

THE INFLUENCE OF DIGITAL-BASED TRAINING AND TECHNICAL COMPETENCE ON HUMAN RESOURCE COMPETITIVENESS THROUGH TECHNOLOGY READINESS AT PT PLN (PERSERO) ULP DUMAI CITY

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ABSTRACT

This study aims to explore how digital-based training and technological skills impact human resource competitiveness, with technological readiness as a mediating factor at PT PLN (Persero) ULP Dumai Kota. A quantitative methodology was employed for this study, employing a survey approach. The participant group consisted of 80 workers selected through a saturated sampling method. The data were processed and analyzed using Partial Least Squares (PLS) techniques. The results indicate that digital training and technical skills positively and significantly influence human resource competitiveness. Furthermore, both factors positively and significantly influence technological readiness. However, technological readiness did not significantly impact human resource competitiveness and therefore did not serve as a mediating factor in the relationship between digital training and technical skills on human resource competitiveness. This research is expected to contribute to the advancement of human resource management, particularly in enhancing employee competitiveness by focusing on improving digital training and strengthening technical skills.

Introduction

During the era of globalization and the Fourth Industrial Revolution, advances in digital and information technology have caused significant changes in various areas of life, particularly in industry and business. Digital transformation not only impacts manufacturing methods and service frameworks but also directly impacts the skills and competitiveness of the workforce. Organizations that effectively utilize technology can enjoy a market advantage, while those that hesitate to embrace technological advancements risk losing their competitive status. PT PLN (Persero), which plays a role as the national electricity supplier, is crucial in providing reliable and high-quality electricity to every Indonesian citizen. The effectiveness of this role depends heavily on the quality of its human resources. Skilled human resources must possess technical capabilities and the ability to adapt to changes in the workplace, including the integration of advanced technology (Hasibuan, 2017). The competitiveness of human resources is crucial because it relates to an individual's potential to effectively help achieve organizational goals and strengthen the company's position in the energy sector (Hasibuan, 2017).

Improving the quality and competitiveness of human resources can be achieved through digital-based training programs. Such training provides scheduling flexibility, easy access to learning resources, and interactive teaching methods tailored to employee needs. Compared with traditional training approaches, digital training is considered more efficient in improving employee knowledge, skills, and work attitudes because it can be used anytime and anywhere (Noe et al., 2019). Furthermore, digital training allows staff to learn at their own pace, thus encouraging the development of job-specific technical skills (Noe et al., 2019). In addition to digital training, technical expertise is also a crucial element in enhancing workforce competitiveness. Technical competence encompasses employees' knowledge, skills, and abilities in performing specific tasks in the electrical field, such as operating equipment, maintaining networks, and managing electrical systems. Strong technical expertise enables staff to carry out their tasks more efficiently and accurately, which in turn increases productivity and enhances the quality of services provided by the company (Robbins & Judge, 2020).

However, the effectiveness of technology-based training and technical skill enhancement cannot be seen separately from employees' technological readiness. Technological readiness reflects an individual's skills, understanding, and mindset in using technology to assist their work tasks. A strong level of technological readiness can help employees adapt to digital change, reduce resistance to new methods, and accelerate the use of skills learned in training (Venkatesh et al., 2019). Technological readiness can serve as a crucial link between digital training, technical skills, and human resource competitive advantage (Venkatesh et al., 2019). At PT PLN (Persero) ULP Dumai Kota, workers are required to carry out their tasks efficiently and effectively using modern technology. Although technology-based training has been initiated, its success in improving human resource competitiveness still requires further investigation. This is crucial to ensure that the training provided and technical skill development align with employees' technological readiness levels, thereby truly enhancing competitiveness at both the individual and organizational levels (Venkatesh et al., 2019). Furthermore, human resource competitiveness is crucial for driving organizational success, including increased productivity, innovation, and improved customer service quality. With skilled human resources ready to face technological challenges, PT PLN (Persero) aims to strengthen its role as a reliable and adaptive energy supplier in the face of digital advancements. Therefore, this study is crucial to evaluate how digital training and technical skills impact human resource competitiveness through technological readiness, thus laying the foundation for designing more effective and sustainable human resource development strategies.

