

An Empirical Approach to Evaluate Employee Performance Using Fingerprint Attendance

Vivin Maharani EKOWATI^{1*}, Achmad Sani SUPRIYANTO², Titis MIRANTI³, Masyhuri MACHFUD⁴

¹Associate professor. Department of Management, Faculty of Economics, State Islamic University of Maulana Malik Ibrahim, Malang, Indonesia, Email:vivien.maharani@yahoo.com

²Professor, Department of Management, Faculty of Economics, State Islamic University of Maulana Malik Ibrahim, Malang, Indonesia.

³Associate professor, Banking Department, Faculty of Economics, State Islamic University of Maulana Malik Ibrahim, Malang, Indonesia.

⁴Associate professor, Universitas Islam Malang, Indonesia.

*Corresponding Author

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Abstract

Technological advances in an increasingly modern society makes work easier. To achieve good results, discipline should be manifested by complying with applicable regulations, and the level of attendance is one of its promoters. Attendance makes it possible to record the presence of employees, however manual presence cannot be dissociated from the risk of fraud, which is very susceptible to manipulation. Therefore, an electronic attendance system in the form of fingerprints is needed to create orderliness since it reduces fraud in recording employee presence. This study describes the relationship between variables and the influence of mediation using a quantitative approach with an explanatory study. The sample was 150 respondents using the proportional random sampling technique. Furthermore, primary and secondary data sources were collected using a questionnaire and documents respectively. SMART-PLS, a measurement and a structural equation model was used for data analysis and explaining the relationship between variables. The results showed that Fingerprint attendance has a direct influence on performance. Also, it has an indirect influence on performance through Work Discipline, which plays an important role in mediating the relationship between variables.

Keywords: *Electronic Attendance System, Fingerprint Attendance, Work Discipline, Employee Performance.*

Introduction

The prosperity of a nation is largely determined by the quality of human resources and the quality of human resources is determined by the quality of education. The development of science and technology in this era of globalization occurs in various fields, one of which is in the field of education, namely the emergence of various kinds of sophisticated technological equipment that can improve performance. Improving performance is a new challenge for the world of education in developing human resources (Budi et al., 2019).

Human Resources (HR) is one of the most important resources in every organization and institution. Having human resources that have high productivity and performance is the dream of every organization and institution (Batilmurik et al., 2019). These resources have a lot to play in the context of achieving company goals. If the quality of human resources owned is in accordance with the expectations of the institution, then the institution has real competitiveness (Aisyah & Yasri, 2019).

Currently, there are changes in all aspects of life due to the rapid increase in modernization and advances in information technology. The field of education, involving both the practitioners and the system, is one of the affected aspects

(Dameria et al., 2020). One of the supporting successes in the process is the role of education or administrative staff. They are faced with the responsibility of helping the teaching and learning process in a university, by providing several services, including preparing lecture equipment, and infrastructure. Furthermore, they are also expected to assist the teaching and learning process in the laboratory.

Learning process is a conscious and planned effort to create an academic atmosphere, where students can actively have the opportunity to develop their potential and possess spiritual strength, self-control, and good personality. They are also expected to be intelligent with good reasoning attitudes and noble behavior, as well as possess other competencies needed for themselves, the surrounding community, and the society on a large scale (Dameria et al., 2020). How to maintain competitive advantages in the global competitive environment is an important key to competitiveness, and the solution lies in the quality of human resources and management, meaning employees are the most important asset, and how to improve employees' job discipline and enhance job performance has become an important subject for research (Astuti et al., 2020; Paais & Pattiruhu, 2020). Employees should play a role in determining the success of the learning process through high discipline, performance, professionalism and awareness of their responsibilities as civil servants. Therefore, various efforts

should be made such as the optimization of discipline in time management for the goal to be achievable (Wandasari et al., 2019).

