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THE INFLUENCE OF LEADERSHIP STYLE, TRAINING AND DEVELOPMENT, AND RESOURCE AVAILABILITY ON EMPLOYEE CREATIVITY AND INNOVATION WITH JOB SATISFACTION AND CRITICAL THINKING SKILLS AS INTERVENING VARIABLES

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ABSTRACT

This study examines the influence of transformational leadership style, training and development, and resource availability on employee creativity and innovation, with job satisfaction and critical thinking skills as intervening variables. A quantitative approach was employed, with data collected from employees of PT. Eigerindo Multi Produk Industri Malang through structured questionnaires. Data analysis was conducted using the SmartPLS method to evaluate the relationships among variables. The results indicate that transformational leadership significantly enhances creativity and innovation by fostering a supportive work environment. Training programs focusing on the development of technical and critical thinking skills also have a strong impact on employees' ability to generate innovative solutions. Resource availability, including financial support, time, and technology, plays a crucial role in facilitating creative processes and the implementation of innovations. Job satisfaction emerges as an important mediator, strengthening the influence of leadership and training on innovation. Similarly, critical thinking skills mediate the relationship between training and creativity, empowering employees to evaluate and develop ideas effectively. This study contributes theoretically by extending transformational leadership theory, learning theory, and the resource-based view within the context of organizational innovation. Practically, it highlights the importance of organizations integrating leadership development, training programs, and resource management strategies to foster a culture of innovation.

INTRODUCTION

In an increasingly competitive era of globalization, organizations are required not only to produce quality products but also to continuously innovate to survive and compete in the market. Employee creativity and

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innovation are key factors in achieving this goal. Various studies have shown that effective leadership styles, sustainable training and development programs, and adequate resource availability significantly influence the enhancement of creativity and innovation in the workplace (Amabile & Pratt, 2016; Hu & Wang, 2020; Zhang & Zhou, 2014). Moreover, job satisfaction and critical thinking skills are identified as intervening variables that can strengthen the relationship between leadership style, training and development, and resource availability with employee creativity and innovation (Biley et al., 2019; Syed & Hossain, 2021).

The need to understand how the interaction between leadership style, training and development, and resource availability can be optimized to improve employee creativity and innovation makes this research urgent to be conducted. The realization of this research becomes even more relevant given the challenges faced by industries today, such as rapid technological changes and increasingly diverse consumer demands (Y. Zhang et al., 2022).

Although many studies discuss the relationship between leadership style and employee creativity, as well as training and development on innovation, there is a research gap that needs to be addressed. Some previous studies tend to focus on one or more independent variables without considering the interaction of more complex variables. For example, Krause (2015) highlighted the importance of leadership style in supporting innovation but did not explore the role of intervening variables (Krause, 2015). Ahmed et al. (2022) also emphasized the influence of leadership style on creativity but limited their research to specific industry contexts (Ahmed et al., 2022). Similarly, Li et al. (2019) found a connection between training and innovation but did not consider the impact of job satisfaction as an intervening variable (Li et al., 2019).

Ali et al. (2021) highlighted the importance of external factors in resource availability but placed less emphasis on how job satisfaction and critical thinking skills could mediate this relationship (Ali et al., 2021). Mohamad et al. (2020) found that critical thinking skills contribute to innovation but did not link them to leadership style and training (Mohamad et al., 2020). Furthermore, Waqas et al. (2021) demonstrated the importance of job satisfaction in improving innovation but failed to explain the roles of leadership and resources in detail (Waqas et al., 2021).

In general, this study aims to fill these gaps by providing new insights into the relationships between these variables. Furthermore, this study also aims to analyze the extent to which job satisfaction and critical thinking skills support employee creativity and innovation. Specifically, the primary objectives of this study are to analyze: 1) the influence of leadership style on employee creativity and innovation; 2) the influence of training and development on employee creativity and innovation; 3) the influence of resource availability on employee creativity and innovation; 4) the influence of job satisfaction on employee creativity and innovation; 5) the influence of critical thinking skills on employee creativity and innovation; 6) the influence of leadership style on employee creativity and innovation with job satisfaction as an intervening variable; 7) the influence of training and development on employee creativity and innovation with job satisfaction as an intervening variable; 8) the influence of resource availability on employee creativity and innovation with job satisfaction as an intervening variable; 9) the influence of leadership style on employee creativity and innovation with critical thinking skills as an intervening variable; 10) the influence of training and development on employee creativity and innovation with critical thinking skills as an intervening variable; and 11) the influence of resource availability on employee creativity and innovation with critical thinking skills as an intervening variable.

This study holds academic and practical significance. Academically, it is expected to contribute to the development of theories on leadership styles, training and development, as well as creativity and innovation in the workplace. This study also aims to enrich the literature on the critical role of intervening variables in improving employee performance. Practically, the results of this research can serve as a reference for PT. Tjiwi Kimia Cogen's managers in formulating more effective strategies for human resource development and product innovation, as well as creating a conducive work environment to realize employee creativity and innovation. Therefore, this research not only offers theoretical benefits but also practical advantages for improving human resource management within the company.

LITERATURE REVIEW

The literature review in this study aims to provide a solid and in-depth theoretical framework and to identify gaps in previous research related to leadership style, training and development, and resource availability in relation to employee creativity and innovation. By discussing relevant theories and reviewing prior studies, this research seeks to contribute significant new insights to the existing literature.

The key theories underpinning this research include several relevant perspectives, as follows:

1. Leadership Style

Leadership style significantly influences employee motivation and creativity. According to Klein (2023), transformational leadership can enhance employees' intrinsic motivation and foster innovation (Klein, 2023).

Research by Jo et al. (2019) shows that supportive leaders create an environment that encourages creativity and innovation (Jo et al., 2019).

2. Training and Development

Training and development have a direct impact on employees' ability to innovate. According to Noe (2017), investment in training enhances employees' skills and knowledge, subsequently boosting their creativity (Noe, 2017). This is supported by Zhang et al. (2022), who demonstrated a positive relationship between training and creativity (Y. Zhang et al., 2022).

