

The Effectiveness of Performance and The Effect of Work Environment, Technology Infrastructure, and Work Autonomy on Employee Performance during Work from Home

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ARTICLE INFO

DOI: 10.32832/jm-uika.v13i1.5485

Article history:

Received:

23-09-2021

Accepted:

11-11-2021

Available online:

01-02-2022

Keywords:

Intrinsic motivation, Performance, Technology infrastructure, Work environment, Work from home.

ABSTRACT

This study was conducted to analyze the effectiveness of employee performance while working from home. This study also aims to analyze the effect of work environment, technology infrastructure, work autonomy, and intrinsic motivation on employee performance. Working from home as a new method of flexible work is being accelerated due to the Corona Virus Disease 2019 (COVID-19) pandemic. This new work system resulted in several changes that occurred in the workplace related to the work environment. Furthermore, changes occur in the use of higher technology. This indicates the importance of the availability of technology infrastructure while working from home. Data analysis was performed using Wilcoxon Signed Rank and Structural Equation Modeling Partial Least Square (SEM-PLS). The results show that employee performance is less effective when working from home. This is indicated by a decrease in employee performance. Work environment, technology infrastructure and intrinsic motivation have a significant effect on employee performance while working from home. Meanwhile, no significant effect was found between work autonomy and employee performance. There needs to be an effort from the government regarding the problem of incomplete employee work equipment, one of which is the application of a work digitization system. Another action is that leaders need to improve their ability to use technology by providing training in the IT.

1. INTRODUCTION

Performance management of government agencies in Indonesia was born from the passion to create professional, results-oriented, and accountable government agencies through the application of performance management principles, performance-based budgeting, and performance measures. Gibson *et al.* (2011) define performance as work results related to organizational goals such as efficiency, quality, and effectiveness. Furthermore, Colquitt *et al.* (2014) have another opinion about performance. He considers performance as the value of a series of employee behaviors that contribute to the achievement of organizational goals, both positively and negatively. Meanwhile, Wibowo (2017) synthesized several definitions to conclude that performance is not only about doing the job and the results achieved from the job, but also explaining how to do the job. Based on the definitions of performance described previously, this study considers performance as the work achieved by workers from a job that has a relationship with organizational targets or goals. Performance measures can be seen from productivity, efficiency, and effectiveness. Efficiency describes the ratio of the effective output to the required input. While effectiveness is related to the ability to achieve goals. Thus, performance effectiveness can be considered as the ability to meet goals and provide the maximum possible results. For public organizations, employee performance is said to be effective if it is successful in carrying out public services. Armstrong (2018) has several terms to describe performance effectiveness.

The maturity of government agencies in managing performance through the implementation of the system varies. The Ministry of PAN-RB as the central government agency responsible for overseeing the quality of performance management implementation conducts evaluations to map the maturity of government agencies. The results of the performance accountability evaluation in 2020 show that there are still many provinces that score B. In addition, the result of the BKN evaluation stated that 3.3% of agencies were very good, 35% were good, 50% enough and 11.7% poor in the implementation of performance management of civil servant (BKN 2020). This shows that government agencies need to continue to increase efforts in achieving goals/targets correctly, and choosing appropriate and effective activities (programs/activities) that have an impact on achieving goals/ suggestion. In achieving the goals correctly, government agencies are now faced with new challenges. The challenge is in the form of changing the work system that is done at home or working from home. Due to the current Coronavirus 2019 (COVID-19) pandemic, the implementation of working from home is accelerating. Some countries have implemented lockdown (WHO 2020). At the same time, in Indonesia, in accordance with Government Regulation No. 21 of 2020, large-scale social restrictions or PSBB have been implemented. This has an impact on limiting work in the office and replacing it with working from home.

Working from home is a form of flexible work concept. Klindzic and Maric (2017) mention that the flexible work concept includes flexible working hours, remote work, shift work, compressed workweeks, and working from home. The ILO (2017) defines telework as work carried out outside the main workplace or employer's place with support, namely information

and communication technology (ICT) such as smartphones, tablets, laptops, and computers. The definition shows that working remotely is work that is achieved with the help of ICT and is done outside the office. The implementation of work from home during pandemic is different from before, so it is possible that the effectiveness of its performance is different. If according to many studies it is stated that wfh can improve performance, but that is not necessarily the case during this pandemic.