Work discipline is an important asset that employees should have because it involves providing services to the community. Based on the provisions of Article 3 paragraph 11 Indonesian Government Regulation Number 53 of 2010, every Civil Servant is obliged to be present at work and fulfill predetermined working hours. As an effort of educational institutions to improve delivery, various innovations to support performance are continuously conducted. One forms of this innovation includes the application of fingerprint attendance, which is hoped to increase the discipline of education staff. This innovation was conducted to overcome the weaknesses of conventional employee attendance recording tools. These tools require a lot of intervention from human resources administrative staff as well as the honesty of employees that are currently recording.

Budi et al. (2019) states that the recording of employee attendance is one of the factors managing human resources (HR). Conventional employee attendance recording tools require a lot of employee HR interventions as well as employee honesty that is being recorded. This often provides opportunities for manipulation of attendance data if continuous monitoring of this process is not carried out properly. Electronic attendance systems with biometric technology may have the potential to overcome weaknesses in organizational security systems. Biometrics is the automatic use of physiological or behavioral characteristics, such as fingerprints and irises to verify a person's identity (Sheng et al., 2012; Jungsun and Bo, 2014).

Biometric technology verifies identity through characteristics such as fingerprint, face, retina pattern, voice, handwritten signature, and so on. These techniques, which use physical data, are gaining attention as more convenient personal authentication methods than conventional methods such as passwords or identity cards because they use data derived from measurements and the data are unique to the individual and remain so throughout a person's life lifetime. In this technology, fingerprint is becoming the most mature and popular biometric technology used in automatic personal identification. The reason for the popularity of fingerprint verification is that fingerprints fulfill uniqueness, stability, permanence and are easy to retrieve (Akinduyite et al., 2013).

The workplace and education domains apply biometric technology for attendance recording or tracking, access permits (Seng & Haidi, 2019), and behavioral analysis (Mittal et al., 2016). Attendance records are used for payroll of employees. Access permission ensures that only authorized personnel can enter the site. Furthermore, behavioral biometrics are used to track the concentration level of each individual in the office. The application relieves employees both in terms of participation levels, easiness in attendance processes, increases efficiency in reporting, improves paperless systems, and provides information/reports to leaders. Also, the application implements fingerprint attendance to make it easier for superiors to see the discipline level of every employee (Seng & Haidi, 2019). To this regard, discipline is about work time, and obeying predetermined rules. With high awareness in implementing institutional rules embodied by high discipline, work productivity will be achieved. Therefore, it influences the effectiveness and efficiency of achieving organizational goals (Hasibuan, 2002).

The use of fingerprint attendance and applied disciplinary values is expected to increase employee's performance. As stated by (Fahmi, 2017) performance is a masterpiece that can be achieved by a person. (Nawawi, 2012) stated that its

appraisal is one of the Human Resource Management activities with broad objectives. This is because the association consists of many other Human Resource Management activities. In realizing good performance, employees are required to have the discipline of assisting the process.

Study conducted by Kristin et al. (2016), Mulyadi (2020), Setiawan (2011) showed that the level of absenteeism has a significant effect on performance. Furthermore, Mulyadi (2020) reported that there is a relationship between fingerprint attendance levels and employee work discipline levels. Pangarso and Susanti (2016). Utari & Rasto (2019) and Kuncorowati (2018) stated that work discipline possessed a significant influence on performance. Therefore, the impact of implementing Fingerprint Attendance can not only be made a reference to employee performance but also should see the output produced (Inayatillah, 2015).

Several existing studies have empirically examined the relationship between factors that empirically investigate the use of biometric in the Technology Acceptance Model (TAM) (Morosan, 2012). This was first introduced by Le and Cao (2020), Kustono (2021) to explain the factors that influence an individual's intention and behavior when using and accepting certain technologies. TAM has been widely used to evaluate user acceptance and explain behavior, as well as assess the impact of information. While this study provides a framework for others to explore biometric technology further, there are still shortcomings such as the lack of generalization as the sample is limited to college or university students.

This study develops a model from Mulyadi (2020) by adding work discipline as a mediating variable. It fills the study gap Inayatillah (2015) by exploring and identifying the causal model of work discipline as a mediating variable. Furthermore, the role of fingerprint attendance and its relationship with work discipline was introduced to improve employee performance. Therefore, this study aimed to examine the direct influence of Fingerprint Attendance on Employee Performance. Also, to test the indirect effect of Fingerprint Attendance on Employee Performance through Work Discipline, and determine the role as a mediating variable.

