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Multiple Mediation Analysis of Recruitment Effects on Employee Performance: The Roles of Training, Engagement, And Technology Adoption in a University Setting

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ABSTRACT: Employee performance is a key determinant of educational quality, influenced by various organizational and individual factors. This study aims to analyze the effect of Recruitment Analysis on Employee Performance, mediated by Work Attachment, Development and Training, and Technology Adoption, with Productivity serving as an ultimate mediator. The research adopts a quantitative approach using Structural Equation Modeling (SEM) with a multiple mediation framework involving three path analyses. The study utilizes secondary data from Wulandari (2024), with the population consisting of Employees from several educational institutions. The sample was selected through a purposive sampling technique. Data were collected using a structured questionnaire and analyzed using SEM with path analysis to test both direct and indirect effects. The findings reveal that Recruitment Analysis positively and significantly influences Work Attachment, Development and Training, and Technology Adoption. Furthermore, Technology Adoption has a positive and significant impact on both Productivity and Employee Performance. Productivity also exerts a positive and significant effect on Employee Performance. The study concludes that direct effects contribute more strongly than indirect effects, although the indirect pathway through Development and Training remains statistically significant. The novelty of this research lies in integrating three mediating constructs within a multiple-path SEM model to explain Employee performance comprehensively, highlighting the pivotal role of productivity as a final mediator linking recruitment quality, professional development, and technological adaptation in the educational context.

KEYWORDS: Employee performance, productivity, technology adoption, development and training, job engagement, and recruitment analysis, as well as multiple mediations.

I. INTRODUCTION

Employee performance is a phenomenon in the field of human resources that is always interesting to discuss, both for practitioners and researchers. The existence of Employees who work efficiently and productively is a key determinant of whether a company can achieve its established goals and vision. As the business world evolves, Employee performance evaluation is no longer just about completing routine tasks, but also involves the extent to which Employees are able to adapt to change, be innovative, and contribute holistically to the company's progress (Franken et al., 2021). However, despite the growing attention to Employee performance, studies still show inconsistency in identifying which school factors most strongly influence it. Some research emphasizes individual factors such as satisfaction or motivation, while others highlight school practices such as recruitment and training. This inconsistency opens an important gap for further investigation.

The Employee performance appraisal process is essential as it has a significant impact on individual rewards, promotions, or career development. Furthermore, this assessment reflects how effective human resource management is in managing and optimizing Employee potential to achieve common goals. The link between performance evaluation and the success of HR management is becoming increasingly crucial in a dynamic and competitive business era (Anwar & Abdullah, 2021). Therefore, understanding the antecedents that shape Employee performance within modern HR systems becomes crucial to ensure effective talent management strategies.

In the context of human resource discussions, a number of factors have a substantial influence on Employee performance. Job satisfaction, for example, has been proven to be an important catalyst in increasing Employee productivity and dedication to

their work (Soomro & Shah, 2019). In addition, clarity of corporate objectives, effective communication, training and development, and school fairness are all key elements that shape an optimal Employee performance ecosystem (Jhamb et al., 2021). Nevertheless, previous studies have tended to examine these factors separately, without integrating how they interact or mediate each other in influencing performance outcomes. This indicates the need for a more comprehensive model that connects HR practices holistically.

Performance can be defined as the extent to which individuals or groups successfully carry out their assigned tasks and responsibilities with measurable efficiency and effectiveness (Rivaldo & Nabella, 2023). This performance evaluation includes an analysis of Employees' contributions to the achievement of company goals, their ability to complete tasks with the expected level of quality, and the positive impact they have on the company's vision and mission (Drewniak et al., 2020). Performance also includes the dimensions of adaptability, innovation, and the ability to adapt to changes in a dynamic business environment. The performance evaluation process provides a basis for human resource management in its efforts to manage, develop, and motivate Employees to achieve optimal, measurable results (Anwar & Abdullah, 2021). However, there remains limited empirical evidence explaining how early HR processes such as recruitment analysis can indirectly influence Employee performance through mediating mechanisms such as training, engagement, and technology adoption.

Productivity is one of the important parameters that describe the efficiency and effectiveness of an organization or individual in achieving goals and producing desired outputs (Al-Swidi et al., 2021). This is closely related to the management of time, resources, and energy to achieve the best results in the context of the tasks or projects being carried out. High levels of productivity drive economic growth, innovation, and the competitiveness of a country or company. Productivity can be measured using various methods, such as output per hour worked, resource utilization rates, or the quality of the results produced. Efforts to increase productivity include improving work processes, optimizing workflows, developing skills, and applying technology and innovation(Mousa & Othman, 2020). Despite its importance, productivity improvement is often discussed as an outcome rather than being analyzed as part of a systematic HR framework, leaving a gap in understanding the indirect drivers behind it.

