The Contribution of Transformational Leadership and Information Technology to the Climate of Innovation and Innovative Work Behavior

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ABSTRACT

This study aims to investigate the impact of two main factors, namely Transformational Leadership (X1) and Information Technology (X2), on the Innovation Climate (Y1) and Innovative Work Behavior (Y2) in the organizational environment. Quantitative methods were used in this study, with the Partial Least Squares Structural Equation Modeling (PLS-SEM) version 4 analysis tool, to analyze the relationship between the proposed variables. Data is collected through a survey of employees from various backgrounds and levels within the organization. This study proposes five hypotheses, tested through data analysis using the PLS-SEM approach. The trial was carried out twice to ensure the stability and consistency of the results. The results of the study show that Transformational Leadership has a significant positive effect on the Innovation Climate in organizations. In addition, Information Technology also has a strong positive impact on the Innovation Climate. These results indicate that leaders who apply a transformational leadership style and utilize information technology can encourage a positive culture of innovation within the organization. Furthermore, this study reveals that the Innovation Climate has a significant favorable influence on Innovative Work Behavior. This suggests that employees are more likely to engage in innovative work behaviors when organizations create an environment that supports innovation. The results of this study have important practical implications for organizational management. Applying transformational leadership and investment in information technology can be a strategy to enhance a culture of innovation and innovative work behavior in the workplace. In addition, these findings can form the basis for more in-depth follow-up research on other factors that influence organizational innovation.

Keywords: *Transformational Leadership, Information Technology, Innovative Work Behavior, Innovation Climate*

1. INTRODUCTION

Innovation is the key to winning the competition in business. In a modern economic view, innovation is considered an essential factor that enables organizational survival, growth, and competitiveness, supported by Kmieciak et al [1]. Innovation is also a powerful means of competitive differentiation, which enables organizations to penetrate new markets and increase high margins and competition to be executed with speed, skill, and precision, supported by Schilling et al [2]. Organizations without innovation cannot grow and develop; even organizations without innovation cannot adapt to their environment. Innovation in the organization is mainly developed by leaders who can stimulate change. Leadership is always suggested in the organizational context as a factor that inspires, enables, and influences various aspects of work behavior and employee performance. Many research findings also explore the significant impact of leadership style on innovative work behavior, the capacity of leaders to recognize

opportunities, and the resulting innovative capabilities, competitiveness, and business growth change, supported by Chen C, et al. [3] & Hair Jr, et al. [4] .

Several studies have shown that transformational leadership has a positive effect on Innovative Work Behavior in the corporate context, supported by Afsar B, et al. [5] ; Hair Jr et al [6] ; Feng C et al. [7] ; Pian, QY. et al [8], while studies are showing significant effect, supported by Choi SB et al. [9] & Sekaran [10] . Apart from the Transformational Leadership factor, several studies have also shown that information technology is a factor that influences innovative work behavior, supported by Machado, C et al. [11]. Furthermore, supported by Jang SL, et al. [12] argue that innovative work behavior depends on the influence of a company's technology work. In addition, Jasperson et al [13] revealed that when innovative behavior is low, it can be caused because most employees are unable to utilize information technology, supported by Kmieciak [1] explained that the application of information technology capabilities is used as an approach that occurs in Small and Medium Enterprises (SMEs), which has a significant relationship between the use of information technology and innovative activities. The capacity for innovative behavior of employees towards information technology is a major challenge for companies, supported by Stock, R et al. [14].

As explained above, these variables are a stimulus for employee innovative behavior and organizational adaptability in dealing with a constantly changing environment. While there are several examples of organizations that eventually died or did not grow and develop, such as BlueBird. BlueBird, as one of the largest taxi transportation fleets in Indonesia, does not make changes through innovation so that when competitors appear, New Entrants (such as GoJek and Grab) experience disruptions. Hence, they cannot compete and ultimately lose the competition, supported by Kasali, R [15]. In 2019, the growth of the MSME sector experienced a decline in business due to the pandemic; the MSME sector was the hardest hit sector where more than 30 percent of MSMEs experienced business termination due to non-current working capital during the pandemic. MSMEs are a business sector essential in contributing to the Indonesian economy; almost 97 percent of Indonesia's workforce is absorbed in the business sector and contributes 61.07 percent to Indonesia's GDP (Kemenkop Umkm.go.id, 2020). Several efforts, such as providing working capital, digital coaching, and marketing, were carried out by the central government to revive the MSME sector (Kemenkeu.go.id, 2021). Therefore, this research is expected to help efforts to revive the MSME sector during a pandemic by increasing sustainability and good competitive advantage.

2. METHODS

Employees of the Indonesian company SMES in Malang participated in the survey. Transformational Leadership (X1), Information Technology (X2), Innovation Climate (Y1), Innovative Work Behavior (Y2), and system success are the six indicators used in this sort of quantitative study. The population and sample are determined using the Hair formula, and the score is calculated using the Likert scale:

Minimum sample size = Number of indicators x 5

Additionally, are 14 indicators multiplied by 5 to get a minimum sample size of 70. Conducting data analysis in this study using SmartPLS 4.0 software, using inferential statistical analysis with six steps of structural equation modeling (SEM), which will be assessed descriptively .)