Literature Review

Electronic attendance

Electronic attendance is a tool used to determine the attendance of office employees, companies and educational institutions to get employee attendance data accurately and automatically. The tools used for electronic attendance today are very diverse ranging from card attendance, fingerprint attendance (fingerprint), and facial time attendance machines (Aisyah & Yasri, 2019). The fingerprint is an attendance application program in the field of data processing, employee attendance, and report printing (Mulis, 2009). It is a software strictly used for attendance purposes, which includes storage of data during entry and return hours, and processing them into reports that can later be used for policymaking by the leadership.

Misbach (2010) showed that fingerprint is a very detailed genetic structure because the markers inherent in humans, which cannot be changed. It is simply known as human barcodes due to the specific, permanent, and easy to classify nature. Furthermore, it provides in-depth and detailed information about the attendance of an employee. Therefore, it can be used to check a person's performance and the progress of agencies/institutions on a large scale. By implementing

fingerprint attendance, employees are expected to have more optimal performance (Fahmi, 2017; Mulyadi, 2020).

Performance

Performance is a work or actual achievement achieved by a person and was defined by Mangkunegara (2007) to be an output with high efficiency, and effectiveness. Furthermore, performance is the result of work in quality and quantity achieved by an employee in conducting duties following the responsibilities assigned. Performance is the work result in quality and quantity achieved by an employee upon performing his duties in accordance with the responsibilities assigned.

Mathis and Jackson (2009) report that performance is what employees do or don't do. Employees' performance in general includes the following elements: (a) quantity of results, (b) quality of results, (c) timeliness and results, (d) attendance and (e) ability to work together. Supriyanto et al. (2021) suggests that performance is the result of work achieved by a person or group of people in carrying out the task given along with the specified criteria. Based on the theoretical and empirical analysis described, the study hypothesis is:

H1 : Fingerprint attendance has a direct influence on performance

Monitoring as a process, ensures organizational and management objectives are achieved. It guarantees that implementation of tasks/work is in accordance with the predetermined plan. Also, it involves comparing the actual results achieved with predetermined standards, and when implementation deviates from the plan, necessary corrections are required (Herlambang, 2013).

Recording employee attendance is an important factor in human resource management. It is an activity or routine conducted by employees to prove that they are present or not working in an agency. With high awareness in implementing agency regulations embodied in work discipline, productivity will also be achieved (Hasibuan, 2002). Mulyadi (2020) showed that the fingerprint attendance rate can improve employee work discipline, which act as executor of management to strengthen organizational guidelines (Davis & Newstrom, 2012).

Work discipline

Work discipline is a tool used by managers to communicate with employees. It helps to change behavior and as an effort to increase one's awareness and willingness to comply with all applicable company regulations and social norms (Rivai, 2010). Employee performance is the result of work in quality and quantity achieved by an employee in conducting duties following the responsibilities assigned (Mangkunegara, 2007). To achieve this, attendance (Fahmi, 2017), and discipline are needed because they are related to performance efficiency (Utari & Rasto, 2019; Kunrowati, 2018). In addition, the fingerprint model is used to check and control the discipline and performance of lecturers and education staff. In practice, attendance data will be recorded and stored on the server through an integrated system called the Higher Education Information System. This determines the level of discipline and performance of education personnel (Mulyadi, 2020). Based on the theoretical and empirical analysis that have been described, the study hypothesis are:

H2 : Indirect Influence of Fingerprint Attendance (X) on Performance (Y) through work discipline.

H3 : Work discipline mediates the Influence of Fingerprint Attendance on Performance

Methodology

Research Design

Conceptually, this study was designed using a quantitative approach that involves a direct mediation by analyzing the relationship between fingerprint attendance, work discipline, and employee performance.