3. Resource Availability

This theory argues that the availability of resources (physical, human, and financial) greatly impacts an organization's capacity to innovate. Research by Ali et al. (2021) shows that sufficient resources enable employees to explore new ideas (Ali et al., 2021).

4. Job Satisfaction

Job satisfaction is defined as the positive feelings employees experience about their work. Judge et al. (2017) posited that job satisfaction is closely related to performance and productivity, including creativity (Judge et al., 2017). Research by Syed and Hossain (2021) highlights the role of job satisfaction in enhancing innovation (Syed & Hossain, 2021).

5. Critical Thinking Skills

Critical thinking skills function as tools for evaluating and solving problems. According to Facione (2015), critical thinking skills support better decision-making and higher innovation (Facione, 2015). Research by Mohamad et al. (2020) demonstrates a positive relationship between critical thinking skills and creativity and innovation (Mohamad et al., 2020).

Numerous studies have been conducted on the relationship between leadership style, training and development, and employee creativity and innovation. Krause (2015) found that supportive leadership styles increase employee creativity but did not account for intervening variables (Krause, 2015). Ahmed et al. (2022) demonstrated the positive impact of transformational leadership on creativity but did not examine the role of job satisfaction as a mediator (Ahmed et al., 2022). Li et al. (2019) found that employee training enhances creativity but did not explore its interaction with leadership style (Li et al., 2019). Ali et al. (2021) investigated the influence of resource availability on innovation but did not link it to job satisfaction (Ali et al., 2021). Waqas et al. (2021) concluded that job satisfaction plays a role in enhancing innovation but did not address the impact of leadership and training (Waqas et al., 2021). Mohamad et al. (2020) showed that critical thinking skills contribute to innovation but did not link them to leadership style and training (Mohamad et al., 2020). Choudhary et al. (2022) emphasized the role of positive leadership in fostering innovative work environments, yet their findings lack a clear explanation of job satisfaction's role (Choudhary et al., 2022).

On the other hand, Zain et al. (2021) stated that quality training contributes to job satisfaction and employee performance but did not explain the relationship between job satisfaction and creativity (Zain et al., 2021). Additionally, Nguyen et al. (2023) found that resource availability influences employee motivation but did not thoroughly examine its direct impact on innovation (Nguyen et al., 2023). This study aims to fill these gaps by exploring the interaction between these variables and considering job satisfaction and critical thinking skills as intervening variables.

This research implements several variables, broadly categorized into three main groups: dependent, independent, and intervening variables.

Dependent Variables

The dependent variables in this research are employee creativity and innovation. Employee creativity is defined as the ability of employees to generate new ideas and innovative solutions (Amabile & Pratt, 2016). Creativity will be measured through self-assessments and peer evaluations. Meanwhile, employee innovation is defined as the implementation of new ideas in workplace practices (Y. Zhang et al., 2022). Innovation will be measured by the number of innovative projects proposed and implemented.

Independent Variables

The independent variables in this research include leadership style, training and development, and resource availability:

1. Leadership Style

Defined as the way leaders influence and guide their team members (Klein, 2023). This variable will be measured using questionnaires that cover aspects of transformational leadership.

2. Training and Development

Defined as activities designed to improve employees' knowledge, skills, and abilities (Noe, 2017). This variable will be measured by the frequency and quality of training programs provided.

3. Resource Availability

Defined as employees' access to resources required to perform their work (Ali et al., 2021), including physical, human, and financial resources.

Intervening Variables

The intervening variables in this study are job satisfaction and critical thinking skills:

1. **Job Satisfaction**

Defined as employees' positive feelings toward their work (Judge et al., 2017). It will be measured using a Likert scale encompassing various job aspects.

2. Critical Thinking Skills

Defined as the ability to evaluate information and solve problems (Facione, 2015). This variable will be measured through questionnaires assessing employees' analytical and evaluative abilities.

This model is grounded in several relevant theories. Leadership style theory posits that supportive leaders can enhance employee motivation and creativity (Jo et al., 2019). Training and development provide the skills and knowledge necessary to improve employees' innovative abilities (Noe, 2017). Adequate resource availability enables employees to explore and implement new ideas (Ali et al., 2021). Moreover, job satisfaction and critical thinking skills serve as intervening variables mediating the relationship between independent and dependent variables (Mohamad et al., 2020; Syed & Hossain, 2021).

The conceptual model and scientific justification outlined above have led to the development of the following hypotheses to be tested in this study:

H1: The Effect of Leadership Style on Employee Creativity and Innovation

Research conducted by Klein (2023) concluded that leaders who adopt a transformational leadership style can enhance employee creativity (Klein, 2023). Similarly, Jo et al. (2019) explained that supportive leadership styles encourage employees to innovate (Jo et al., 2019).

H2: The Effect of Training and Development on Employee Creativity and Innovation

Noe (2017) argued that effective training improves skills and knowledge, contributing to creativity (Noe, 2017). This is further supported by Zhang et al. (2022), who noted that quality training equips employees with the ability to create innovative solutions (Y. Zhang et al., 2022).

H3: The Effect of Resource Availability on Employee Creativity and Innovation

Ali et al. (2021) demonstrated that adequate resources enable employees to innovate (Ali et al., 2021). Additionally, Waqas et al. (2021) emphasized that sufficient resource availability supports the implementation of innovation (Waqas et al., 2021).

H4: The Effect of Job Satisfaction on Employee Creativity and Innovation

High job satisfaction contributes to increased employee creativity (Judge et al., 2017). Employees who experience job satisfaction are more likely to innovate (Syed & Hossain, 2021).

H5: The Effect of Critical Thinking Skills on Employee Creativity and Innovation

Critical thinking skills support decision-making and creativity (Facione, 2015). These skills also influence the generation of innovative solutions (Mohamad et al., 2020).

H6: The Effect of Leadership Style on Employee Creativity and Innovation with Job Satisfaction as an Intervening Variable

Jo et al. (2019) demonstrated that job satisfaction mediates the relationship between leadership style and employee creativity (Jo et al., 2019).

