



Technology Training & Creativity for Strengthening Employees Innovative Behaviors

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ABSTRACT

Objective - The objective of this study is to determine the effect of technology training and creativity on employees' innovative behaviors.

Methodology/Technique – The research applied a quantitative exploratory method and a multiple regression method with SPSS software. All data were from a survey with instruments/questionnaires to the saturated sample consisting of all 116 employees at the Telecommunications Equipment Testing Center (henceforth BBPPT).

Finding - The results show that: the variables of technology training (X_1) and creativity have the R^2 value of 0.488, meaning that these variables contributed 48.8% to the innovative behaviors. Further technology training and creativity aspect simultaneously and significantly affect the innovative behaviors, for this reason, the mathematical model $Y = -0.043 + 0.333 X_1 + 0.662 X_2$ is applicable for predicting the influence of variable X_1 and X_2 to variable Y ;

Novelty - The absence of the variables of technology training and creativity will, therefore, decrease the value of the variable of employees' innovative behaviors to -0.043 in the scale of 1 to 5, poor category; on that ground, it is essential to conduct programs regarding technology training and creativity cultivation. Further The creativity variable is the one that contributes to the innovative behaviors the most, since the significance value of the variable is greater than the technology training ($0.662 > 0.333$).

Type of Paper: Empirical.

JEL Classification: M53, M59.

Keywords: creativity, innovative behaviors, intervention, technology, training

Reference to this paper should be made as follows: Budiningsih, I; Soehari, T.D; Hidayati, R.N. 2020. Technology Training & Creativity for Strengthening Employees Innovative Behaviors, *Global J. Bus. Soc. Sci. Review* 8(3): 162 – 169. [https://doi.org/10.35609/gjbsr.2020.8.3\(3\)](https://doi.org/10.35609/gjbsr.2020.8.3(3))

1. Introduction

Rapid development in the sector of information, communication, and technology (ICT) that is capable of fulfilling the needs of modern society has urged the necessity of ensuring a sense of security in communication for technology users.

* Paper Info: Revised: June 13, 2020

Accepted: September 30, 2020

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In the upcoming years, the race to 5G as the fifth generation of mobile network has sparked rapid progression of telecommunication technology, especially IPv6, machine to machine (M2M) communication, internet of things (IoT), and intelligent transportation system (ITS). In the next five years, it is estimated that the number of telecommunication devices connected with the network will see significant growth by ten times than that of the current human population. The advancement of telecommunication technology demands the transformation of telecommunication companies, both private and public, such as the Telecommunications Equipment Testing Center (henceforth BBPPT).

As one of the implementation units of public services, BBPPT is continually striving to enhance the quality of public services. The benchmark of the services can be seen in community satisfaction index or CSI. According to the annual report of BBPPT 2019, the CSI was in moderate category at 3.29, thus signifying the necessity to enhance the quality of service to reach the quality category at 4.0. To achieve the goal, innovation in every aspect, ranging from facilities, infrastructures, and human resources, is required. Provided in the following Table 1 are the results of an in-depth interview with a total of 30 respondents regarding the contributing factors of innovation among the employees in BBPPT.

Table 1. Result of Individual In-depth Interview (IDI) on Contributing Factors of Innovation

Contributing Factors of Innovation	Total	Percentage
Regulation	3	10%
Work environment	2	7%
Training	10	33%
Testing skills	1	3%
Commitment	6	20%
Creativity	8	27%
Sum Total	30	100%

Source: Pre-research data (2019)

From the above Table 1, the respondents claim that two dominant factors are impactful on innovative behaviors of the employees at BBPPT; those are training (33%) and creativity (27%). Both factors have underpinned the present study, which intends to determine whether or not the training and employees' creativity contribute to their innovative behaviors at BBPPT.

Central to today's competitive environment is innovation. This aspect is crucial not only for organizations, companies, and large industries but also in other institutions ranging from government and non-government bodies, as well as small and medium enterprises. An organization is considered innovative if the institution does something differently and creates breakthrough, despite the risks. Robbins and Coutler (2012:16) assert that innovation refers to the way for individuals to apply new and different approaches in their works, discover their potentials, and become risk-takers. Innovation correlates not only with sophisticated forms of technology but also with attempts in creating something unique that no one has already done. Woodman et al. In Robbins and Coulter (2010:21-24), arguing that it is a case of innovative behavior in an organization/company in addition to the support of a group of creative members of the organization, led by creative people, is also supported by a working environment that encourages the creation of new products. A study by Fauzia et al. (1917:32) mentions areas of improvement that lead to innovative behaviors of employees, such as a) implementation of learning organization, b) knowledge sharing, and c) collective organizational commitment. These three aspects contribute significantly to the enhancement of

