-learning are flexible enough that it can be delivered as per the convenience of each trainee / employee.	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc
(vi) ICT helps the trainer / mentor to evaluate trainees accurately and immediately.	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc
(vii) ICT based training improves the competencies of employees / trainees.	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc

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