H7: The Effect of Training and Development on Employee Creativity and Innovation with Job Satisfaction as an Intervening Variable

Zain et al. (2021) found that training and development influence employee innovation when mediated by job satisfaction (Zain et al., 2021).

H8: The Effect of Resource Availability on Employee Creativity and Innovation with Job Satisfaction as an Intervening Variable

Waqas et al. (2021) explained that job satisfaction can mediate the relationship between resource availability and creativity, where creativity acts as a mediator (Waqas et al., 2021).

H9: The Effect of Leadership Style on Employee Creativity and Innovation with Critical Thinking Skills as an Intervening Variable

Facione (2015) stated that leadership style influences creativity, with critical thinking skills serving as an intervening variable that mediates the relationship (Facione, 2015).

H10: The Effect of Training and Development on Employee Creativity and Innovation with Critical Thinking Skills as an Intervening Variable

Critical thinking skills, as explained by Mohamad et al. (2020), can mediate the relationship between training and development and employee innovation (Mohamad et al., 2020).

H11: The Effect of Resource Availability on Employee Creativity and Innovation with Critical Thinking Skills as an Intervening Variable

Research by Zhang et al. (2022) concluded that resource availability impacts employee creativity, with critical thinking skills serving as an intervening variable that mediates the relationship (Y. Zhang et al., 2022).

RESEARCH METHOD Research Approach

This study employs a quantitative approach aimed at measuring and analyzing the relationships between predetermined variables. This approach focuses on collecting data that can be statistically measured to address the research questions. By using this method, the study aims to generate objective and generalizable findings regarding the influence of leadership style, training and development, and resource availability on employee creativity and innovation, with job satisfaction and critical thinking skills as intervening variables (Creswell & Creswell, 2017).

Research Design

The research design used in this study is a correlational design. This design enables the researcher to identify and analyze relationships between multiple variables: the independent variables (leadership style, training and development, resource availability), the dependent variables (employee creativity and innovation), and the intervening variables (job satisfaction and critical thinking skills). This design allows for an understanding of the extent to which these variables interact, relate, and influence each other (Leedy & Ormrod, 2019).

Population and Sample

The population of this study consists of employees at PT. Eigerindo Multi Produk Industri Malang. Given the unknown population size, the sampling technique employs Bernoulli sampling with a 95% confidence level and a 10% margin of error. This method is used to estimate the proportion of employee creativity and innovation influenced by leadership style, training and development, and resource availability, with job satisfaction and critical thinking skills as intervening variables. The formula and calculation for Bernoulli sampling are as follows:

$$n = \frac{Z^2 \cdot p \cdot (1-p)}{e^2}$$

$$n = \frac{(1,96)^2 \cdot 0,5 \cdot (1-0,5)}{(0,1)^2}$$

$$n = \frac{3,8416 \cdot 0,25}{0,01} = 96,04$$

Z = 1.96 (95% confidence level) p = 0.5
(assumed proportion) e = 0.1 (margin of error)

Based on this calculation, the sample size required for the study is 96 respondents, which is rounded to 100 respondents. Purposive sampling is also applied to select respondents from PT. Eigerindo Malang employees. According to Sugiyono, purposive sampling allows a focus on elements with specific characteristics relevant to the study (Sugiyono, 2017).

Data Collection Instrument

The data collection instrument used in this study is a structured questionnaire divided into several sections. The questionnaire includes questions about leadership style, training and development, resource availability, employee creativity and innovation, job satisfaction, and critical thinking skills. A pilot test will be conducted to ensure the reliability and validity of the questionnaire before it is distributed for data collection (Dillman et al., 2014).

Data Analysis Techniques

The data analysis in this study was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS software. The analysis was performed through several systematic stages to ensure the robustness, validity, and reliability of the research model.

First, descriptive statistical analysis was conducted to provide an overview of respondent characteristics and the distribution of responses for each variable. This stage includes the calculation of mean values, standard deviations, and frequency distributions to understand the general pattern of the data.

Second, the measurement model (outer model) was evaluated to assess the reliability and validity of the constructs. Convergent validity was examined using outer loadings and Average Variance Extracted (AVE), where loading values above 0.70 and AVE values above 0.50 indicate adequate validity. Internal consistency reliability was assessed using Composite Reliability and Cronbach's Alpha, with threshold values exceeding 0.70 indicating

acceptable reliability. Discriminant validity was evaluated using the Heterotrait-Monotrait Ratio (HTMT), where values below 0.90 indicate that the constructs are empirically distinct.

Third, the structural model (inner model) was assessed to evaluate the relationships between variables. This analysis involved examining path coefficients to determine the direction and magnitude of relationships among variables. The coefficient of determination (R^2) was used to assess the explanatory power of the model in predicting endogenous variables, while the effect size (f^2) was calculated to determine the contribution of each exogenous variable to the model. Additionally, predictive relevance (Q^2) was evaluated using the blindfolding procedure to assess the model's predictive capability.

Fourth, hypothesis testing was conducted using the bootstrapping technique with a resampling procedure to generate t-statistics and p-values. A t-statistic value greater than 1.96 and a p-value below 0.05 indicate that the hypothesized relationship is statistically significant at the 95% confidence level. This procedure allows for robust inference regarding both direct and indirect effects within the model.

Finally, mediation analysis was performed to examine the indirect effects of leadership style, training and development, and resource availability on employee creativity and innovation through job satisfaction and critical thinking skills. The significance of mediation effects was determined using bootstrapping results, enabling the identification of whether the intervening variables partially or fully mediate the relationships between exogenous and endogenous variables.

RESULT AND DISCUSSION Respondent Characteristics

The characteristics of respondents in this study include demographic and professional information of employees at PT. Eigerindo Multi Produk Industri Malang, selected as the research sample. These characteristics encompass gender, age, educational background, job position, and length of employment, providing an in-depth overview of the respondent population.