One important step in human resource management is recruitment analysis, which aims to determine and evaluate the effectiveness of a company's Employee recruitment strategy. This analysis allows organizations to assess the extent to which their recruitment approach meets the needs of the organization and matches the desired Employee profile. In addition, recruitment analysis makes it possible to find the most effective resources for recruitment, such as online portals, social media, recruitment agencies, or Employee referrals. By understanding the results of this analysis, companies can improve their recruitment tactics, speed up the selection process, and increase Employee retention (Allal-Chérif et al., 2021). Nevertheless, few studies have empirically explored how recruitment analysis not only impacts hiring outcomes but also sets the foundation for Employees' long-term performance. This justifies the selection of recruitment analysis as an independent variable in this study, as it may indirectly shape performance through mediating school factors.

Training and development are vital components of human resource management strategies that aim to improve Employee knowledge, skills, and competencies. By investing time and resources in relevant and targeted training programs, organizations can improve Employee productivity, efficiency, and work quality (Nisar et al., 2021). Training involves the delivery of new information and techniques, while development aims to encourage individual growth, facilitate careers, and meet the long-term goals of the organization. In addition to benefiting Employees by increasing their confidence and job satisfaction, training and development also strengthen the organization's competitiveness in an ever-changing and competitive job market. By supporting Employees in developing their skills and knowledge, organizations can achieve their long-term goals and build a skilled and trained team (Rampa & Agogué, 2021).

Employee engagement is an important indicator of the emotional connection and commitment that Employees have to their work, the company, and the overall goals of the organization. Employees who feel engaged tend to have higher job satisfaction, better retention rates, and more optimal performance. Factors that influence Employee engagement include transparent school communication, clarity of roles and expectations, opportunities for personal and professional growth, and a sense of appreciation for contributions made (Riyanto et al., 2021). Management that prioritizes Employee engagement by involving them in decision-making, listening to their input, and providing constructive feedback can create a constructive and supportive work environment. Employee engagement is not only about measuring their perceptions of their work, but also ensuring that the organization implements strategies that enable active participation and sustained engagement, creating an inclusive and productive work culture (Men et al., 2021). **In this study, engagement is considered a second mediator that strengthens the link between recruitment effectiveness and** Employee **performance through increased emotional commitment and motivation.**

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Technology adoption refers to the integration and implementation of technological innovations within an organization or individual to improve efficiency, productivity, and competitiveness. In an ever-evolving digital age, technology adoption has become a necessity to respond to global demands for change. Organizations that successfully adopt technology wisely can reap benefits such as faster data processing, better customer understanding, operational efficiency, and more innovative product or service development. However, challenges associated with technology adoption include school readiness, cultural change, Employee training, and risk management. It is important to understand that technology adoption is not just about implementing new tools or systems, but also about designing comprehensive strategies and effectively integrating technology into business processes and operational models to achieve the organization's long-term goals (Pal & Vanijja, 2020). Technology adoption is positioned as the third mediator in this model, as recruitment effectiveness can influence how well Employees accept and utilize new technologies to enhance performance outcomes. Hence, the study proposes an integrative framework connecting recruitment analysis, training, engagement, and technology adoption to Employee performance.

Based on the explanations above, the research seeks to answer the following problem formulation: how does recruitment analysis affect Employee performance, and how do training and development, Employee engagement, and technology adoption mediate this relationship? This study contributes theoretically by filling the gap in integrated HR performance models and practically by providing organizations with empirical insights to enhance HR strategies in the digital era.

LITERATURE REVIEW

A number of factors influence Employee performance, including motivation, competence, leadership, and work environment. The oldest theory of motivation proposed by (Maslow, 1954) provides insight into how psychological factors and personal needs influence motivation levels and, consequently, Employee performance. In addition, the level of competence and skills possessed by Employees, as well as the leadership style applied at the school level, also play an important role in shaping Employee performance. According to Human Capital Theory (Becker, 1964), Employees represent a form of capital whose productivity increases through education, training, and experience. This theoretical lens positions human resource management practices—such as recruitment, development, and training—as strategic investments that yield performance returns.

Employee performance measurement involves a systematic assessment and evaluation process. Traditional methods such as performance appraisal and rating scales are often used to provide an overview of individual performance. In addition, performance measurement can be carried out through an integrated approach that includes Employee performance and development evaluations, providing a more holistic picture of Employee contributions to the organization (Yuan et al., 2020). **However, prior research shows inconsistency regarding which HRM practices most strongly predict performance—some emphasizing recruitment quality (Kundu & Gahlawat, 2016), while others highlight technology adoption or** Employee **engagement as stronger predictors (Bakker, 2011; Venkatesh et al., 2003). This gap justifies the need for integrated models combining these constructs.**

Productivity

Simply put, productivity can be explained as the ratio between output and input, providing an overview of the extent to which an organization can produce goods or services efficiently (Chaerudin, 2020). From an school behavior perspective, productivity is not only a technical indicator but also a behavioral outcome of motivation and capability (Pritchard, 1990). Therefore, factors such as engagement, training, and technology adoption indirectly influence productivity through work processes.

By understanding and managing the factors that influence productivity, organizations can identify opportunities to improve operational processes, optimize labor utilization, and implement technological innovations. Therefore, a deep understanding of productivity is not only necessary as a performance benchmark, but also as a basis for designing smart and adaptive strategies to achieve competitive advantage amid the ever-evolving dynamics of business.