3. RESULT AND DISCUSSION

3.1 Results

In the SEM test, there are at least three steps of analysis, namely: (1) testing the relationship between indicators and latent or construct variables (the outer model or measurement model); (2) testing the relationship between latent

or construct variables (the structural model); and (3) testing the compatibility model. The results of the calculations on the construct validity and reliability tests are shown in Figure 1 below, which is the result of running the outer model test (measurement model).

Figure 1 below shows the results of the construct validity and reliability tests. Questions or indicators with a loading factor value of 0.7 will be excluded from the model when testing their validity, supported by Hair Jr, et al. [16] . Figure 1 shows that the first running output shows a loading factor value of 0.7, which will then be excluded from the model one by one, which contains all indicators with a loading factor value of > 0.7.
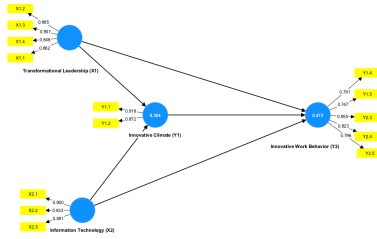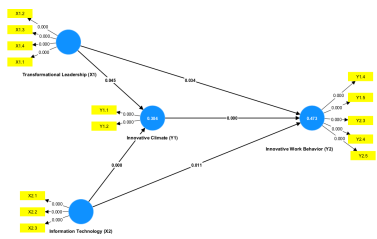

Figure 1 Run 1

Figure 2 Pls Bootstraping

The influence analysis between latent and construct variables in the SEM model is nothing more than testing the structural model in path analysis. In the inner model, the research hypotheses will be proven. In this study, the analysis used bootstrapping using SmartPLS software. The results of running calculations with Bootstrapping are shown in Figure 2 below, and the results of several stages of the analysis are explained below.

To complete the analysis in this study, the authors display a table of hypothesis test results. This can be seen in the table.

Table 1. Hypothesis Test

	Sampel asli (O)	Rata-rata sampel (M)	Standar deviasi (STDEV)	T statistik (O/STDEV)	Nilai P (P values)
Information Technology (X2) -> Innovative Climate (Y1)	0.450	0.452	0.103	4.372	0.000
Information Technology (X2) -> Innovative Work Behavior (Y2)	0.250	0.252	0.098	2.555	0.011
Innovative Climate (Y1) -> Innovative Work Behavior (Y2)	0.429	0.427	0.106	4.038	0.000
Transformational Leadership (X1) -> Innovative Climate (Y1)	0.208	0.206	0.104	2.002	0.045
Transformational Leadership (X1) -> Innovative Work Behavior (Y2)	0.182	0.184	0.086	2.118	0.034

Source: Data Process, 2023

Shown in Table 1 above is the calculation result of bootstrapping to test the inner model, which describes the research hypotheses in the SEM model simultaneously. The results of the path analysis explaining the direct effects of one construct on another are as follows:

1. H1 = Transformational Leadership (X1) positively affects the Innovation Climate (Y1) with a path coefficient of px1y1 = 0.208 and p-value = 0.045. So, the first hypothesis is proven.

2. H2 = Information Technology (X2) positively and significantly affects the Innovation Climate (Y1) with a path coefficient of px2y1 = 0.450 and p-value = 0.000. So, the second hypothesis is proven.

3. H3 = Transformational Leadership (X1) significantly affects Innovative Work Behavior (Y2) with a path coefficient of px1y2 = 0.182 and p-value = 0.003. So, the third hypothesis is proven.

4. H4 Information Technology (X2) positively affects employee behavior (Y2) with a path coefficient of px2y2 = 0.250 with a p-value = 0.000. So, the fourth hypothesis is proven.

5. H5 Innovation climate (Y1) positively and significantly affects employee behavior (Y2) with a path coefficient py1y2 = 0.429 with a p-value = 0.000. So, the fifth hypothesis is proven.

Model Fit Testing

At the stage of testing the suitability of the model, there are five types, among others, by looking at the coefficient of determination (R square), f square, q square, and the standardized root mean square residual (SRMR). In this paper, researchers only used two model fit tests: R square and SRMR. The initial stage of testing the model's suitability is to determine the coefficient of determination (R square) value. The results of calculating R^2 are shown in Table 2 below.

Table 2. Model Fit Test Table (R-square)

	R-square	Adjusted R-square
Innovation Climate	0.304	0.301
Innovative Work Behavior	0.473	0.480

Source: Data Process, 2023

Table 2 shows that the model fit test with the R-square test shows a 0.304 or 30% significance level in the Y1 variable. This means that the percentage value of the influence of exogenous variables, namely transformational leadership, and technology as exogenous variables on endogenous variables, namely the climate of innovation, is 30%. Next, in Table 6, the model fit test with the R-square test shows a significance level of 0.473 or 47% in the Y2 variable. This means that the percentage value of the influence of the endogenous variable, namely the climate of innovation, on another endogenous variable, namely employee behavior, is 47%.