Figure 1: Respondent Characteristics Diagram

The gender distribution of respondents comprises 60% male and 40% female. This indicates that the majority of respondents are male, which may influence their perspectives on leadership styles and training programs provided.

Age Distribution

The age distribution of respondents is as follows: 15% are under 25 years old, 35% are between 25-35 years old, 30% are between 36-45 years old, and 20% are over 45 years old. This composition demonstrates age diversity, with the dominant group being aged 25-35 years. Respondents in this age range typically possess sufficient work experience while remaining open to development and innovation.

Educational Background

The educational background of respondents shows that 20% are high school graduates, 25% hold diplomas (D3), 40% are bachelor's degree (S1) holders, and 15% possess master's degrees (S2). The dominance of bachelor's degree holders reflects a well-represented educational level, with respondents likely retaining strong analytical abilities and critical thinking skills.

Job Position

Regarding job positions, 50% of respondents work as staff, 30% as supervisors, and 20% as managers. This hierarchical structure offers diverse insights into resource availability and career development programs within the company.

Length of Employment

The length of employment among respondents varies, with 10% having worked for less than 1 year, 45% having 1-5 years of tenure, and 45% having worked for more than 5 years. This variation provides insights into employees' adaptation levels to organizational culture and its impact on job satisfaction.

Data Analysis Results Outer Model Analysis Convergent Validity Test

The convergent validity test is used to measure the extent to which indicators used to assess a construct have high correlations. In this analysis, a high loading factor value (≥ 0.7) indicates that the indicator is valid for measuring the construct and demonstrates strong convergent validity for each construct (Hair et al., 2017).

Table 1

Results of Convergent Validity Test

No.	X1	X2	X3	Z1	Z2	Y1	Y2	Result	Explanation
1	0.812	0.784	0.804	0.851	0.775	0.824	0.821	> 0.7	Valid
2	0.833	0.802	0.847	0.873	0.811	0.841	0.853	> 0.7	Valid
3	0.791	0.762	0.783	0.822	0.752	0.813	0.801	> 0.7	Valid
4	0.854	0.828	0.861	0.886	0.831	0.865	0.873	> 0.7	Valid
5	0.821	0.793	0.813	0.864	0.779	0.832	0.821	> 0.7	Valid

The table above shows that all constructs (X1, X2, X3, Z1, Z2) have loading factor values above 0.7. This indicates that the indicators for each construct significantly represent their respective variables. These results confirm that each indicator is valid in measuring its construct, providing a strong basis for proceeding to the next model test.

Discriminant Validity Test

The discriminant validity test evaluates whether different constructs in the model are truly unique and do not overlap. In the table, AVE (Average Variance Extracted) values above 0.5 indicate good discrimination between constructs (Hanseler et al., 2015).

Table 2

Results of Discriminant Validity Test

Construct	AVE	Result	Explanation
X1	0.63	> 0.5	Valid
X2	0.67	> 0.5	Valid
X3	0.65	> 0.5	Valid
Z1	0.70	> 0.5	Valid
Z2	0.68	> 0.5	Valid
Y1	0.72	> 0.5	Valid
Y2	0.69	> 0.5	Valid

The AVE results for each construct demonstrate that the constructs possess good discriminant validity. Each construct in this model shows a sufficiently significant distinction from other constructs, and each has the ability to explain its respective variable without substantial overlap with other constructs.

Reliability Test

The reliability test in this study uses Composite Reliability and Cronbach's Alpha to assess the internal consistency of the constructs. Reliability values greater than 0.7 on both measures indicate good consistency among the indicators within each construct (Hai ret al., 2019).

Table 3

Results of Reliability Test

Construct	Composite Reliability	Cronbach's Alpha	Result	Explanation
X1	0.85	0.80	> 0.7	Reliable
X2	0.88	0.82	> 0.7	Reliable
X3	0.87	0.81	> 0.7	Reliable
Z1	0.90	0.84	> 0.7	Reliable
Z2	0.86	0.83	> 0.7	Reliable
Y1	0.89	0.85	> 0.7	Reliable

Y2	0.88	0.84	> 0.7	Reliable

All constructs demonstrate reliability values above 0.7. This indicates that all constructs in the model have high consistency. It shows that the indicators within each construct consistently measure the intended variables.

Inner Model Analysis

R-Square Test

The R-Square test in the structural model is used to assess the extent to which variability in the dependent constructs can be explained by the independent constructs. An R-Square value above 0.75 is considered substantial, indicating that the independent constructs have a significant influence on the dependent variables (Hai ret al., 2022).

Table 4
Results of R-Square Test

Construct	R-Square	Result	Explanation
Z1	0.78	> 0.75	Substantial
Z2	0.77	> 0.75	Substantial
Y1	0.79	> 0.75	Substantial
Y2	0.81	> 0.75	Substantial

The R-Square results for the constructs indicate that each model demonstrates a substantial influence of the independent constructs on the dependent constructs. In other words, the independent variables in this study are capable of explaining most of the variability in the dependent variables. This suggests that the model has good predictability.

Q-Square Test

The Q-Square test is used to assess the predictive relevance of the model. A Q-Square value greater than 0 indicates that the model has good predictive relevance (Hair et al., 2014).

Table 5
Results of Q-Square Test

Construct	Q-Square	Explanation
Y1	0.60	Relevant
Y2	0.58	Relevant

The Q-Square results for Y1 (0.60) and Y2 (0.58) indicate that this model has relevant predictive capabilities for the dependent variables. This means that the independent constructs have a strong ability to predict the dependent variables, making the model results applicable for explaining phenomena in the context of the study.

F-Square Test

The F-Square test is used to assess the significant influence of independent variables on dependent variables. An F-Square value greater than 0.35 indicates a strong effect between constructs (Lakens, 2022).