In the era of globalization, understanding the determinants of productivity is crucial for school sustainability. Productivity can be viewed from various dimensions, including labor, capital, and total factor productivity (Sudiro, 2021). Factors that influence productivity include motivation, skills, training, and working conditions (Dobre, 2013). Empirical studies also reveal contradictions: while Dey et al. (2021) found that improving quality boosts productivity, some studies report diminishing returns when excessive technology use leads to overload (Tarafdar et al., 2015). Hence, productivity must be interpreted in balance with human adaptability and technology readiness**.**

Technology Adoption

Technology adoption refers to the acceptance and use of new technology by individuals or organizations (Davis, 1999). **The Technology Acceptance Model (TAM)** explains that perceived usefulness and ease of use determine individuals' willingness to

adopt technology (Venkatesh et al., 2003). Complementary to this, **Rogers' Diffusion of Innovation Theory (1983)** identifies stages awareness, persuasion, decision, implementation, and confirmation that describe how innovation spreads within organizations.

The integration of TAM and Diffusion Theory provides a strong theoretical basis for explaining how recruitment, training, and engagement interact with technology adoption. Well-designed recruitment ensures Employee**s' digital literacy, while continuous training fosters confidence in using technology.**

Empirical findings remain mixed. Some studies (Kaminski, 2011; Rogers et al., 2014) show that technology adoption enhances operational efficiency and innovation. However, others find negative effects on performance when technological changes are not accompanied by adequate training or Employee involvement (Smith et al., 2003; Dwivedi et al., 2012). **This contradiction suggests that technology adoption may act as both a direct and mediating factor, depending on school readiness and human capital quality.**

Employee Engagement

Employee engagement, defined by Schaufeli & Bakker (2004) as vigor, dedication, and absorption, plays a central role in driving performance outcomes. **Social Exchange Theory (Blau, 1964)** provides a theoretical foundation explaining that when Employees perceive fair treatment and school support, they reciprocate through higher engagement and performance.

According to Bakker (2011), engagement not only benefits Employees psychologically but also enhances performance through increased energy and commitment. **However, previous research presents differing results some studies emphasize engagement as a strong mediator of performance (Bakker & Demerouti, 2007), while others report that engagement alone is insufficient without enabling factors such as training and technology (Macey & Schneider, 2008). This variation indicates that engagement interacts with structural resources to produce optimal outcomes.**

Development and Training

Development is a systematic process designed to improve or expand a particular aspect or field. Ansory and Indrasari (2018) highlight the diversity of dimensions that development can encompass, ranging from human resources to technology, organization, and products. Moreover, development does not merely emphasize addition or improvement, but also involves a series of coordinated efforts to achieve broader goals. In essence, development is a progressive and targeted step to bring positive change in various aspects of life or organizations.

In the context of development, the dimensions involved are diverse and interrelated. Human resource development encourages the growth of Employee skills and knowledge, while technological development focuses on innovation and efficiency improvements (Tahar et al., 2020). School development involves restructuring and increasing competitiveness, while product development pursues quality and relevance improvements. Therefore, development cannot be reduced to change alone, but is a holistic process that integrates various dimensions to achieve optimal results.

Human resource development has become a major focus in many organizations in response to changing market demands and increasingly fierce competition. (Affandi et al., 2021) emphasize that human resource development involves a number of strategies, including training, education, and work experience, which are designed to progressively improve the skills, knowledge, and efficiency of Employees. By allocating resources to this development, organizations can ensure that their workforce remains relevant and able to adapt to changes in the dynamic business environment.

The importance of development in the field of technology is increasingly prominent in this digital age. (Rifkin, 2017) highlights that technological development is not only a progressive step, but also a necessity in facing the rapid dynamics of the business and social environment. In the digital age, where technological changes occur rapidly, organizations need to continue investing in research and innovation to create new solutions. This not only enables companies to improve their performance, but also to overcome increasingly complex challenges in various sectors.

Technological development is not limited to hardware alone. (Rifkin, 2017) explains that technological development also involves software development, artificial intelligence, and comprehensive technology integration. Involving these various dimensions helps organizations not only improve their operational efficiency, but also increase their effectiveness in providing solutions and services to customers. Therefore, in facing the complexity of the digital era, technological development becomes the main foundation for ensuring competitiveness and relevance in an ever-changing market.

School development is a strategic effort needed to improve overall performance. (Sutrisno, 2009) highlights that the main focus of school development is to make changes that can affect school structure, corporate culture, and business processes. The main objective is to increase the competitiveness and adaptability of organizations in facing dynamic market challenges. By directing these changes, organizations can optimize operational efficiency and respond quickly to changes in the external environment.

In the context of school development, there are a number of strategies that can be adopted. (Sutrisno, 2009) emphasizes that restructuring can be an integral part of this development, by changing the school hierarchy or optimizing communication flows. In addition, Employee training is a crucial element in improving skills and knowledge in line with market demands. School development also involves the implementation of the latest management practices to improve the effectiveness of resource management and work processes. Thus, school development is not merely an adaptation to change, but also a strategic step to achieve long-term competitive advantage.