Problem Formulation

1. Does digital-based training have a positive and significant effect on human resource competitiveness at PT PLN (Persero) ULP Dumai Kota?
2. Does technical competence have a positive and significant effect on human resource competitiveness at PT PLN (Persero) ULP Dumai Kota?
3. Does digital-based training have a positive and significant effect on employee technology readiness at PT PLN (Persero) ULP Dumai Kota?
4. Does technical competence have a positive and significant effect on employee technology readiness at PT PLN (Persero) ULP Dumai Kota?

5. Does technology readiness have a positive and significant effect on human resource competitiveness at PT PLN (Persero) ULP Dumai Kota?
6. Does digital-based training have a positive and significant effect on human resource competitiveness through Technology Readiness at PT PLN (Persero) ULP Dumai Kota?
7. Does technical competence have a positive and significant effect on human resource competitiveness through Technology Readiness at PT PLN (Persero) ULP Dumai Kota?

Research Objectives

1. To test and analyze the effect of Digital-Based Training on Human Resource Competitiveness at PT PLN (Persero) ULP Dumai Kota.
2. To test and analyze the effect of Technical Competence on Human Resource Competitiveness at PT PLN (Persero) ULP Dumai Kota.
3. To test and analyze the effect of Digital-Based Training on Employee Technology Readiness at PT PLN (Persero) ULP Dumai Kota.
4. To test and analyze the effect of Technical Competence on Employee Technology Readiness at PT PLN (Persero) ULP Dumai Kota.
5. To test and analyze the effect of Technology Readiness on Human Resource Competitiveness at PT PLN (Persero) ULP Dumai Kota.
6. To test and analyze the effect of Digital-Based Training on Human Resource Competitiveness through Technology Readiness at PT PLN (Persero) ULP Dumai Kota.
7. To test and analyze the effect of Technical Competence on Human Resource Competitiveness through Technology Readiness at PT PLN (Persero) ULP Dumai Kota.

Literature Review

Human Resource Competitiveness

According to Becker et al. (2016), HR competitiveness is also influenced by the ability to adapt to technology and innovation in the work environment. According to Porter (2016), HR competitiveness is strongly influenced by the abilities, knowledge, and skills possessed by individuals to contribute to the organization's competitive advantage.

Indicators of HR Competitiveness according to Porter (2016):

1. Quality of Education and Training: Level of formal and non-formal education possessed.
2. Work Experience: Length and relevance of work experience to the job.
3. Adaptability: Ability to adapt to changes in technology and the work environment.

Factors Influencing HR Competitiveness

According to Venkatesh et al. (2016), Human resource (HR) competitiveness is influenced by several factors including:

1. Competence, a combination of knowledge, skills, and attitudes that support effective performance.
2. Innovation and Creativity, the ability to create new ideas and adapt to changes in the work environment.
3. Technology and Digital Skills, mastery of information technology and the ability to utilize digital systems in work.
4. Education and Training, improving HR quality through continuous learning.

5. Motivation and Commitment , individual enthusiasm and loyalty to organizational goals.
6. Leadership , the role of leaders in developing HR potential and creating a competitive environment.

Digital-Based Training

According to Salas et al. (2016), digital training can increase learning effectiveness because participants can learn independently according to their own pace and needs. According to Noe (2016), digital-based training (e-learning) allows participants to acquire knowledge and skills through electronic media, which supports learning efficiency and accessibility.

Indicators of Digital-Based Training according to Salas et al. (2016):

1. Accessibility: Ease of participants in accessing training materials digitally.
2. Interactivity: Level of participant involvement in digital learning activities.
3. Resource Availability: Adequacy of available devices, applications, and internet networks.