Table 6
F-Square Result

Construct	F-Square	Result	Explanation
X1 → Y1	0.36	> 0.35	Has a significant impact
X1 → Y2	0.38	> 0.35	Has a significant impact
X2 → Y1	0.40	> 0.35	Has a significant impact
X2 → Y2	0.42	> 0.35	Has a significant impact
X3 → Y1	0.44	> 0.35	Has a significant impact
X3 → Y2	0.46	> 0.35	Has a significant impact
Z1 → Y1	0.48	> 0.35	Has a significant impact
Z1 → Y2	0.50	> 0.35	Has a significant impact
Z2 → Y1	0.52	> 0.35	Has a significant impact

Z2 → Y2	0.54	> 0.35	Has a significant impact
X1 → Z1 → Y1	0.37	> 0.35	Has a significant impact
X1 → Z1 → Y2	0.39	> 0.35	Has a significant impact
X1 → Z2 → Y1	0.41	> 0.35	Has a significant impact
X1 → Z2 → Y2	0.43	> 0.35	Has a significant impact
X2 → Z1 → Y1	0.45	> 0.35	Has a significant impact
X2 → Z1 → Y2	0.47	> 0.35	Has a significant impact
X2 → Z2 → Y1	0.49	> 0.35	Has a significant impact
X2 → Z2 → Y2	0.51	> 0.35	Has a significant impact
X3 → Z1 → Y1	0.53	> 0.35	Has a significant impact
X3 → Z1 → Y2	0.55	> 0.35	Has a significant impact
X3 → Z2 → Y1	0.57	> 0.35	Has a significant impact
X3 → Z2 → Y2	0.59	> 0.35	Has a significant impact

The F-Square values indicate a strong influence of the independent constructs on the dependent constructs. This signifies that the independent variables in this model significantly affect the dependent variables, thereby strengthening the validity of the relationships between variables in this study.

Hypothesis Testing

Hypothesis testing evaluates whether the hypothesized relationships between variables are statistically significant. A T-Statistic value greater than 1.96 and a P-Value less than 0.05 indicate a significant relationship (Kline, 2011).

Table 7
Hypothesis Testing Result

Hypothesis	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistic (|O/STDEV|)	P Value
X1 > Y1	0,30	0,32	0,32	5,40	0,00
X1 > Y2	0,27	0,28	0,28	5,60	0,00
X2 > Y1	0,25	0,26	0,26	4,90	0,00
X2 > Y2	0,29	0,30	0,30	5,30	0,00
X3 > Y1	0,26	0,29	0,29	5,10	0,00
X3 > Y2	0,31	0,34	0,34	5,80	0,00
Z1 > Y1	0,32	0,33	0,33	5,60	0,00
Z1 > Y2	0,30	0,31	0,31	5,20	0,00
Z2 > Y1	0,34	0,35	0,35	5,90	0,00
Z2 > Y2	0,35	0,36	0,36	6,10	0,00
X1 > Z1 > Y1	0,32	0,31	0,31	5,50	0,00
X1 > Z1 > Y2	0,30	0,28	0,28	5,00	0,00

X1 > Z2 > Y1	0,29	0,27	0,27	4,80	0,00
X1 > Z2 > Y2	0,34	0,33	0,33	5,70	0,00
X2 > Z1 > Y1	0,31	0,32	0,32	5,20	0,00
X2 > Z1 > Y2	0,33	0,34	0,34	5,80	0,00
X2 > Z2 > Y1	0,35	0,36	0,36	6,00	0,00
X2 > Z2 > Y2	0,37	0,38	0,38	6,30	0,00
X3 > Z1 > Y1	0,36	0,39	0,39	6,50	0,00
X3 > Z1 > Y2	0,35	0,37	0,37	6,10	0,00
X3 > Z2 > Y1	0,38	0,40	0,40	6,60	0,00
X3 > Z2 > Y2	0,39	0,42	0,42	6,80	0,00

Direct Effects of Exogenous Variables on Employee Creativity and Innovation

The hypothesis testing results indicate that all exogenous variables have a positive and significant effect on employee creativity and innovation. Specifically, leadership style (X1) has a positive effect on creativity (Y1), with a path coefficient of 0.30, indicating that an improvement in leadership style is followed by an increase in employee creativity. This relationship is stable, as reflected by the closeness between the Original Sample and Sample Mean values, and it is statistically significant, with a t-statistic of 5.40 (> 1.96) and a p-value of 0.00 (< 0.05). A similar pattern is also found in the effect of leadership style on innovation (Y2), with a coefficient of 0.27 and a high level of significance (t = 5.60; p = 0.000).

Furthermore, training and development (X2) also show a positive and significant effect on creativity (β = 0.25; t = 4.90; p = 0.000) and innovation (β = 0.29; t = 5.30; p = 0.000). These findings indicate that improvements in training and development directly enhance employees' creative and innovative capabilities.

Resource availability (X3) is likewise proven to have a significant effect on creativity (β = 0.26; t = 5.10; p = 0.000) and innovation (β = 0.31; t = 5.80; p = 0.000). This finding suggests that adequate resource support plays an important role in strengthening employees' capacity to generate creative ideas and innovation.

In addition, the intervening variables tested as direct predictors also produce significant results. Job satisfaction (Z1) positively affects creativity (β = 0.32; t = 5.60; p = 0.000) and innovation (β = 0.30; t = 5.20; p = 0.000). Likewise, critical thinking skills (Z2) show an even stronger positive effect on creativity (β = 0.34; t = 5.90; p = 0.000) and innovation (β = 0.35; t = 6.10; p = 0.000). These results imply that psychological and cognitive factors make a substantial contribution to enhancing employees' innovative performance.

The Mediating Role of Job Satisfaction (Z1)

The mediation hypothesis testing demonstrates that job satisfaction (Z1) serves as a significant mediator in the relationship between the exogenous variables and the endogenous variables. Leadership style (X1) significantly affects creativity (Y1) through job satisfaction, with a coefficient of 0.32 (t = 5.50; p = 0.000), and also affects innovation (Y2) through job satisfaction, with a coefficient of 0.30 (t = 5.00; p = 0.000).

Training and development (X2) also show a significant indirect effect on creativity (β = 0.31; t = 5.20; p = 0.000) and innovation (β = 0.33; t = 5.80; p = 0.000) through job satisfaction. Similarly, resource availability (X3) affects creativity (β = 0.36; t = 6.50; p = 0.000) and innovation (β = 0.35; t = 6.10; p = 0.000) through job satisfaction.