According to previous research, working from home has been implemented due to technological advancement. Technology information and communication can create convenience for working from home in different locations, making it possible to work at home. In addition, working from home can bring many advantages, such as increased productivity (Nakrosiene *et al.*, 2019) and increased workload (Rupietta and Beckmann, 2016). Furthermore, working from home allows for greater freedom or flexibility in completing work. According to Gajendran *et al.* (2014) the more time employees spend outside the office or working from home, the higher their perception of autonomy. Working from home provides a more flexible work schedule and gives employees the opportunity to choose their own workplace. Employees who feel they have control over how they work can generate intrinsic motivation which then leads to increased performance (Zhou *et al.*, 2019).

In addition to the advantages, some researchers (Harpaz 2002; ILO 2016) argue that working from home also has disadvantages, such as lack of supervision, communication, and the lack of interaction between employees and colleagues and superiors that lead to a sense of isolation among employees. In addition, another negative consequence of the work-from-home policy is the lack of recognition of achievement and work-life balance (Zhang, 2016). When working from home, it is almost impossible for workers to separate work from family time.

Several studies on working from home already exist (Gajendran & Harrison 2007; Rupietta & Beckmann 2016), but the implementation of working from home during this pandemic, especially in Indonesia is not the same as before, including at the Ministry of Religious Affairs of Sukabumi Regency. As one of the government agencies, the Ministry of Religion of Sukabumi Regency implements a work-from-home system by following the Circular Letter of the Minister of Administrative Reform and Bureaucratic Reform No. 19 of 2020 regarding the adjustment of the work system of the state civil apparatus to prevent the spread of COVID-19. The implementation of the work from home system at the Ministry of Religion of Sukabumi Regency includes three stages, starting from 30%, 70% to 100% working from home. In addition, the implementation of the work from home system at the Ministry of Religious Affairs of Sukabumi Regency also refers to the circular letter of the Minister of Religion No. 16 of 2020 concerning the arrangement of the work system in the new normal order for employees within the Ministry of Religious Affairs.

When performing duties and functions, that is, conducting public services, employees of the Ministry of Religious Affairs of Sukabumi Regency faced several changes in the working envi-

ronment, but there are some restrictions. If the concept of working from home was previously designed with a comfortable work location, employees faced with many distractions. This fact because all family members are at home during the pandemic. Zhang (2016) argues that when workers faced with a lot of distractions by family problems, it prevents them from focusing on work.

Working from home also encourages employees to use higher technology. This fact shows the importance of the availability of technology infrastructure that can support work such as computers, laptops, smartphones, and internet network services. Vilhelmson and Thulin (2016) state that the availability of technology and information is a prerequisite for implementing re-mote work. Sukabumi Regency employees live in areas where not all areas have normal access to the signal. According to the head of the Sukabumi Regency Public Information and Communications Division, there are 89 villages that are experiencing a signal crisis or included in areas that are far from the coverage of the cellular provider's signal. This fact resulted in an unstable internet network there. Meanwhile, the internet network is one indicator of the technology infrastructure that needed when working from home.

The changes and restrictions that have occurred due to the work-from-home system have challenged employees and staffing coaches in managing changes and ensuring that they maintain effective performance. At the same time, the effectiveness of performance when working from home is still a controversy, especially in the religious department of Sukabumi Regency, so it is interesting to do research. This analysis can then be used as a study for staffing supervisors or the government to improve the efficiency of working at home. The aim of study to analyze effectiveness of employee performance while working from home. Employee performance can not be separated from the factors that influence it. as well as performance when working from home. The factors discussed earlier such as the work environment, technology infrastructure, work autonomy and intrinsic motivation are thought to influence the effectiveness of employees in achieving their work goals or targets. Therefore, this paper also aims to analyze the effect of the work environment, technology infrastructure, work autonomy, and intrinsic motivation on employee performance.

2. RESEARCH METHODS

This research was carried out from March to June 2021 with the object of research the Ministry of Religious Affairs of Sukabumi Regency. Primary data was obtained through survey results using online questionnaires distributed through google form media to employees and interviews with personnel analysts. The questionnaire was measured using a Likert scale which is a non-comparative and naturally single-dimensional scaling technique (Santosa, 2018). The Likert scale used is a scale of 1-5 because according to Santosa (2018) the Likert scale of 1-5 is the most frequently used.

The population in this study were employees of the Ministry of Religious Affairs of Sukabumi Regency, amounting to 1200 people. The sample selection was carried out using a probability sampling procedure using a simple random sampling method. Employees are selected by

random and have an equal chance of being selected. The number of samples was determined using the Slovin formula.

$$n = \frac{N}{1 + Ne^2} \dots\dots\dots(1)$$

N = population; e= error value

Total population is 1200 people and the research error value is 10%, then the minimum number of sample is 92 people with the following calculations.

$$n = \frac{1200}{1+1200.0,1^2} = 92.3 \dots\dots\dots(1)$$

Based on the formula, the required number of sample is at least 92 respondents, but in this study, the number of samples was set at 120 respondents due to considering the existence of a defective or unprocessed questionnaire. The determination of 120 respondents also refers to Santosa (2018) that the minimum sample is 10% of the population.