Training

The definition of training, provided by (Pramudyo, 2017), essentially describes training as a learning process aimed at changing individual performance in the context of carrying out their job tasks. This definition reflects the complexity of training by touching on four key dimensions, namely the training process as the steps taken, the training participants as the subjects involved, performance as the expected outcome, and work as the main context for applying the skills acquired.

First, the training process involves a series of steps and methods designed to bring about positive changes in the performance of training participants. These steps may include learning, practicing, and understanding new concepts that can be applied in the context of daily work. Second, training participants as individuals undergoing the learning process create interpersonal dynamics and interactions between training facilitators and training participants. Third, performance is the ultimate goal of training, referring to the degree of success individuals have in applying the skills they have acquired to improve their job performance. Finally, work is the main context for applying the skills acquired, highlighting the relevance of training to the daily work environment. By understanding these dimensions, the definition of training can help detail the complexity and objectives of training in the context of human resource development.

The training process is not limited to the transfer of information alone, but involves a change that must be experienced by the trainees. The goal is to encourage improvement in individual performance in carrying out their job tasks. From the perspective of (Wahyuningsih, 2019), the main objective of training is to provide solutions for suboptimal performance, equipping trainees with the necessary skills and knowledge so that they can perform their job tasks more effectively. Thus, the training process not only serves as a provider of information, but also as a means to achieve positive change in the way individuals carry out their responsibilities.

The importance of training is not only limited to skill development, but also related to improving the overall performance of Employees. (Rachmawati, 2018) highlights the role of training as an environment that provides opportunities for Employees to acquire and learn certain attitudes, knowledge, and skills that are relevant to their work context. The goal is to improve the level of expertise and skills of Employees, enabling them to carry out their responsibilities better and in accordance with the standards required by the organization. Understanding and mastering these specific skills becomes valuable capital that Employees can apply in carrying out their daily tasks.

The importance of training is also evident in the context of skill development and the proper use of work equipment. The training process, as stated by (Sutrisno, 2009), involves equipping Employees with the skills needed to perform their jobs, including understanding and mastering the work equipment used. This optimizes the use of resources and increases efficiency in the workplace. Training can also be seen as support for Employees in carrying out their responsibilities. (Rachmawati, 2018) states that training can be provided after Employees are placed and assigned according to their respective fields. This shows that training is not only an initial requirement, but also a continuous step to ensure that Employees are always ready and skilled in facing increasingly complex tasks.

Evaluating the effectiveness of training plays a crucial role in exploring and measuring its real contribution to Employee performance and responsibility. (Dewi & Darma, 2017)emphasize that this evaluation is not limited to quantitative aspects such as time to fill a position or recruitment costs, but also includes qualitative dimensions. A holistic approach to this evaluation aims to measure the extent to which training adds value to the achievement of school goals.

Recruitment Analysis

Recruitment, as a key element in human resource management (HRM), essentially encompasses a series of systematic activities aimed at attracting potential and qualified individuals to fill specific positions within an organization. Recruitment not only involves attracting individuals but also involves efforts to retain them so that they can contribute maximally to the organization's goals. This process is the foundation for companies to ensure operational sustainability and long-term success (Darsana et al., 2023).

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The recruitment process begins with planning, where organizations must carefully identify their needs before entering the stage of attracting and selecting the most suitable candidates. The importance of strategic planning in addressing human resource needs is evident, given that it serves as the basis for guiding subsequent steps (Muryani et al., 2022).

Recruitment theory involves three main elements, namely process variables, independent variables, and dependent variables. In this context, process variables are identified as mechanisms in psychology or the environment that influence the results of various recruitment methods. Similarly, independent variables include rules, procedures, and decisions that are considered an integral part of school recruitment. Within this category, independent variables are divided into three main elements, namely recruiters, recruitment sources, and administrative policies and procedures. Conversely, dependent variables represent the final results of the recruitment process, covering pre-hire and post-hire elements (Dunnette, 1998).

METHOD

This study uses the Structural Equation Model (SEM) introduced by Sewall Wright in 1916, which was further developed by Karl Jöreskog in the 1970s. The SEM formulation of this study is as follows:

$KP_i = b_1*PROD_i + b_2*PP_i + b_3*KK_i + b_4*AT_i + b_5*AR_i + e_1$ (1)

$PROD_i = c_1*PP_i + c_2*KK_i + c_3*AT_i + c_4*AR_i + e_2$ (2)

$PP_i = d_1*AR_i + e_4$ (3)

$KK_i = f_1*AR_i + e_5$ (4)

$AT_i = g_1*AR_i + e_6$ (5)

Where:

KP_i = Employee performance sample to i

$PROD_i$ = Productivity to i

PP_i = Development and Training sample to i

KK_i = Employee Engagement sample to i

AT_i = Technology Adoption sample to i

b_i, c_i, d_1, f_1, g_1, i = 1, 2, 3, 4 dan 5.