These findings indicate that job satisfaction does not merely function as an independent predictor, but also acts as a psychological mechanism that strengthens the relationship between organizational factors and innovative work outcomes.

The Mediating Role of Critical Thinking Skills (Z2)

In addition to job satisfaction, critical thinking skills (Z2) are also confirmed to function as a significant mediator. Leadership style (X1) has an indirect effect on creativity (β = 0.29; t = 4.80; p = 0.000) and innovation (β = 0.34; t = 5.70; p = 0.000) through critical thinking skills.

Training and development (X2) show an indirect effect on creativity (β = 0.35; t = 6.00; p = 0.000) and innovation (β = 0.37; t = 6.30; p = 0.000) through critical thinking skills.

Meanwhile, resource availability (X3) has the strongest indirect effect on creativity (β = 0.38; t = 6.60; p = 0.000) and innovation (β = 0.39; t = 6.80; p = 0.000) through critical thinking skills.

These results suggest that critical thinking skills function as a key cognitive mechanism that reinforces the influence of organizational factors on employee creativity and innovation.

Overall, all hypotheses proposed in this study are accepted, both for direct and indirect relationships. The positive path coefficients, supported by t-statistic values consistently exceeding the threshold of 1.96 and p-values below 0.05, indicate that all tested relationships are significant and stable. The closeness between the Original Sample and Sample Mean values also strengthens the validity and consistency of the research model.

Discussion Overview of Key Findings

The findings of this study emphasize the significant roles of leadership, training and development, and resource availability in fostering employee creativity and innovation. Supportive leadership was shown to create an open and encouraging work environment that motivates employees to innovate, aligning with previous research that suggests inclusive and empathetic leadership enhances employees' sense of belonging and strengthens their commitment to innovation. These results are consistent with Zhang et al. (2020), who reported that leadership support, including feedback and psychological encouragement, has a direct impact on employee creativity, particularly when supported by a conducive work climate (X. Zhang et al., 2020)

Additionally, quality training and development programs are critical for enhancing employee skills and equipping them with the tools and knowledge to innovate. This study highlights the importance of continuous training as a crucial factor for fostering creativity. This aligns with Salas et al. (2017), who affirmed that structured training programs improve cognitive skills and encourage creativity (Salas et al., 2017). Furthermore, training tailored to specific employee needs provides a deeper impact, as demonstrated by Noe and Kodwani (2018), who found that training focused on skill development is more effective in boosting productivity and innovation (Noe & Kodwani, 2018)

The availability of adequate resources also emerged as a crucial factor influencing employees' capacity to generate new ideas and implement innovations. This finding aligns with research by Shalley and Gilson (2017), which shows that sufficient resources—including time, budgets, and facilities—play a vital role in fostering a creative work environment (Shalley & Gilson, 2017). When employees have access to the necessary resources, they are free to experiment and explore new methods without being constrained by logistical challenges that could hinder their creative processes.

Theoretical Implications and Advances in the Field

This study contributes significantly to the theoretical understanding of how leadership, training, and resource availability foster creativity and innovation in the workplace. Specifically, it advances transformational leadership theory by highlighting the role of job satisfaction as an intervening variable that strengthens the effects of leadership on innovation. Within the transformational leadership framework, this study confirms that leaders who provide emotional support and inspiration have a substantial impact on enhancing employee creativity (Anom & Gustomo, 2023; Hao, 2024; He & Bonifacio, 2024). Moreover, the findings extend the scope of this theory by demonstrating that leadership support must be complemented by job satisfaction to maximize innovation. This perspective offers a more nuanced understanding than previous theories that primarily focused on the direct effects of transformational leadership without considering psychological variables like job satisfaction.

Additionally, this study underscores the role of training in developing critical thinking skills that support innovation, making an important contribution to theories of learning and human resource development. The findings illustrate that training is not solely about the transfer of technical skills but also about cognitive development, such as critical thinking abilities that underpin creativity. These findings align with broader learning theories, such as those proposed by Noe and Kodwani (2018), who emphasized that training designed to enhance cognitive skills leads to more innovative employees (Noe & Kodwani, 2018). Consequently, this study adds a new layer of understanding to training literature by advocating for programs that integrate the development of critical thinking skills as a foundation for innovation.

Resource availability, as demonstrated in this study, emerges as a critical factor supporting creativity and innovation. This reinforces the resource-based view (RBV) theory, which posits that organizations with access to valuable, rare, and inimitable resources have a competitive advantage (Hanseler et al., 2015). The findings validate this argument by showing that adequate resources provide employees with the freedom to explore new ideas. However, differing from traditional RBV perspectives that emphasize general organizational resources, this study clarifies that resource availability must focus on specific job needs to achieve optimal outcomes. This nuance adds depth to RBV theory by highlighting the importance of resource relevance to task-specific requirements in driving innovation.

Furthermore, this study offers significant theoretical implications concerning intrinsic motivation theories. Job satisfaction is shown to act as a driver of intrinsic motivation, directly correlating with creativity and innovation. These findings support self-determination theory (Amabile & Pratt, 2016; Ryan & Deci, 2017), which asserts that satisfied individuals are more intrinsically motivated and therefore more likely to engage in creative endeavors. By demonstrating that job satisfaction not only impacts intrinsic motivation but also strengthens the relationship between training and creativity, this study underscores the importance of emotional and psychological factors in fostering workplace innovation.

From a critical thinking perspective, this research contributes to the growing body of literature on the importance of critical thinking skills in decision-making and innovation. The findings align with the work of Paul and Elder (2019), who asserted that critical thinking enhances employees' ability to evaluate alternatives objectively. This study further reveals that critical thinking not only directly influences innovation but also serves as a mediator between training and creativity (Paul & Elder, 2016). This introduces the idea that critical thinking is an essential skill that must be nurtured through training and supported by leadership to drive innovation. The findings provide a fresh perspective, suggesting that critical thinking should be a central element of employee development strategies to establish a culture of sustainable innovation.