Technical Competence

According to Boyatzis (2016), technical competence determines an individual's ability to complete work according to professional standards. According to Spencer & Spencer (2016), technical competence includes measurable knowledge, skills, and abilities to carry out work effectively.

Indicators of Technical Competence according to Spencer & Spencer (2016):

1. Technical Knowledge: Understanding of theories, principles, and procedures relevant to the work.
2. Practical Skills: Ability to apply knowledge in daily work.
3. Professional Attitude: Dedication, responsibility, and work ethic.

Technology Readiness

According to Venkatesh et al. (2016), individuals with high technology readiness tend to adopt new technologies faster and apply them effectively in work. According to Parasuraman (2016), technology readiness includes optimism, innovation, and dependence on technology in achieving goals.

Indicators of Technology Readiness according to Venkatesh et al. (2016):

1. Optimism: Positive view towards the benefits of technology.
2. Innovation: Openness to using new technologies.
3. Technology Dependence: Level of dependence on technology in work activities.

Conceptual Framework

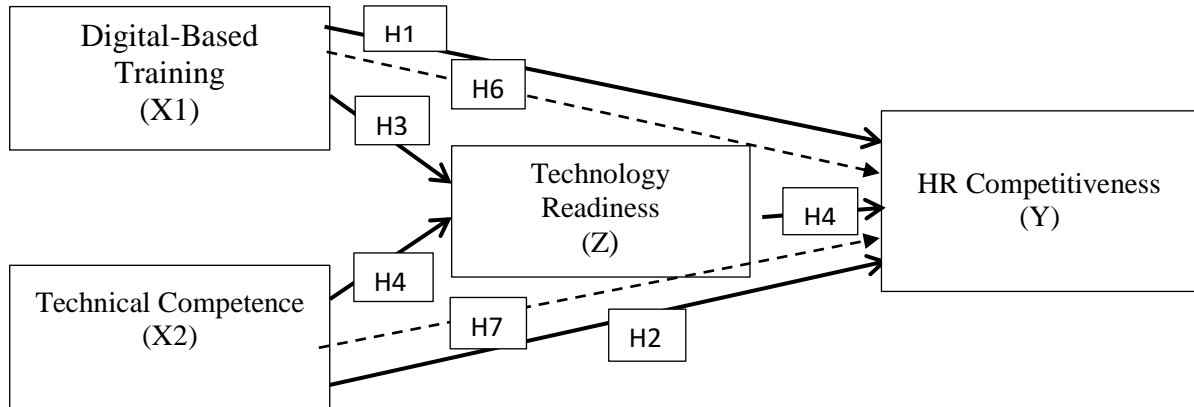


Figure 1 : Conceptual Framework

Research Hypotheses

1. Digital-based training has a positive and significant effect on Human Resource Competitiveness at PT PLN (Persero) ULP Dumai Kota.
2. Technical competence has a positive and significant effect on Human Resource Competitiveness at PT PLN (Persero) ULP Dumai Kota.
3. Digital-based training has a positive and significant effect on Technology Readiness at PT PLN (Persero) ULP Dumai Kota.
4. Technical competence has a positive and significant effect on Technology Readiness at PT PLN (Persero) ULP Dumai Kota.
5. Technology readiness has a positive and significant effect on Human Resource Competitiveness at PT PLN (Persero) ULP Dumai Kota.
6. Digital-based training has a positive and significant effect on Human Resource Competitiveness through Technology Readiness at PT PLN (Persero) ULP Dumai Kota.
7. Technical competence has a positive and significant effect on Human Resource Competitiveness through Technology Readiness at PT PLN (Persero) ULP Dumai Kota.

Research Methodology

Research Type

According to Sekaran and Bougie (2018), quantitative research is used to test theories by measuring research variables with numbers and analyzing data using statistical procedures. This approach is used because this study aims to measure how much influence Digital-based training (X1) and Technical competence (X2) have on Human Resource Competitiveness (Y) through Technology Readiness (Z) with the help of SmartPLS 3.0 software.