Data analysis was carried out used the Wilcoxon Signed-Rank test to compare the employee’s performance be-fore and during working from home. This research undergo two times of data collection, before and during work from home. After that, an analysis of the differences in employee responses was carried out which then concluded about the effectiveness of the employee's performance while working from home. Furthermore, this study used Structural Equation Modeling (SEM) with partial least squares (PLS) to analyze the effect of work environment, tech-nology infrastructure, job autonomy, and intrinsic motivation on employee’s performance. SEM is a multivariate statistical analysis technique, which allows researchers to examine the direct and indirect effects between complex variables, either repeatedly or non-repeatedly to obtain a comprehensive picture of a model (Hair *et al.*, 2017).

3. RESULTS & DISCUSSION

The results of the study will discuss two objectives, the first is about the effectiveness of performance, the second is about the factors that affect performance. In more detail, the discussion of the second objective is the influence of the work environment, technological infrastructure, work autonomy, and intrinsic motivation on performance. This is illustrated in the following model.

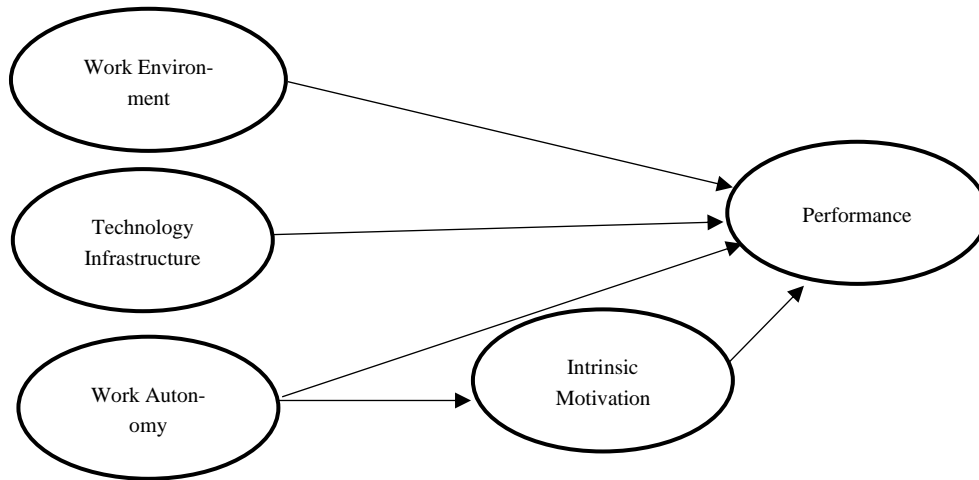


Figure 1. Conceptual Model Research

Source : Data Processed, 2021

First, we will discuss the first objective, which is about the effectiveness of employee performance. The result of Wilcoxon Signed-Rank test showed a probability value (sig.2-tailed) of less than 0.05 for each indicator (**Table 1.**). The result shows that there is a significant difference in performance before and when working from home. The difference in performance can be seen to increase or decrease as seen from the number of positive and negative ratings on the Wilcoxon test results.

Table 1. The result of Wilcoxon Signed-Rank Test

No.	Performance indicators	Z	Sig.(2-tailed)	Positive rank	Negative rank	Ties
1	Work quality	-4,748	0,000	9	46	65
2	Work quantity	-4,846	0,000	10	43	67
3	Punctuality	-5,356	0,000	11	53	56
4	Cost effectiveness	-2,146	0,032	23	38	59
5	Work independent	-3,361	0,001	16	38	66
6	Work commitment	-4,105	0,000	10	38	72
Average				13	43	64

Source : Data Processed (2021)

In the table above, positive rank is the number of employees who have improved performance. Negative rank is the number of employees who experience a decrease in performance, and ties is the number of employees who do not experience a change in performance. That means, the performance before and during work from home remains the same. Further, **Table 1.** shows that the number of negative rank on each performance indicator is greater than the number of positive rank. This indicates that there are differences in performance that lead to negative or there has been a decline. This indicates that employees whose performance decreases when working from home is higher than those who experience an increase. Therefore, it can be concluded that employee performance is considered less effective while working from home.

It shows that there are employees who has not been able to achieve maximum work results according to work goals and targets in conditions of working from home. It indicates that employees have not been able to manage change and overcome the constrain faced while working from home.