Table 3. SRMR Test

IndexFit	Fit Criteria	Marginal Fit Criteria	Results
Standardized Root Mean Square Residual (SRMR)	≤ 0.08	0.08 – 0.09	0.071

Source: Data Process, 2023

The value that describes the model's mismatch based on the residuals is the SRMR value. Therefore, the model is better and more accurate with a smaller SRMR value. If the SRMR value is 0.08, the model is considered to be fit; if it is between 0.08 and 0.10, the model is said to be marginal; and if it is more significant than 0.10, the model is said to be wrong (unsuitable), supported by Tseng S[17]. Given that the model fit is marginal and acceptable, Table 3's SRMR value of 0.071, which falls between 0.08 and 0.10, indicates.

3.2 Discussions

After testing the relationship between indicators and latent variables, testing the relationship between latent variables, and testing the model's fit, a final model that fits simultaneously has been found. As explained above, all indicators of transformational leadership (X1), information technology (X2), innovation climate (Y1), and innovative work behavior (Y2) variables are valid, and no indicators or variables are excluded from the model. Then, the process of finding the final model that fits simultaneously brings implications for all hypothesized models that can be accepted. Several previous researchers have tested some of these indicators, and the results are still reliable indicators of these variables. The five hypotheses in this study were found to be influential and significant.

1. *Transformational leadership* can have an impact on employees, even on the behavior of the organization itself, such as increasing organizational innovation. Organizations/companies that have a strong innovation climate can foster innovation activities because of their supportive environment, supported by Kruft T et al. [18]. The model fit test results prove a positive influence relationship from the transformational leadership variable (X1) to the innovation climate (Y1). This influence can be seen through the magnitude of the influence of 0.208. This proves that the better the ability of human resources in the organization in this context is the leader who can provide transformation in the organization, then it is directly proportional to the climate of innovation in the organization.

2. Organizations/companies with a substantial innovation climate can foster innovation activities because of their supportive environment, supported by Kruft, T. et al. [18]. As for measuring the Innovation Climate, much literature has constructed related indicators, one of which is IT infrastructure within the organization. The model fit test results prove a positive influence relationship from the information technology variable (X2) to the innovation climate (Y1). This influence can be seen through the magnitude of the influence of 0.045. This proves that the better the information technology in the organizational support infrastructure, the more directly proportional to the growth of the innovation climate in the organization.

3. Transformational leaders help followers grow and develop into leaders by responding to the needs of individual followers by empowering them and aligning the goals and objectives of individual followers,

leaders, groups, and the larger organization. They empirically demonstrated that transformational leadership can move followers to exceed expected behavior and lead to high levels of follower satisfaction and commitment to the group and the organization, supported by Bass BM, et al. [19]. The model fit test results prove a positive and significant influence relationship between transformational leadership (X1) and innovative work behavior (Y2). The magnitude of the influence of the influence can be seen through the magnitude of the influence of 0.182.

4. It supports work processes in increasing organizational effectiveness through adequate infrastructure support in the process of growing innovative behavior within the organization. The model fit test results prove a positive and significant influence relationship from the information technology variable (X2) to innovative work behavior (Y2). The magnitude of the influence of the influence can be seen through the magnitude of the influence of 0.250. This proves that the existence of supporting infrastructure, namely information technology, is directly proportional to the growth of innovative work behavior within the organization.

5. *Innovative* work Behavior can be defined as all individual employee actions in creating/initiating, processing, and implementing new ideas and ways of doing things, such as new products, ideas, technology, work procedures, or processes to increase organizational effectiveness. The model fit test results prove a positive and significant influence relationship from the innovation climate variable (Y1) to innovative work behavior (Y2). The magnitude of the influence of the influence can be seen through the magnitude of the influence of 0.429. This proves that the high growth of the innovation climate in the organization will be directly proportional to the innovative work behavior in the organization.

AUTHORS' CONTRIBUTIONS

The model fit test results prove a significant influence relationship between the exogenous variables X1 and X2 on the innovation climate (Y1) and the Y1 innovation climate on innovative work behavior (Y2). The magnitude of the influence of the influence can be seen through the magnitude of the influence of 0.473. This proves that the high growth of the innovation climate in the organization will be directly proportional to the innovative work behavior in the organization. The magnitude of the influence of the innovation climate on innovative work behavior of 47% explains that in assessing innovative work behavior, the innovation climate variable is a reliable indicator that influences the success of innovative work behavior achievements.

ACKNOWLEDGMENTS

study become a basis for further research that will be more in-depth and comprehensive in exploring other factors that influence innovation and innovative work behavior.

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