Sample and Data Collection

The data collection technique used a questionnaire given to the educational staff of Islamic universities in Malang Raya. The sample consisted of all educational staff with a total of 150 and the sampling technique used was simple random sampling. Data collection was conducted using a questionnaire distributed to all respondents, with a Likert scale of five. Fingerprint Attendance Indicator refers to Mulis (2009); Padayachee (2010) include Function; Reliability; Usability and Efficiency. Work Discipline Indicator refers to Hasibuan (2002) includes abilities; Remuneration; Justice; Punishment; Firmness; Human relations. Employee Performance Indicator (Y) refers to Mangkunegara (2007), Maharani et al. (2013) include quantity, quality, and timeliness. The measure used to evaluate the variables was the Likert scale, weighed according to the items, with a range of 1 to 5 (Sekaran, 2003; Supriyanto et al., 2020).

Data analysis

Descriptive statistical analysis makes it possible to determine the frequency distribution of respondents' responses from the results of the questionnaire and to describe in detail the variables examined. This study approach uses quantitative analysis methods of Partial Least Squares Structural Equation Modeling (PLS-SEM). The approach was used to test the modified results of several study models. Therefore, the results of model development can provide an overview of the variables under study. Another reason for using PLS is that the available indicators do not meet the reflective measurement model (Garson, 2016). The variable measurement scale uses a Likert scale (1 = Strongly Disagree - 5 = Strongly agree) and analysis was conducted using Smart-PLS 3.0. The criteria for measuring variables and constructs were based on conditions such as AVE value > 0.50 (Hair et al., 2014; Supriyanto et al., 2020). The main variables consist of Composite Reliability Value (CR > 0.6), Measurement of Cronbach's alpha value > 0.5, R-square, and loading-factor measurements as the main forming variables (Chin, 1998).

Results

Statistical calculation results

The stage of this study is to examine the relationship between variables using SMART-PLS, measurement and structural equation models. The results of the reliability test of each variable include fingerprint attendance, work discipline,

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and the performance had a Cronbach alpha value higher than the cut-off point of 0.60. Therefore, all variables can be accepted since the Cronbach alpha is expected to be higher than $\alpha > 0.60$

(Garson, 2016). Furthermore, the results of composite reliability are said to be good when the value is above 0.70. Table 1 showed the composite reliability measurement model.

Variable	Alpha Cronbach	Composite Reliability	Conclusion
Fingerprint attendance	0,860457	0,906451	Reliable
Work discipline	0,884392	0,910336	Reliable
Employee performance	0,759994	0,861633	Reliable

Table 1. Instrument Reliability Test Results

Variable	AVE	\sqrt{AVE}	Latent variable correlation		
			afis	Work discipline	Employee performance
Fingerprint attendance	0,709	0,842	1.0000		
Work discipline	0,594	0,771	0,712	1.0000	
Employee performance	0,676	0,822	0,796	0,761	1.000
Description : afis = Fingerprint Attendance (X1); Work Discipline (Y1); Employee Performance (Y2).					

Table 2. Value of AVE, \sqrt{AVE} and correlation between latent variables

The test results in Table 2 showed that the square root of average variance extracted (\sqrt{AVE}) value of all variables is greater than the correlation between latent and other latent variables, therefore, the instrument is said to be valid. The square root of average variance extracted (\sqrt{AVE}) with 0.5 can also be compared.

The goodness of Model Fit is measured using Q Square (Q2). A value of $Q2 > 0$ showed that the model has predictive relevance and the magnitude has a vulnerability value of $0 < Q2 < 1$.

R2 values of each are as follows :

$$Q2 = 1 - (1 - R12)(1 - R22)$$

$$Q2 = 1 - (1 - 0,508)(1 - 0,846)$$

$$Q2 = 0,924$$

The Q2 value is 0.924 or 92.4%, the contribution of the data explained by the model is 92.4%. Meanwhile, the remaining 7.6% is explained by other variables that are not contained in this model.

Structural Equation Modeling

SEM using PLS was conducted to test hypotheses including direct and indirect or moderating effects. The results of the direct effect described in this section are shown in Table 3, the findings showed that fingerprint attendance has an effect on employee performance (coefficient = 0.327, $P < 0.000$), therefore H1 is statistically accepted.