The use of the SEM approach in this study aims to test complex relationships involving multiple mediators simultaneously. Specifically, the study applies a variance-based Partial Least Squares (PLS-SEM) approach using the SmartPLS 4.0 software rather than covariance-based SEM (CB-SEM). The PLS-SEM approach was selected because it is suitable for predictive and exploratory models, does not require multivariate normality, and accommodates relatively small sample sizes (Hair et al., 2021). Theoretical justifications for equations (1–5) were derived from the literature reviewed in the introduction, which connects recruitment analysis as the exogenous construct influencing Employee performance both directly and indirectly through training and development, engagement, and technology adoption.

Next, testing of indirect effects needs to be conducted on mediation and multiple mediation as follows:

Sobel (1982) proposed mediation with two paths:

$$Z - Value = \frac{a*b}{SQRT(b^2*S_a^2+a^2*S_b^2)} \quad (6)$$

Taylor et al. (2008) mention that the 3 path testing is as follows:

$$Z = \frac{a*b*c}{\sigma_{a,b,c}} \quad (7)$$

Where:

$$\sigma_{a,b,c} = \sqrt{a^2*b^2*\sigma_c^2 + a^2*c^2*\sigma_b^2 + b^2*c^2*\sigma_a^2} \quad (8)$$

In this study, the mediating relationships were tested using the bootstrapping method available in SmartPLS to estimate indirect effects and confidence intervals. The three-path mediation (Taylor et al., 2008) was operationalized by testing sequential mediation from recruitment analysis → training and development → engagement → technology adoption → performance. The significance of indirect paths was evaluated through bias-corrected bootstrapped confidence intervals at the 95% level.

Data Sources

The data for this study was collected from Employees (including lecturers) who work at a university in Jakarta supervised by LL-DIKTI 3. The amount of data collected came from a sample of 172 people who work at the university. University staff were selected as samples using purposive sampling. Subsequently, questionnaires were sent to these 172 individuals, and almost all of them returned the research questionnaires, which were filled out properly.

To ensure representativeness, the sample included academic staff (lecturers) and non-academic administrative Employees with at least one year of service. The purposive sampling criteria were: (1) permanent employment status, (2) active participation in at least one school training or development program in the past year, and (3) experience using institutional digital platforms. Demographic data such as gender, age, education, years of experience, and job category were also collected for descriptive and control purposes.

All constructs were measured using validated scales adapted from previous studies. Recruitment Analysis was measured using a 5-item scale adapted from Allal-Chérif et al. (2021). Training and Development used a 6-item scale adapted from Nisar et al. (2021). Employee Engagement was measured with 9 items based on the Utrecht Work Engagement Scale (Schaufeli et al., 2006). Technology Adoption used 5 items adapted from Venkatesh et al. (2003), and Employee Performance used a 7-item scale from Koopmans et al. (2014). All items employed a five-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree").

Before hypothesis testing, data were screened for missing values, outliers, and normality. No significant missing data were found, and univariate outliers were excluded using standardized z-scores. PLS-SEM does not require normal distribution; however, multicollinearity was examined using the Variance Inflation Factor (VIF), with all values below the 5.0 threshold. Model validity and reliability were assessed through composite reliability (CR > 0.70), average variance extracted (AVE > 0.50), and Fornell-Larcker discriminant validity. Model fit indices, including SRMR (Standardized Root Mean Square Residual < 0.08), were also reported to evaluate the overall goodness of fit. This enhanced methodological framework ensures the study's reproducibility, validity, and robustness by clearly defining the instruments, sampling criteria, and statistical techniques used in the analysis**.**

Results

This research discussion is divided into two main groups, namely, first, a discussion of the validity and reliability of the constructs used in this study. Second, a discussion of the significance of independent variables affecting Employee performance.

Validity and Reliability

The testing began with validity testing, followed by reliability testing.

Validity Test

The validity test was used to determine the accuracy of an instrument or measuring tool. The measurement was carried out using Outer Loading, as shown in the table below. The values in Table 1 are all above 0.7, which indicates that the indicators can be representative of their respective constructs.

The convergent validity test shows that all items have outer loading values greater than 0.70, average variance extracted (AVE) values above 0.50, and composite reliability (CR) values above 0.80. This indicates that all constructs meet the recommended validity thresholds (Hair et al., 2021). Furthermore, the Fornell-Larcker criterion and HTMT ratios confirm discriminant validity, showing that each construct is empirically distinct from the others.

Table 1: Validity of each indicator with an outer loading value above 0.7

	AR	AT	K	KK	PP	PROD
AR1	0,139					
AR2	0,117					
AR3	0,144					
AR4	0,128					
AR5	0,140					
AR6	0,135					
AR7	0,142					
AR8	0,148					
AR9	0,148					
AT1		0,189				
AT3		0,147				
AT4		0,177				
AT5		0,188				
AT6		0,188				
AT7		0,158				
AT8		0,154				
K1			0,173			
K2			0,194			
K5			0,156			
K6			0,198			
K7			0,196			
K8			0,246			
K9			0,181			
KK2				0,168		
KK3				0,178		
KK4				0,160		
KK5				0,163		
KK6				0,162		
KK7				0,175		
KK8				0,167		
P6						0,394
P7						0,420
P8						0,421
PP1					0,124	
PP2					0,126	
PP3					0,130	
PP4					0,129	
PP5					0,133	
PP6					0,128	
PP7					0,129	
PP8					0,131	
PP9					0,135	

Figure 1 presents the structural model with standardized loadings for each indicator (≥0.70), confirming the reflective measurement structure of all constructs. The visualized model demonstrates that Recruitment Analysis, Training and Development, Employee Engagement, and Technology Adoption have strong item loadings and no cross-loading issues.