employees' innovative behaviors by 62%, while the rest 38% refers to other factors. The formation of innovative behaviors that settle in one's self takes time and long processes and through certain stages; It is in accordance with the opinion of Carmeli & Spreitzer in Barrand et al. (2012:146), that the formation of innovative behaviors involves the 'three' stages: a) first phase: recognizing problems and finding solutions; b) phase two: promoting the solution or its idea found to build legitimation and support; c) the third stage: implementing the idea or solution in the work.

The need for training emerges once adult individuals get roles in various activities in their life, e.g., their jobs, family life, and social life. The individuals will, in turn, realize that they still have things to learn. According to Prawiradilaga and Chaerumen (2018:243), cultivating continuous learning for employees is not an easy task. In fact, many have failed to instill such a habit as an organizational culture. Budiningsih et al. (2017:249) argue that in the digitalization era, learning intervention is still an impactful instrument that has a positive influence on boosting employee performance in a company by 45.5%. The finding resonates with the reference. Despite the advantage of training, Prawiradilaga and Chareumen (2018:190) emphasize that the training will be practical if it meets certain conditions. First, the training material should be in line with the employees' needs. Second, the content should be in sync with the vision, mission, and value of the organization, including the characteristic of jobs. Third, the training program should adapt to the technology advancement and future of the organization. Anitha et al. (2016: 1086-1087) state that training, age, educational qualification, and work experience serve as the elements of human capital that are significant to the work performances. Regarding this notion, Ekawati and Soleha (2017: 146) opine that the more professional the human capital of an organization, the more likely the employees of the company or organization to enhance their innovative behaviors.

Creativity plays an important role in human life. It drives one's effort to invent new concepts, products, and procedures that are applicable in real life and capable of solving any problems. Jamaris (2015:74) defines creativity as the mental activity of humans that indicates the interaction of the person with the environment continuously. It also symbolizes the person's patience and perseverance in producing ideas and discovering something new that is fruitful to others and the surrounding. Mulyadi and Susilo (2017:45) have proven the significance of training for students' creativity. In their study, it is shown that the students of Police Language School (Sekolah Bahasa Polri) who participated in training sessions had more creativity than others who did not. Regarding the employees' creativity, Budiningsih et al. (2018:462) note that creativity and entrepreneurial leadership are simultaneously significant to shaping the behaviors of innovation producer by 77.26%, and the other 22.74% refers to other aspects. Rogers in Munandar (2011:114-115) raises factors that affect the emergence of creativity in someone, among others: the internal factors and the external factors of people. Furthermore Rogers in Munandar (2011:115) which is meant by external factors is an environmental factor that can develop a person's creativity characterized by an environment that gives a psychological authentication (accepting a person as it is, there is no external evaluation, fellow empathy) and psychological freedom (giving freedom of expression).

The objective of this research is to find out whether or not technology training and creativity has a positive contribution to strengthening the innovative behaviors of employees at BBPPT. The organization of this paper consists of introduction, research method, results, discussion and references.

Research Method

This research relied on a quantitative exploratory method; it involved technology training ((X1) and creativity (X2) as the independent variables and employees' innovative behaviors as the dependent variable. Further, the X1 and X2 data against Y were analyzed using the multiple linear regression analysis with SPSS program. The sample, consisting 116 respondents out of the total employees of BBPPT, was selected employing the saturation method. The data were collected using a non-test instrument (questionnaire) and Likert scale. The scale ranges from 1 to 5: 5 = strongly agree, 4 = agree, 3 = neither agree nor disagree, 2 = disagree, and 1 = strongly disagree.

Research Variables and Indicators

Research variables consist of employee innovative behaviors (Y), technology training (X1) and creativity (X2) with each variable indicator visible as presented in Table 3 below:

Tabel-3 Indicators of Variable Y, X1 and X2

Variable	Indicators
Employees Innovative Behavior (Y)	Creative ideas of the process Creative service ideas Creative product ideas
Technology Training (X1)	Instructor
	Participant
	Technology Materials
	Method
Creativity (X2)	Training Objectives
	Person
	Process
	Product

Validity and Reliability Tests of the Instrument

The validity and reliability of data collection instrument were examined before the data retrieval process. The r formula of Pearson Product Moment was applied in determining the instrument validity, while r formula of Cronbach Alpha was used to test the instrument reliability. The following Table 2 present the results of the validity and reliability tests.