Relationship		Coefficient	t statistics	p-value	Description
Afis	Discipline	0,712	10,821	0,000	Significant
Afis	Perform	0,327	4,913	0,028	Significant
Discipline	Perform	0,657	10,048	0,000	Significant

Table 3. Hypothesis Testing Results Direct Effect

Variables	Original sample	Sample mean	Standard deviation	t-statistic	p-value
afis-Discipline-Perform	0.468	0.280	0.112	2.612	0.002

Table 4. Test results for indirect effects

Table 4 showed that afis has an indirect effect on performance. The indirect results of the afis on performance is 0.468. The t statistical value is $2.612 > 1.96$ with a p-value of $0.002 < 0.005$. Therefore, afis can indirectly improve employee performance and H2 is said to be accepted statistically.

Testing the mediation hypothesis is needed to detect the position of the intervening variables in the model through the Sobel Test. The test uses the free calculator software for the significance of mediation version 4.0. Table 5 showed the results of Sobel Test analysis.

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Correlation	A	B	SEA	SEB	t value	sig	Des
afis-Discipline-Perform	0.712	0.657	0.06583	0.06541	7.36386	0.000	sig

Table 5. Sobel Test Results

The results showed that the Sobel Test value was 7.36386 > 1.96 and the significance was 0.000 < 0.05; Therefore, it can be concluded that work discipline mediates the effect of fingerprint presence on employee performance. Table 5 showed that work discipline mediates the effect of fingerprint presence on

employee performance therefore, H3 is accepted.

Based on the results of the tests that have been carried out, the PLS test results are as follows :

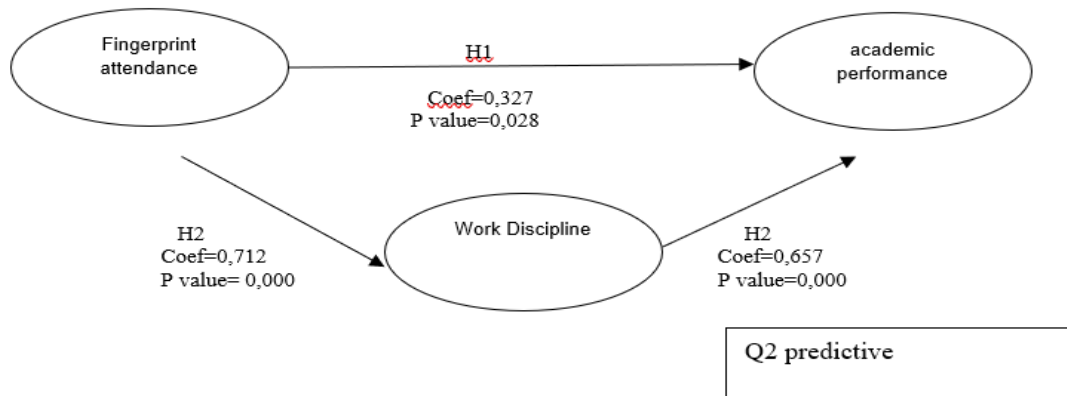


Figure 1. PLS Test Results

Figure 1 showed that the coefficient representing the effect of fingerprints on work discipline and employee performance is significant. The work discipline variable in the model is categorized as partial mediation. Therefore, there is sufficient empirical evidence, where work discipline mediates the effect of fingerprints on employee performance.

Discussion

The inner model showed that the presence of fingerprint has a direct effect on employee performance. These results are consistent with Dameria et al. (2020), in the implementation of filling in attendance lists manually (only in the form of attendance lists). This will become an obstacle for organizations to monitor employee discipline in terms of punctual arrival and return hours every day. The current fingerprint technology makes organizational activities smoother in monitoring employee discipline, as well as with the minimum possibility of fraud in recording attendance from work.

This is consistent with Kristin et al. (2016), reported that the level of absenteeism has a significant influence on performance. The findings in the field are in line with Setiawan (2011); Nawawi (2012), to achieve good performance, attendance is needed to monitor employee. This results confirm the opinion of Dameria et al. (2020) that recording employee attendance is one of the important factors in human resource management. It is an activity conducted by employees to prove themselves present in an agency. With great awareness of the implementation of government regulations manifested in work discipline, performance is also achieved. These are not in line with Inayatillah (2015), where the impact of implementing Fingerprint Attendance cannot only be made a reference to employee

performance.