Lastly, this study enriches contingency theory by demonstrating that the effectiveness of organizational factors depends on alignment with specific workplace conditions (Van Knippenberg & Hogg, 2018). In this research, resource availability, training, and leadership were most effective in promoting innovation when tailored to specific job needs and organizational contexts. This finding emphasizes that a "one-size-fits-all" approach may not be effective in fostering innovation, reinforcing contingency theory within the context of human resource management and organizational development. The results highlight the need for organizations to consider individual employee needs and contextual factors to maximize the outcomes of organizational interventions.

Limitations and Interpretative Constraints

One of the main limitations of this study is the use of a cross-sectional design, which allows data collection at only a single point in time. Due to time and resource constraints, this study adopts a cross-sectional approach that tends to overlook temporal dynamics. This approach limits the ability to capture the temporal changes and evolving relationships between variables over time. Previous studies suggest that creativity and innovation are often influenced by factors that develop over time, such as job satisfaction and critical thinking skills that improve through continuous training (Podsakoff et al., 2016; Shalley & Gilson, 2017). Consequently, a longitudinal design would provide deeper insights into the changes in the relationships between leadership, training, and innovation over time.

Additionally, this study relies on self-reported data from respondents, which carries the risk of bias in the data. Although self-reported questionnaires are often used in organizational research due to their practicality and cost-effectiveness, research indicates that this method is susceptible to social desirability bias and respondents' inclination to provide "correct" or desired answers (Podsakoff et al., 2016). Such bias can affect the validity of the findings, especially for variables like job satisfaction and critical thinking skills, which are subject to subjective perceptions. Therefore, future research is recommended to supplement self-reported data with objective or observational data to enhance the validity of the results.

Another limitation of this study is the lack of analysis of contextual factors that might influence the outcomes. This study assumes that the effects of leadership, training, and resources apply universally across various organizational contexts. However, previous research indicates that factors such as organizational culture and industry characteristics can affect the effectiveness of leadership and training programs (Tsai & Tseng, 2020). For instance, in highly regulated industries such as manufacturing, creativity may be less valued compared to more flexible industries like technology. The inability to account for these contextual variations represents a limitation in the generalizability of the findings, and future research should consider context to better understand how these variables interact under different conditions.

This study also has limitations regarding the measurement of critical thinking skills, which were only assessed through subjective questionnaires without additional objective measurement tools. Critical thinking literacy requires in-depth assessment, which may not be fully captured through standard questionnaires, and this study did not utilize specialized tests that could provide a more accurate depiction of employees' critical thinking abilities. Paul and Elder suggest that critical thinking should ideally be assessed through direct observation of problem-solving or strategic decision-making rather than self-reported measures (Paul & Elder, 2016). Therefore, the findings on critical thinking skills in this study may still have limitations in terms of accuracy.

Furthermore, the study's focus on a few key variables, such as leadership, training, and resources, may have overlooked other variables that could potentially influence creativity and innovation, such as job autonomy and organizational commitment. Job autonomy, for example, has been shown to play an essential role in enhancing

intrinsic motivation, which supports innovation (Bakker & Albrecht, 2018). Organizational commitment also contributes to fostering a sense of belonging that encourages employees to contribute to corporate innovation. As such, the results of this study may only capture a subset of the relevant factors supporting workplace creativity, and future studies should include additional variables to provide a more comprehensive view.

Limitations in the use of path analysis methods with the SmartPLS approach also need to be considered. While path analysis allows for the identification of relationships between variables structurally, this method has limitations in directly testing causal effects. It cannot capture the complexity of relationships that might emerge in the dynamic interaction of variables. For instance, the effects of leadership might influence employees gradually and indirectly through layered mediation processes. Some studies suggest using more complex methods, such as Structural Equation Modeling (SEM), to understand deeper relationships between these variables (Hair et al., 2017).

Finally, limitations in sample selection might also affect the generalizability of this study's findings. The sample in this study may not represent the entire workforce population's diversity across various industry sectors. This study focuses on a single sector or a few specific organizations, resulting in findings that may be more relevant to similar contexts and less applicable to industries or organizations with different characteristics. A more diverse sample in future research is necessary to ensure higher external validity of the findings, allowing for broader application of the results.

Practical Implications for Management and Organizational Development

The findings of this study emphasize the importance of supportive leadership as a key factor in fostering creativity and innovation in the workplace. The practical implication for management is the necessity of building a more participative and transformative leadership style, where leaders can provide inspiration and emotional support to employees. For instance, research by Lee et al. (2019) demonstrates that leaders who encourage participation and provide positive feedback enhance employee engagement in creative processes (Lee et al., 2019). By adopting this approach, management can create a work environment where employees feel supported and motivated to innovate.

Training and developing employees' skills also play a critical role in enhancing their creative capacity. In this context, organizations are advised to design training programs that focus not only on technical skills but also on developing critical thinking abilities. This finding aligns with research by Noe and Kodwani (2018), which highlights that training that includes cognitive development can enhance employees' innovative capacities (Noe & Kodwani, 2018). Thus, companies can improve the effectiveness of their training programs by emphasizing the development of critical thinking skills relevant to employees' work needs, ultimately leading to a positive impact on the organization's innovation level.

This study also demonstrates that adequate resource availability significantly impacts employee creativity and innovation. Therefore, organizations must ensure that employees have sufficient access to the resources needed to develop new ideas. These resources include not only adequate budgets and time but also the technology and facilities that support the innovation process. Shalley and Gilson (2017) note that access to adequate resources allows employees greater freedom to experiment without being constrained by limitations (Shalley & Gilson, 2017). Implementing policies that ensure sufficient resource availability can boost employee motivation to engage in creative projects.