After being confirmed, there were several constraints caused their performance to decline while working from home. First, the incompleteness of work equipment can hinder the process of completing the work. In addition, for types of work such as teachers, the availability of technology owned by students sometimes does not match what is needed so that the teacher's work is not optimal. Furthermore, the problem of an unstable internet network can hinder the completion and delivery of tasks in accordance with the specified time. The limitations of communication and interaction are also a constrain for employees who have community service jobs.

To test the effect of these four factors on performance, SEM PLS analysis was used including two stages, the outer model and the inner model. The first, discussing the results of the outer model analysis. The focus of this analysis is to see whether or not the validity and reliability requirements of the data obtained from the respondents. The measure of validity in this measurement model is called convergent validity, which is seen from the value of the outer loading of the latent variable and its indicators.

The definition of instrument validity in the context of quantitative research is put forward by research method experts as "The degree to which it measures what it is supposed to measure" (Pallant, 2010; Sugiyono, 2010). This means that the validity of a study is related to the extent to which a researcher measures what should be measured. Based on the criteria of Hair *et al.* (2017), an indicator of a variable is valid if it has a minimum outer loading value of 0.70. The results of the analysis show that all indicators of each variable have a loading factor value of more than 0.7 (**Table 2.**), so all indicators are considered valid. This shows that the indicators used can explain well the latent variables. The results of the analysis show that all indicators on each variable are valid. That is the variables used in this study are able to measure what should be measured. In other words, the measured variable is really the variable that the researcher wants to study. In particular, the validity of quantitative research is rooted in the view of empiricism which emphasizes evidence and objectivity.

Table 2. Outer loading result

Latent/variable	Indicator	Outer Loading	Description
Work environment	Room condition	0.89363	Valid
	Infrastructure	0.84713	Valid
	Working tools	0.82296	Valid
	Relationship between employees	0.83598	Valid
	Work relationship	0.79000	Valid
Technology infrastructure	Physical availability	0.91479	Valid
	Physical quality	0.90785	Valid
	Suitability	0.81209	Valid
Work autonomy	Freedom	0.88958	Valid
	Independence	0.88624	Valid
	flexibility	0.85824	Valid
Intrinsic motivation	Interest	0.93733	Valid
	Behavior	0.94831	Valid
	Needs	0.92054	Valid
Performance	Work quality	0.92378	Valid
	Work quantity	0.92842	Valid
	Punctuality	0.92194	Valid
	Cost effectiveness	0.79188	Valid
	Independence	0.85869	Valid
	Work commitment	0.84198	Valid

Source : Data Processed (2021)

In addition to convergent validity, the results of the measurement model can also explain discriminant validity which indicates construct reliability or internal consistency. This internal consistency is measured by the value of composite reliability and Cronbach alpha. Hair *et al.* (2017) states that a variable is reliable if the variable has a composite reliability (CR) and Cronbach alpha (CA) value of more than 0.7.

Table 3. Reliability analysis

Latent	Composite Reliability	Cronbachs Alpha	Description
Work environment	0.92	0.81	reliable
Technology infrastructure	0.91	0.85	reliable
Job autonomy	0.91	0.85	reliable
Intrinsic motivation	0.95	0.93	reliable
Performance	0.95	0.94	reliable

Source : Data Processed (2021)

The results show that the value of CR and CA in each latent variable is more than 0.7 (**Table 3.**). This shows that the latent variables of work environment, technology infrastructure, work autonomy, intrinsic motivation, and performance have sufficient internal consistency values.

The next step in PLS SEM analysis is to explain the results of the inner model. The inner model can be evaluated by looking at the coefficient of determination or R^2 on the endogenous variables. The coefficient of determination shows how much the endogenous variable can be explained by the exogenous variable. The value of R^2 also indicates the predictive power of the path model. Based on the criteria of Hair *et al.* (2017) the R^2 value is 0.25 including the weak model, 0.50 medium model, and 0.75 including the strong model. The results of the analysis show that the value of R^2 on the intrinsic motivation variable is 0.145. It shows that the work autonomy variable can explain intrinsic motivation by 14.5% and the remaining 85.5% is explained by other variables. The value of R^2 on the intrinsic motivation variable shows a weak predictive model. The value of R^2 on the performance variable is 0.57. This shows that the variables of work environment, technology infrastructure, work autonomy, and intrinsic motivation can explain the performance of 57.3% and the remaining 42.7% is explained by other variables. The value of R^2 on the performance variable shows a moderate predictive model.