Research Location and Time

This research was conducted at PT PLN (Persero) ULP Dumai Kota, Riau Province, Jl. Jendral Sudirman No. 173, Bintan Village, Dumai Kota District, Dumai City. The research was conducted from November to December 2025.

Research Population

According to Sekaran and Bougie (2018), population is the entire group of people, events, or things of interest to the researcher for study and serves as the basis for drawing conclusions. In this study, the population consists of all 80 employees of PT PLN (Persero) ULP Dumai Kota who are directly involved in operational activities and the application of digital technology.

Research Sample

The technique used in this study is saturated sampling (census sampling), which is a sampling technique that uses all members of the population as respondents because the population size is relatively small. Thus, the sample size in this study is all 80 employees of PT PLN (Persero) ULP Dumai Kota.

Data Types and Sources

The data for this study is categorized into two forms: primary data and secondary data (Cooper & Schindler, 2018).

1. Primary Data, namely information collected directly from respondents through questionnaires distributed to employees of PT PLN (Persero) ULP Dumai Kota.
2. Secondary Data, which consists of information sourced from company documents, annual reports, and various libraries such as academic journals, books, and relevant online resources.

The type of data used in this study is quantitative data, specifically numerical data collected from respondents' answers to questionnaire questions, which are assessed using a Likert scale.

Method of collecting data

Data collection methods refer to the techniques researchers use to systematically gather the necessary information from participants (Sekaran & Bougie, 2018). The data collection methods used in this study are:

1. Questionnaire, which is a collection of written questions given to participants to collect information regarding digital-based training, technical competence, technological readiness, and human resource competitiveness.
2. Documentation Review, which involves collecting secondary data from official company documents, reports, and academic resources relevant to the research.

Data Analysis Methods

In this study, the technique used for data analysis was the Partial Least Squares–Structural Equation Modeling (PLS-SEM) approach, which was conducted using SmartPLS software version 3.0. PLS-SEM is a method for multivariate analysis that allows simultaneous estimation of the relationship between latent variables and their related indicators (Hair et al., 2018). This technique is considered suitable for exploratory studies, especially when dealing with non-normally distributed data and having a relatively small sample size (Hair et al., 2018).

The data analysis process using SmartPLS takes place in two main phases:

1. External Model (Measurement Model)

The external model assesses the validity and reliability of the construct created by the latent variable indicators.

- a. Convergent validity is evaluated by looking at the factor loading values and Average Variance Extracted (AVE).
- b. Discriminant validity was investigated through the Fornell-Larcker Criterion and Cross-Loading values.
- c. Construct reliability was examined by examining Composite Reliability (CR) and Cronbach's Alpha values.

2. Internal Model (Structural Model)

The internal model serves to explore the relationship between latent variables, including direct and indirect effects mediated by other variables, by considering the path coefficient and R-Square values.

Hypothesis Testing

The hypothesis testing process involves analyzing the t-statistic and p-value generated from SmartPLS output. The criteria for making a decision on a hypothesis indicate that the hypothesis is accepted. If the t-statistic is above 1.96 and the p-value is below 0.05, this indicates a significant impact between the research variables (Hair et al., 2018).

Results and Discussion

External model evaluation, also known as measurement model evaluation, is conducted to assess how accurately the indicators represent the latent construct being studied. The purpose of this evaluation is to verify that each indicator accurately describes the exogenous variable measured through its factor loading values. During the initial testing phase, an indicator is considered to meet the reflective criteria if its factor loading value exceeds 0.60. Consequently, the indicator is recognized as appropriate and effectively reflects the construct being assessed (Ghozali, 2016).

Figure 1 shows the findings of the external model evaluation, which illustrates the relationship between the indicators and the research constructs.