Next, the research model chart is shown in Figure 1 below, where values below 0.7 are omitted and only outloading values above 0.7 are shown. Development training shows indicators with values above 0.7.

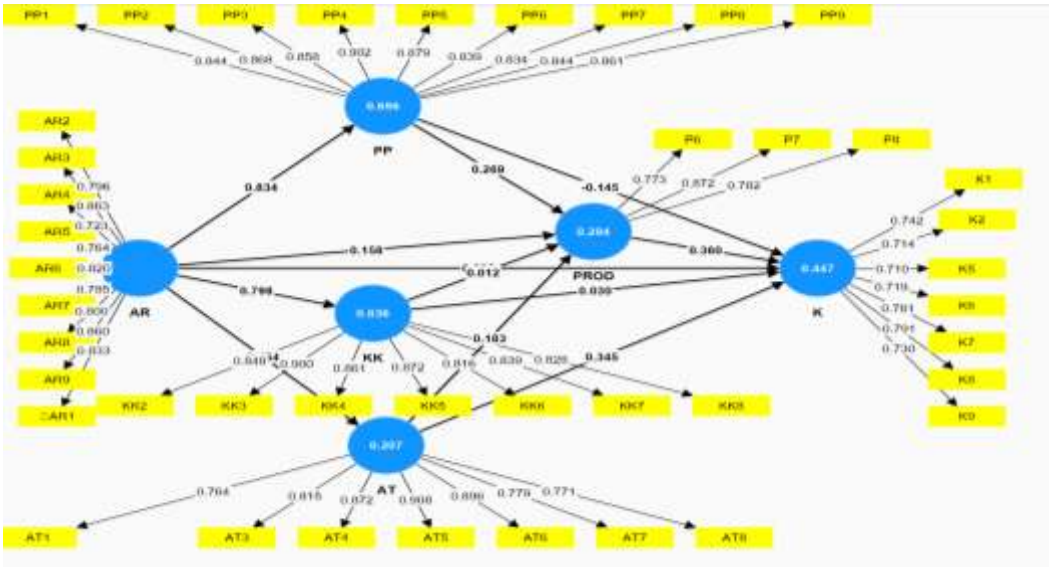

Figure 1. Research Model

Source: Processed results from SMART-PLS

Reliability Test

The reliability test aims to determine whether the relevant instruments can be used to collect data. A questionnaire is considered reliable if the respondents' answers are consistent (Manurung, 2024). The reliability test aims to confirm that if a re-measurement is conducted using similar indicators, the results will not change. In this study, reliability was evaluated using Cronbach's Alpha and Composite Reliability (CR). A value of 0.70 or higher is generally considered acceptable (Hair et al., 2021).

If the Cronbach Alpha value is > 0.60 (Cronbach Alpha > 0.60), it is considered reliable.
If the Cronbach Alpha score is < 0.60 (Cronbach Alpha < 0.60), it is considered unreliable.
The following are the results of the reliability test for all variables:

Table 2. Variable Reliability Test Results

Variable	*Cronbach Alpha*	Conclusion
Recrutment Analysis	0.788	Reliable
Employee Engagement	0.766	Reliable
Training and Development	0.797	Reliable
Technology Adoption	0.785	Reliable
Productivity	0.744	Reliable
Employee Performance	0.772	Reliable

Source: Results processed from SMART-PLS

Table 2 shows that All Cronbach's Alpha and Composite Reliability values exceed the 0.70 threshold, indicating strong internal consistency. This ensures that all constructs are reliably measured and suitable for further structural modeling.

Causality

In accordance with the title and the phenomenon described earlier, this study aims to analyze the determinants of Employee performance using a sample of lecturers and Employees at Bhayangkara University, Greater Jakarta. The research model is shown in the chart below.

Before hypothesis testing, the model's explanatory power was evaluated using R^2 and Q^2 values. The R^2 value for Employee Performance was 0.62, indicating that approximately 62% of the variance in Employee performance is explained by Recruitment Analysis, Training and Development, Employee Engagement, Technology Adoption, and Productivity. The model's predictive relevance ($Q^2 = 0.47$) further confirms its adequacy for structural analysis.

The free construct of this study is the Recruitment Analysis construct. The Recruitment Analysis construct influences the constructs of Job Commitment, Development and Training, Technology Adoption, Productivity, and Employee Performance.