Also, the inner model showed that fingerprint presence has an indirect effect on employee performance through work discipline. This is consistent with the findings of Mulyadi (2020) that the fingerprint attendance rate is able to improve employee work discipline. Furthermore, these results are also in line with the findings of Utari & Rasto (2019) that work discipline has a significant effect on performance. The conditions in the field are consistent with the theory conveyed (Davis & Newstrom, 2012) that it is an executor of management to reinforce organizational guidelines. Therefore, someone is willing to obey all applicable regulations to achieve performance. The findings in the field support the opinion Rivai (2010), where it is a tool used by managers to communicate with employees. Therefore, they are willing to change behavior as an effort to increase one's awareness and willingness to obey all applicable social rules and norms. Likewise, to achieve good performance, attendance is needed to monitor employee performance (Fahmi, 2017). Therefore, work discipline will reduce the influence of fingerprint presence on employee performance.

Furthermore, the inner model showed that work discipline mediates the effect of fingerprint presence on employee performance. The study results in the field support the opinion of Mulyadi (2020), where the fingerprint presence model is used to check and control the discipline and performance of lecturers and education staff. In practice, attendance data will be recorded and stored on the server through an integrated system called the Higher Education Information System. In turn, they determine the level of discipline and performance of education personnel. Likewise, Fahmi (2017) stated that the use of fingerprint attendance makes employees have more optimal performance.

To support the success of higher education, it is necessary to have an employee with a high discipline attitude, good performance and behavior that is full of loyalty and obedience to the institution. Therefore, various efforts should be made, one of which is by optimizing discipline in managing time (Wandasari, 2019). This result is consistent with the theory (Mulyadi, 2020), where it was stated that employee performance is the result of work in quality and quantity achieved by conducting duties in accordance with the responsibilities assigned. In addition, it is also in accordance with the theory developed by Rivai (2010), where it was stated that to achieve a good performance, discipline is needed because it is related to efficiency.

The results are in line with the opinion Hasibuan (2002) that with awareness in implementing institutional rules manifested in high work discipline, work productivity will also be achieved. Therefore, it can influence the effectiveness and efficiency of achieving organizational goals. Performance appraisal is one of the human resource management activities which has very broad objectives, because of its association with many other resource management activities. In realizing good performance, employees are expected to have the discipline to enhance the process of achieving maximum performance (Nawawi, 2012).

Conclusion

This study has provided some evidence about the presence of fingerprints and their effect on employee performance in tertiary institutions. This indicates the presence of fingerprints has a direct or indirect effect on employee performance. Work discipline mediates the effect of fingerprints on employee performance. The implementation relieves employees both in terms of the level of participation, eases attendance processes, increases efficiency in report preparation. Furthermore, it improves paperless systems, and provides information/reports to leaders.

Fingerprint attendance is implemented to make it easier for superiors to see the level of discipline of each employee. This discipline covers working time and obeying predetermined rules. Time discipline is needed for the sustainability of the organization, there is awareness in implementing institutional rules. Therefore, work productivity will also be achieved since it affects the effectiveness and efficiency of achieving organizational goals.

Recommendations

This study also investigates the determinants of employee performance using a hierarchical component model to test the presence of fingerprints, work discipline, and the performance of teaching staff in Islamic universities in Malang. In addition, it makes a significant theoretical contribution to existing knowledge about performance and it is limited to the use of cross-sectional surveys. Therefore, future studies are expected to use longitudinal surveys to verify the study variables used. Also, they should examine a wider area since the results can be generalized.

Limitations

This study design cannot completely eliminate the possibility of Common Method Bias, because all data is collected through self report with possibility to be affected by social desirability responses. It means that answers given are considered

appropriate but not necessarily reflect the actual situation. Future research should adopt a mixed questionnaire to get more varied answers.

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