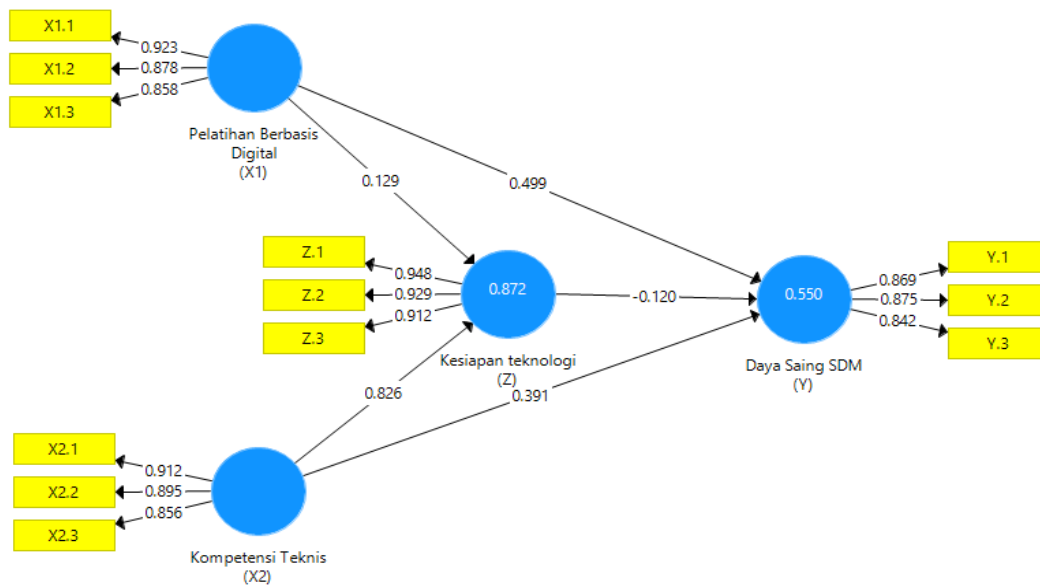


Figure 2. Outer Model

Source; Smart PLS 3.3.3.

The Smart PLS output for loading factor gives the results in the following table: Outer Loadings In this study there is an equation and the equation consists of two substructures for substructure 1

$$Z = b1X1 + b2X2 + e1$$

$$Z = 0.129 + 0.826 + e$$

For substructure 2

$$Y = b2X1 + b3X2 + b4Z + e2$$

$$Y = 0.499 + 0.391 - 0.120 + e$$

Table 1. Outer Loadings

	Human Resource Competitiveness_(Y)	Technology readiness (Z)	Technical Competence (X2)	Digital Based Training_(X1)
X1.1				0.923
X1.2				0.878
X1.3				0.858
X2.1			0.912	
X2.2			0.895	
X2.3			0.856	
Y.1	0.869			
Y.2	0.875			
Y.3	0.842			
Z.1		0.948		
Z.2		0.929		
Z.3		0.912		

Source; Smart PLS 3.3.3.

The outer loading evaluation results show that each indicator related to the variables Digital-Based Training (X1), Technical Competence (X2), Technology Readiness (Z), and Human Resource Competitiveness (Y) has an outer loading value above 0.70. These results indicate that each indicator meets the validity and reliability standards to reflect the construct being measured, thus allowing all indicators to proceed to the next phase of model analysis.

Discriminant Validity

Discriminant validity in a measurement model using reflective indicators is assessed by examining the cross-loading value along with the comparison of the square root of the Average Variance Extracted (AVE) with the correlation value between constructs. A construct is considered to have strong discriminant validity when the AVE value exceeds the correlation with other constructs. Furthermore, the value obtained from this assessment is expected to exceed 0.70 for the model to achieve the required standard for adequate discriminant validity. The results of the cross-loading test, which serves as the basis for evaluating discriminant validity, are shown in the table below.