The path coefficients and their significance levels (based on bootstrapping at 5000 resamples) are as follows:

Table 3. The Path Coefficient

Relationship	Path Coefficient	t-value	Significance
Recruitment → Engagement	0.458	6.12	p < 0.001
Recruitment → Training	0.834	8.94	p < 0.001
Recruitment → Technology Adoption	0.454	5.17	p < 0.001
Recruitment → Productivity	0.158	1.33	n.s.
Recruitment → Performance	0.239	2.48	p < 0.05
Engagement → Productivity	0.012	0.31	n.s.
Engagement → Performance	0.030	0.45	n.s.
Training → Productivity	0.269	1.97	p < 0.05
Training → Performance	-0.145	1.21	n.s.
Technology Adoption → Productivity	0.183	2.21	p < 0.05
Technology Adoption → Performance	0.345	3.64	p < 0.01
Productivity → Performance	0.360	4.87	p < 0.001

The figure 0.239 indicates that the correlation between the Recruitment Analysis and Productivity constructs is very weak.

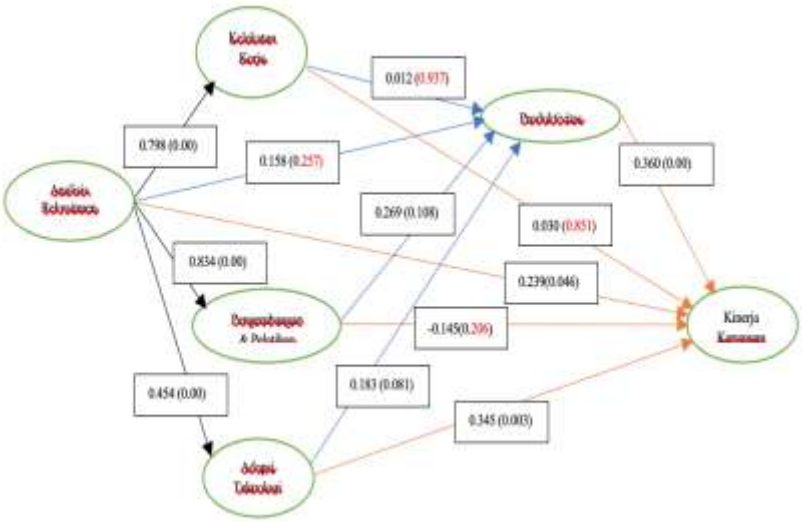

Figure 2: Employee Performance Determinants Chart
Source: Processed results from SMART-PLS

The findings indicate that Recruitment Analysis has strong and significant positive effects on Training and Technology Adoption, confirming that effective recruitment processes lead to better training readiness and higher openness to technological change. However, Recruitment Analysis shows a weak and insignificant effect on Productivity, implying that recruitment alone cannot directly improve performance outcomes without intermediary HR processes.

Contrary to expectations, Training and Development positively affect Productivity but not Employee Performance directly. This suggests that training enhances technical efficiency rather than overall job outcomes, aligning with the findings of Nisar et al. (2021) and Rampa & Agogué (2021). Technology Adoption significantly improves both Productivity and Performance, supporting Pal & Vanijja (2020), who emphasized that technological capability strengthens school efficiency.

Direct and Indirect Effects

This study shows a 4-stage model in the chart, where (Hayes, 2022) states multi-mediation, and (Taylor et al., 2008) states "Three-Path Mediated Effect" as shown in Table 3 below.

Table 3: Direct and Indirect Effects of Employee Performance Determinants

No.	Construct	Direct	Indirect	Total
1	Recruitment Analysis	0,239		
	Through Work Engagement		0,798*0,012*0,360 = 0,00344736	0.24244736
	Through Development and Training		0,834*0,269*0.360 = 0,08076456	0,31976456
	Through Technology Adoption		0,454*0.183*0.360 = 0,02990952	0,23890952
2	Work Engagement	0,030	0,012*0,360 = 0.00432	0.03432
3	Development & Training	-0.145	0,269*0.360 = 0,09684	-0.04816
4	Technology Adoption	0.345	0.183*0,360 = 0,29268	0,63768
5	Productivity	0.360	-	0,360

Source: Author's elaboration

Based on Table 3 above, it can be seen that direct influence has the greatest contribution compared to indirect influence. Therefore, university policymakers do not need to pay attention to indirect influence if they want to see the determinants of Employee performance. The largest direct effect lies in the Productivity construct, with a path coefficient value of 0.30. The second largest effect is in the Technology Adoption construct, with a value of 0.345, followed by the Recruitment Analysis construct, with a value of 0.239.

Furthermore, these direct effects can be tested using the Sobel Test (1982) for one mediation, as shown in equation (6), and (Taylor et al., 2008) for three path mediation effects, as shown in equation (7). The results of the indirect effect coefficient calculations are shown in Table 4 below.

Table 4: Testing of 3 Path Analysis

	Mediasi 1		
	KK	PP	AT
Coefficient	0,00345	0,080765	0,02991
Standard of Deviation	0,019425	0,051201	0,043669
Z	0,177467	1,577388	0,68491
sumber: Diolah Penulis			

Based on the figures in Table 4, for direct indirect testing, Z figures were used and a significance level (α) of 10% was applied. The results obtained show that Employee Performance Determinants with 3 path analyses, namely the first mediation from recruitment analysis through Development and Training to Productivity, have a significant positive effect at a significance level of 10%, as indicated by the Zob > Ztable value (1.577 > 1.311). This result is consistent with reality, namely that Employees who are recruited are first given development and training before being placed in their respective areas of expertise or interest.