Table 2. Results of Instrument Validity and Reliability Tests of Y, X1, and X2 Variables

Variables	Valid Question Items	The Value of r-count (Pearson)	r-table (:0.05)	Reliability Coefficient	Description
Employees Innovative Behaviors (Y)	9	0.304 – 0.643	0.30	0.668	Valid & Reliable
Technology Training (X1)	20	0.315 – 0.529	0.30	0.853	Valid & Reliable
Creativity (X2)	12	0.459 – 0.673	0.30	0.735	Valid & Reliable

Results

The respondents of this research involved 116 employees of BBPPT. Requirement analysis tests comprising the normality, homogeneity, and multicollinearity tests were conducted prior to the regression analysis. In this study, both requirement analyses have been satisfied, where the data of the variable Y, X1, X2 and X2 are normally distributed, whereas variable Y over the variables X1, X2 and X2 are homogeneous. Further, the tolerance level of X1 and X2 is around 1, or the VIF (variance inflation factor) below 10.

The results of the correlational analysis of the variable X1 (technology training) and X2 (creativity) with variable Y (employees' innovative behaviors) obtain the multiple correlation coefficient $R = 0.699$. In other

words, technology training and creativity correlate with the employees’ innovative behaviors significantly and positively. It was also revealed that that r2 of the determinant coefficient is 0.488, implying the percentage of the contribution of technology training (X1) and creativity (X2) towards employees’ innovative behaviors (Y) by 48.8 %, while the remaining 51.2% covers other contributing factors. The overall result of the analysis of multiple correlation analysis and determinant coefficient using SPSS program is displayed in Table 3 below.

Table 3. Multiple Correlation Coefficient X1, X2 & Y

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.699a	.488	.479	.31600	.488	53.955	2	113	.000	2.059

a. Predictors: (Constant), Technology Training (X1), Creativity
 b. Dependent Variable: Employees Innovative Behaviors

The results of the ANOVA test in Table 4 formulates a multiple linear regression model describing the correlation between variables X1 and X2 with the variable Y.

$$Y = - 0.043 + 0.333 X_1 + 0.662 X_2$$

The result of significance test on regression constants shows that a = -0.043 (see Table 4), categorized “insignificant” since the value of sig > 0.05 (0.932 > 0.05). Simply put, the constants significantly influence the process of instilling innovative behaviors. The outcome of significance of the regression coefficient X1 (see Table 4) or b = 0.333 is deemed significant, given that the sig = 0.05 (0.05 = 0.05). Similarly, the regression coefficient of X2, or c = 0.662 (see Table 4) is also significant as sig < 0.05 (0.00 < 0.05). This finding explains that the variable of technology training (X1) and (X2) determine the cultivation of employees’ innovative behaviors (Y). Still, the creativity variable is the one that mostly contributes to the innovative behaviors, since the significance value of the variable is greater than the technology training (0.662 > 0.333).

Table 4. Coefficient

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerances	VIF
1	(Constant)	-.043	.505		-.086	.932					
	X1	.333	.117	.195	2.845	.005	.315	.259	.191	.964	1.037
	X2	.662	.071	.635	9.273	.000	.672	.657	.624	.964	1.037

Dependent Variable: Employees Innovative Behaviors
 X1: Technology Training
 X2: Creativity

The result of the significance test on the simple multiple regression analysis is $Y = -0.043 X_1 + 0.333 X_1 + 0.662 X_2$, categorized significant, given that the value of sig, 0.00, is lower than 0.05, with the F value at 53.955 (see Table 5). The mathematical model is significant and cannot be ignored in predicting the employees’ innovative behaviors by taking into account the data of the variable X1 and variable X2 if both of these independent variables are known. Moreover, the multiple linear regression model $Y = -0.043 + 0.333$

$X1 + 0.662 X2$ indicates if the variables of technology training ($X1 = 0$) and creativity ($X2 = 0$) are absent, the category of the variable of employees' innovative behaviors will drop to -0.043 in the scale of 1 to 5 (poor category). Such a notion accentuates the necessity to conduct programs regarding technology training and creativity cultivation for the employees of BBPPT.