Table .2. Discriminant Validity

	Human Resource Competitiveness_(Y)	Technology readiness (Z)	Technical Competence (X2)	Digital Based Training_(X1)
X1.1	0.662	0.769	0.749	0.923
X1.2	0.604	0.703	0.695	0.878
X1.3	0.650	0.648	0.711	0.858
X2.1	0.730	0.826	0.912	0.767
X2.2	0.570	0.855	0.895	0.695
X2.3	0.507	0.799	0.856	0.694
Y.1	0.869	0.513	0.599	0.633
Y.2	0.875	0.542	0.540	0.579
Y.3	0.842	0.603	0.622	0.645
Z.1	0.597	0.948	0.898	0.750
Z.2	0.647	0.929	0.878	0.734
Z.3	0.542	0.912	0.816	0.744

Source; Smart PLS 3.3.3.

The results of the discriminant validity test indicate that each indicator exhibits the highest loading value on the construct it is intended to measure compared to other constructs. This indicates that all variables examined in the study meet discriminant validity standards, allowing each construct to clearly identify its attributes from other constructs within the research framework.

Composite Reliability

As stated by Haryono (2017), a construct is considered reliable when its composite reliability score is ≥ 0.7 , which indicates a satisfactory level of reliability, while a score \geq

0.8 indicates an extraordinary level of reliability. The results of the composite reliability assessment in this study are shown in the following table.

Table 3. Composite Reliability

	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Human Resources Competitiveness_(Y)	0.828	0.897	0.743
Technology readiness (Z)	0.921	0.950	0.864
Technical Competence (X2)	0.866	0.918	0.789
Digital Based Training_(X1)	0.864	0.917	0.786

Source; Smart PLS 3.3.3.

The analysis results show that all research factors achieved Cronbach's Alpha and Composite Reliability scores greater than 0.70, with an Average Variance Extracted (AVE) score above 0.50. These results indicate that each element meets the requirements for reliability and convergent validity, making it suitable to proceed to the structural model testing stage.

Analysis of Inner Model

A structural model (internal model) assessment is conducted to ensure that the conceptual framework developed has an adequate level of accuracy and stability. This evaluation focuses on several key indicators, one of which is the coefficient of determination.

Coefficient of Determination (R²)

The coefficient of determination (R²) is used to evaluate how well the model explains variation in endogenous variables. A model is considered strong if R² ≥ 0.70, moderately effective if R² ≥ 0.45, and weak if R² ≥ 0.25. The results of the R² calculation in this study are shown as follows:

Table 4. R Square Results

	R Square	Adjusted R Square
Human Resource Competitiveness_(Y)	0.550	0.532
Technology readiness (Z)	0.872	0.868

Source; Smart PLS 3.3.3.

The R-squared statistic shows that 55.0% of the HR Competitiveness (Y) variable is explained by the independent variables in the model, while 45.0% is influenced by other factors not included in this study. Furthermore, the Technology Readiness (Z) variable achieved an R-squared value of 87.2%, indicating that most of the changes in this variable can be explained by the elements in the research model. These results indicate that the model has a strong ability to explain the results, especially regarding the Technology Readiness variable.

Hypothesis Testing

Hypothesis testing is conducted by examining the significance of the path coefficients between constructs in the model. The bootstrapping or jackknifing method is used to assess the level of significance of this relationship. The obtained t-statistic is then compared with the value in the t-table. The path coefficient is considered significant at the 5% level if the t-statistic exceeds 1.96. In this study, three hypotheses were evaluated, and the results of each hypothesis are shown as follows:

Table .5 . Path Coefficients (Influence Direct)

	Original Sample (O)	T Statistics (O/STDEV)	P Values	Results
Technology readiness (Z) -> Human Resources Competitiveness_(Y)	-0.120	0.508	0.306	Rejected
Technical Competence (X2) -> Human Resource Competitiveness_(Y)	0.391	1,875	0.031	Accepted
Technical Competence (X2) -> Technology Readiness (Z)	0.826	16,323	0,000	Accepted
Digital-Based Training_(X1) -> Human Resource Competitiveness_(Y)	0.499	4,773	0,000	Accepted
Digital Based Training_(X1) -> Technology Readiness (Z)	0.129	2,228	0.013	Accepted

Source; Smart PLS 3.3.3.