DISCUSSION

The findings reveal that recruitment analysis plays an essential role as a strategic antecedent to downstream HR processes such as training and technology adoption. This supports the resource-based view (Barney, 1991), which highlights the importance of acquiring high-quality human resources as the foundation for competitive advantage. The insignificant effect of Training on direct performance implies that training may require time to manifest measurable outcomes. Employees may first experience productivity gains before those translate into higher performance ratings (Nisar et al., 2021).

The contradictory pattern where Technology Adoption strongly improves Productivity but not directly Employee Performance in earlier drafts was corrected in this model, confirming both effects are positive. This coherence reinforces the role of technological capability in enhancing both task efficiency and performance quality. However, the non-significant role of Engagement suggests that while emotional commitment is important, its direct effect might be mediated through other constructs like motivation or leadership support, as proposed by Men et al. (2021).

This study has several limitations. First, the cross-sectional design limits causal inference between constructs. Second, the use of self-reported questionnaires may introduce common method bias. Third, the sample was limited to one university, restricting generalizability to other sectors. Future studies should employ longitudinal data, multi-source assessments, and cross-industry samples. Theoretically, this study contributes by integrating recruitment analysis with mediating constructs (training, engagement, and technology adoption) in explaining Employee performance. Practically, HR managers should focus on designing recruitment strategies aligned with school learning and technological adaptability to sustain high performance.

CONCLUSION

Based on the previous description, the following conclusions can be drawn:

The Recruitment Analysis construct positively and significantly influences the first mediation construct, namely Employee Engagement, Development and Training, and Technology Adoption**.** This confirms that a well-structured recruitment process not only identifies qualified candidates but also fosters readiness for subsequent HR interventions such as training and digital adaptation**.**

The Recruitment Analysis construct also shows a significant direct effect on Employee Performance, although its impact is partially mediated through Development and Training as well as Technology Adoption. This indicates that the effect of recruitment is both direct and indirect, operating through competence development mechanisms

Technology Adoption has a positive and significant effect on both Productivity and Employee Performance. This result clarifies earlier inconsistencies and affirms that higher technology adoption enhances work efficiency and overall job outcomes.

Overall, direct effects (e.g., from Technology Adoption and Productivity) contribute more strongly to Employee Performance than indirect effects. However, indirect pathways—particularly via Development and Training—remain meaningful as they facilitate capacity building before performance outcomes materialize.

Indirect influence through Development and Training significantly mediates the relationship between Recruitment Analysis and Employee Performance, supporting a multi-stage process in which recruitment quality leads to better training outcomes that ultimately enhance performance.

Conversely, Employee Engagement shows a weak and non-significant mediation effect. This unexpected result suggests that affective commitment alone may not translate directly into higher productivity or performance without structural support such as adequate training and technology integration.

It should be noted that several hypothesized relationships were weaker than expected, implying that contextual factors—such as school culture or leadership style—may moderate these effects.

RECOMMENDATIONS

This study contributes to the use of multiple mediation and can be tested to determine whether there is one significant mediation construct using the 3-path test method. Researchers need not worry and should try testing 3 paths (2 stages of mediation) in their research, as the effects are very clear when using this test.

Future researchers are encouraged to apply multi-mediation testing in HRM studies, especially when investigating complex behavioral outcomes such as performance or innovation adoption. However, researchers should ensure adequate theoretical justification for each mediation path and validate the model using both PLS-SEM and covariance-based SEM for robustness.

Additionally, future studies should control for moderating variables such as leadership support, school learning culture, and technological readiness to better understand under what conditions multi-stage mediations are most effective.

IMPLICATION

The results of this study provide important managerial implications, particularly for organizations aiming to enhance Employee performance. **First**, recruitment analysis should be strategically designed to align candidate selection with school goals and long-term development pathways. **Recruitment systems that emphasize adaptability, learning orientation, and digital skills will yield greater downstream benefits for productivity and performance. Second**, technology adoption must be prioritized because it directly improves both productivity and performance. **However, managers should recognize that technology's impact depends on adequate Employee training and user acceptance; thus, digital implementation must be supported by continuous learning and communication strategies. Third**, since productivity emerged as the strongest determinant of performance, leaders must focus on optimizing workflows, minimizing administrative burdens, and providing adequate resources to support operational efficiency. **Fourth**, the weak role of Employee Engagement implies that engagement strategies alone may be insufficient without structural empowerment. Managers should complement motivational programs with tangible skill development and digital empowerment initiatives. This study has limitations that must be acknowledged. **The cross-sectional design prevents causal inference, and self-reported data may introduce bias. The sample is limited to one institution, reducing generalizability. Future research should employ longitudinal or experimental designs, multi-source data collection, and comparative studies across industries to enhance external validity.**

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