Table 5. ANOVA

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.776	2	5.388	53.955	.000b
	Residual	11.284	113	.100		
	Total	22.059	115			

a. Dependent Variable: Employees' Innovative Behaviors

b. Predictors: (Constant), Technology Training, Creativity

Discussion

The results of this study show that the training aspect has a positive influence on employee innovative behaviors. According to Prawiradilaga & Chaerumen (2018:190) training as will be effective if it meets several requirements, namely: a) training materials according to the needs of employees; b) alignment of training content with the vision, mission of the organization, organizational value system as well as the characteristics of the work; c) technological developments and the future of the organization. This seems to have been fulfilled in the technology training Telecommunications Equipment Testing Center (henceforth BBPPT); so that the technology training and creativity simultaneously contributes 48.8% in the formation of innovative behaviors of employees. Motgomery explains effective training tips for new technologies: a) know your audience/participant; b) engage end-user before purchasing new technology; c) embrace a long Learning Curve; d) focus on the user interface; e) identify tech champions within your organization and utilize them; f) departmentalize the training approach; g) involve marketing and communications team; h) get outside help; i) demand documentation; j) share information on a need to know basis. The results of this study are also supported by the findings of Kaur, L. & Bhatia, A. (2013:3229) that training in organizations/companies plays an important role in the development of the skills and productivity of the work of its employees; and according to Ekawati & Soleha (2017: 146) that the higher the human capital capability owned by an organization / company, it will have an impact on the increasing innovation capabilities of the organization or company.

Related to the creative aspect, the results of Mulyadi & Susilo (2017:45) research at the Jakarta Police Language School show that training students who have high creativity are higher learning outcomes than students who have low creativity. According to Naiman (2014) creativity is an action that turns new and imaginative ideas into something tangible (product/service). Naiman further explained that creativity is characterized by the ability to see things in a new way, which is useful for discovering concepts that previously did not exist, making the connection between previously unrelated phenomena and resulting in complex problem solutions. Creativity involves two processes: the thought process based on knowledge and the process of realizing/producing in the form of goods/services. If we have ideas but are not followed up by producing them, then we call them "imaginative but not creative". Those creativity is an effort of hard work one consciously uses their knowledge to produce a leap that allows various problems to be overcome. Rogers in Munandar (2011:114) presents factors that influence the appearance of creativity in a person, among others: the internal factors of the person (the open nature, internal locus of evaluation, happy to explore) and environmental factor. Further-more Rogers in Munandar (2011: 115) further explains that environmental factors that can develop one's creativity are characterized by an environment that provides psychological security (accepting a person as is, no external evaluation, fellow empathy) and psychological freedom (giving freedom of expression). According to Sokova (2015) creativity and innovation in a well-run institution /

company is recognized as a path to success. Encouraging employees to think out of the box and give them time and resources to explore new things in new areas to come up with innovative ideas that can ultimately increase organizational productivity.

The formation of innovative behaviors that settle on a person takes a long time and process and goes through certain stages; this is in accordance with the opinion of Carmeli & Spreitzer in Barrand et al. (2012:146), that the formation of innovative behavior involves 'three' stages: a) the first stage: recognizing the problem and finding a solution; b) phase two: promote the solution or idea found to build legitimate and support; c) phase three: implement the idea or solution in its work; therefore, the strengthening of innovative behavior for employees of Telecommunications Equipment Testing Center should continue to be carried out in accordance with the advancement of telecommunication technology, so that its employees have competitiveness; both through various interventions as well as current interventions such as: development of learning organizations, knowledge management and Corporate University.

Conclusion

The results reveal that: 1) the variables of technology training (X1) and creativity have the r^2 value of 0.488, meaning that these variables contributed 48.8% to the innovative behaviors, and the remaining 51.2% refers to other factors; 2) technology training and creativity aspect simultaneously and significantly affect the innovative behaviors, considering that the F value reaches 53.955, where $\text{sig.} = 0.000 < 0.05$. For this reason, the mathematical model $Y = -0.043 + 0.333 X1 + 0.662 X2$ is applicable for predicting the influence of variable X1 and X2 to variable Y; 3) the absence of the variables of technology training and creativity will, therefore, decrease the value of the variable of employees' innovative behaviors to -0.043 in the scale of 1 to 5, poor category. On that ground, it is essential to conduct programs regarding technology training and creativity cultivation. 4) The creativity variable is the one that contributes to the innovative behaviors the most, since the significance value of the variable is greater than the technology training ($0.662 > 0.333$). 5) Strengthening employees' innovative behaviors through the creativity development and technology training program is in line with the advancement of science and technology

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