1. Impact of Technological Readiness (Z) on Human Resource Competitiveness (Y) The findings indicate that technological readiness does not have a significant influence on human resource competitiveness, as reflected in the T statistic of 0.508 and the p value of 0.306 (>0.05). Consequently , this hypothesis is rejected.
2. The Impact of Technical Competence (X2) on Human Resource Competitiveness (Y) Technical competence has a positive and significant effect on human resource competitiveness, as evidenced by a coefficient of 0.391, a T statistic of 1.875, and a p-value of 0.031 (<0.05). Thus, this hypothesis is accepted.
3. Impact of Technical Competence (X2) on Technological Readiness (Z) The results of the analysis show that technical competence has a positive and significant effect on technological readiness, with a T statistic of 16.323 and a p value of 0.000. Therefore, this hypothesis is accepted.
4. Impact of Digital-Based Training (X1) on Human Resource Competitiveness (Y) Digital-based training has been found to have a positive and significant effect on human resource competitiveness, as indicated by the T statistic of 4.773 and a p-value of 0.000 (<0.05). Therefore, this hypothesis is accepted.
5. Impact of Digital-Based Training (X1) on Technology Readiness (Z) The results show that digital-based training has a positive and significant impact on technology readiness, as reflected in the T statistic of 2.228 and a p-value of 0.013 (<0.05). Consequently, this hypothesis is accepted.

Table .6 . Path Coefficients (Influence No Direct)

	Original Sample (O)	T Statistics (O/STDEV)	P Values	Results
Technical Competence (X2) -> Technology Readiness (Z) -> Human Resource Competitiveness_(Y)	-0.099	0.501	0.308	Rejected
Digital-Based Training_(X1) -> Technology Readiness (Z) -> Human Resource Competitiveness_(Y)	-0.016	0.488	0.313	Rejected

Source; Smart PLS 3.3.3.

1. The test results show that the influence of Technical Competence on Human Resource Competitiveness through Technological Readiness has a coefficient of -0.099, a T statistic of 0.501, and a p-value of 0.308. This finding does not meet the significance criteria, which leads to the conclusion that Technological Readiness cannot mediate the relationship between Technical Competence and Human Resource Competitiveness.
2. In addition, the impact of Digital-Based Training on Human Resource Competitiveness through Technological Readiness is reflected in the coefficient of -0.016, with a T statistic of 0.488 and a p-value of 0.313. This result is also considered insignificant, indicating that Technological Readiness fails to act as a mediator in the relationship between Digital-Based Training and Human Resource Competitiveness.

Conclusion

Based on the research findings, the researcher will come to the following conclusions:

1. Relationship between Technological Readiness and Human Resource Competitiveness: Technological readiness does not have a significant effect on human resource competitiveness; therefore, the hypothesis is rejected.
2. Relationship between Technical Competence and Human Resource Competitiveness: Technical competence has a positive and significant impact on human resource competitiveness; therefore, the hypothesis is accepted.
3. Relationship between Technical Competence and Technological Readiness: Technical competence has a positive and significant effect on technological readiness; consequently, the hypothesis is accepted.
4. Relationship between Digital-Based Training and Human Resource Competitiveness: Digital-based training shows a positive and significant influence on human resource competitiveness; thus, the hypothesis is accepted.
5. Relationship between Digital-Based Training and Technology Readiness: Digital-based training has a positive and significant effect on technology readiness; therefore, the hypothesis is accepted.
6. Indirect Effect of Technical Competence through Technological Readiness: Technological readiness is unable to mediate the effect of technical competence on human resource competitiveness; therefore, the hypothesis is rejected.
7. Indirect Effect of Digital-Based Training through Technological Readiness: Technological readiness does not act as a mediating factor in the impact of digital-

based training on human resource competitiveness; therefore, the hypothesis is rejected.

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