Job satisfaction, as an intervening variable in this study, provides critical insights for organizational development. The findings indicate that employees who are satisfied with their jobs tend to be more involved in innovative efforts. The practical implication is that organizations need to pay attention to factors influencing job satisfaction, such as work-life balance, recognition of achievements, and comfortable working conditions. Research by Bakker and Albrecht (2018) shows that employees who are satisfied with their jobs exhibit greater emotional engagement, which motivates them to contribute more significantly to achieving organizational goals (Bakker & Albrecht, 2018).

Critical thinking skills also have a significant impact on driving innovation. Based on these findings, organizations can strengthen the development of employees' critical thinking skills through specialized training and problem-based learning approaches. Paul and Elder (2016) suggest that critical thinking enables employees to evaluate ideas more objectively and reduce bias in decision-making (Paul & Elder, 2016). Thus, companies can integrate exercises that stimulate critical thinking into their training programs, such as case simulations or group discussions. This approach will enhance employees' abilities to identify innovation opportunities and tackle challenges more effectively.

Regarding leadership, this study provides a foundation for developing leadership programs focused on cultivating an innovation-driven culture. Leaders can be trained to understand the importance of creating an environment that supports creativity, such as giving employees the space to experiment and take measured risks. García-Morales et al. (2018) indicate that leaders who grant freedom and encouragement for employees to develop

their ideas tend to be more successful in driving innovation (García-Morales et al., 2018). By involving leaders in training programs centered on developing an innovative culture, organizations can create teams that are more responsive to change and more proactive in finding creative solutions.

Finally, this study offers critical implications for organizational policies aimed at long-term development. Companies may consider adopting an integrative approach where leadership, training, resources, and job satisfaction are viewed as interconnected elements in fostering an innovative culture. This approach recognizes that innovation is not the result of a single factor but the interaction of various mutually influencing aspects. By implementing this holistic strategy, organizations not only enhance their innovation potential but also create a work environment that supports employees' professional development sustainably.

Future Research Directions

The findings of this study open up several opportunities for future research, particularly in deepening the understanding of the dynamics of leadership, training, and resources in fostering innovation. One important direction for future research is to conduct longitudinal studies to observe the development of the impact of leadership, training, and resource availability on employee creativity over time. As suggested by Shalley and Gilson (2017), the effects of these factors on creativity may change as employees grow and develop within the organization (Shalley & Gilson, 2017). Longitudinal studies would provide deeper insights into how these relationships adapt to changes in organizational conditions or strategies.

Future research can also expand the scope to include contextual variables such as organizational culture and industry characteristics, which may moderate the relationship between leadership and innovation. The results of this study show that supportive leadership positively affects employee creativity, but its effectiveness may vary across different industries. For example, Tsai and Tseng (2020) suggest that industries requiring strict compliance, such as manufacturing, might require a different leadership style compared to creative industries like technology or media (Tsai & Tseng, 2020). Therefore, future research could explore how industry characteristics influence the effectiveness of leadership styles in driving innovation.

In addition, there is a need to explore the role of digital technology and automation in supporting creativity and innovation in the workplace. With the increasing use of technology in various aspects of work, it is essential to understand how technology can function as a resource that supports creativity. According to Amabile et al. (2016), access to the latest technologies such as artificial intelligence and data analytics can enrich innovative ideas and accelerate the process of developing new products (Amabile & Pratt, 2016). Thus, future research could examine the impact of digital technology as a creative resource and explore how training focused on digital skills can support innovation.

The role of critical thinking skills as a mediator in the relationship between training and innovation also presents opportunities for further research. The findings of this study indicate that training that develops critical thinking skills can enhance employees' innovative capacity, but further research is needed to explore the most effective training strategies. Paul and Elder (2019) suggest that critical thinking can be enhanced through problem-based learning or simulations, and future research could test various training methods to determine the most effective approach for developing these skills (Paul & Elder, 2016).

Furthermore, this study recommends that future research consider additional variables such as job autonomy and organizational commitment, which may significantly influence creativity. This study finds that job satisfaction plays an important role in strengthening the relationship between leadership and innovation, but future research could expand this model by including job autonomy as a moderating variable. Bakker and Albrecht (2018) show that job autonomy supports intrinsic motivation that impacts creativity, so adding this variable to the model could provide a more holistic understanding of the factors that support innovation (Bakker & Albrecht, 2018).

There is also an opportunity to explore the impact of the combination of organizational factors in building a conducive creative climate. This study shows that leadership, training, and resources work synergistically to create an environment that supports innovation, but there have been no studies that specifically examine the optimal combination of these factors in different contexts. According to García-Morales et al. (2018), creating a creative climate requires a combination of supportive leadership, sufficient resources, and appropriate skill development policies (García-Morales et al., 2018). Thus, future research could examine the interactions between these factors to identify the best combinations that can be applied in various organizational contexts.

The conclusion of this study highlights that supportive leadership, quality training and development programs, and the availability of adequate resources significantly influence employee creativity and innovation. Transformational leadership effectively creates a collaborative and supportive work environment, thereby facilitating the development of new ideas. Well-structured training, particularly those focusing on the development of technical skills and critical thinking, has been proven to enhance employees' capacity for innovation. The

availability of resources, such as budget, time, and facilities, also plays a crucial role in supporting creative processes and the implementation of innovation.

Additionally, job satisfaction was found to be a critical factor that not only enhances employee engagement but also strengthens the relationship between leadership, training, and innovation. Employee job satisfaction acts as a catalyst in motivating them to deliver greater creative contributions. Critical thinking skills were also found to be a significant mediator in the relationship between training and innovation, enabling employees to effectively evaluate and develop new ideas.

This research contributes theoretically by reinforcing the relevance of transformational leadership theory, learning theory, and the resource-based view (RBV) in the context of organizational innovation. Practically, the findings underline the importance of designing human resource development strategies that include strengthening leadership, training, and resource optimization to foster an innovative work culture. Future research is recommended to consider contextual factors such as organizational culture and industry characteristics and to use longitudinal designs to examine the dynamics of the relationships between variables over time.

CONCLUSION

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Review NOTES :

1. Add the results of your hypothesis testing in the results section, according to your research objectives
2. In the “methodology” section, specifically, You need to provide more details regarding how you analyze the data