The next is hypothesis testing which can be seen from the value and significance of the path coefficient. The hypothesis can be accepted if the path coefficient value is greater than 0.1 and the P-values are less than 0.05 and the T-statistic value is greater than t-table at the level of = 0.05 (1.96).

Table 4. Value and significance of the path coefficient.

Path	Original sample	T statistics	P-Values	Description
Work environment → Performance	0.61	8.86	0.000	Significant
Technology infrastructure → Performance	0.17	2.56	0.000	Significant
Job autonomy → Performance	0.05	0.99	0.060	No Significant
Job autonomy → Intrinsic motivation	0.38	6.71	0.000	Significant
Intrinsic motivation → Performance	0.30	4.90	0.000	Significant

Source : Data Processed (2021)

The P-value on the path of work environment to performance is 0.000 (**Table 4.**) or less than 0.05. It shows that the work environment has a significant effect on employee performance. It indicates that comfortable work space conditions and complete work equipment can encourage employees to achieve their performance while working from home. On the other hand, uncomfortable work space conditions and incomplete work equipment will hinder employees in achieving their performance while working from home.

This decreased performance was due to incomplete work equipment at home. Work needs such as printing work results, using stamps, signatures and others cannot be done easily while at home because of incomplete equipment. This usually occurs in the type of community service work. This constraint causes work to be delayed which results in delays in completing tasks. In addition, some employees stated that the unfavorable home conditions caused them not to focus

on work. It causes the target to be achieved in terms of quantity but the results are less than optimal in terms of quality. This findings are in accordance with the research of Awanis and Khatijah (2017) who found that the work environment affects employee performance. The work environment has the potential to affect employee morale, productivity, and performance. A bad work environment can affect employee performance such as delays in completing work, frustration, and can also affect the personal growth of each employee. In addition, an unpleasant workplace can affect the concentration and attention of workers. The unfavorable working environment conditions in this study were incomplete work equipment, and unfavorable workplace conditions because many family members were at home.

The P-value on the path of technology infrastructure to performance is 0,000 or less than 0.05. It shows that technology infrastructure has a significant effect on performance. It indicates that the availability of technology and good technology quality can encourage employees to achieve their performance while working from home. The decline in performance for some employees while working from home indicates that the availability of technology such as computers, laptops, smartphones, and internet network services for some employees is still not good or not as needed. Poor or unstable internet network services have an impact on work processes during online meetings, online learning, and online report collection. Employees as teachers often experience interruptions when teaching through zoom meetings due to unstable networks. In addition, employees as religious instructors also stated that online counseling activities produced less than optimal output because not all people had the skills to use technology.

The findings of this study are in accordance with Jabbouri *et al.* (2015) who found that the availability of technology infrastructures such as hardware, software, and databases helped improve employee performance in innovating. This finding was also accordance with Ratna and Kaur (2016) who found that performance is the job factor that is most influenced by technology among other job factors. It shows that the technology factor is very influential on the performance.

The P-value on the path of job autonomy to performance is 0.060 or greater than 0.05. It shows that work autonomy has no significant effect on performance. This findings can be indicated that the increased work autonomy felt by employees has no effect on their performance. The creation of freedom and flexibility when working from home does not then encourage employees to achieve their performance. Based on the questionnaire responses, the average employee answered quite agree that the level of freedom at work was higher when working from home. However, the freedom referred to is more about the flexibility in determining the place of work, not the freedom to determine the working hours and work methods used. As civil servants, employees of the Ministry of Religious of Sukabumi Regency do not have a high degree of discretion in completing work like private employees. This is because civil servants already have clear main tasks with predetermined working hours so that employees cannot complete work at certain hours according to their wishes. In addition, the freedom to determine the workplace is not as free as working from home conditions before the pandemic. The pandemic conditions forced employees to continue working from home with all family members at home.

This finding contradicts previous research which found that work autonomy has a significant effect on performance (Johari and Yahya, 2016; Nesheim *et al.*, 2017; Ahmetoglu *et al.*, 2019). The results of the analysis of Nesheim *et al.* (2017) show that autonomy is positively related to in-role and extra-role performance. They explained that the greater the job autonomy, the stronger the ability to achieve performance. The results of the analysis show that work autonomy is considered to have a positive effect on performance.

The P-value on the path of work autonomy to intrinsic motivation is 0.000 or less than 0.05. It shows that work autonomy has a significant effect on intrinsic motivation. However, judging from the value of the coefficient of determination, intrinsic motivation is only explained about 14.5% by work autonomy. It shows a weak model, so that it is suspected that there are other variables that are more capable of creating intrinsic motivation than work autonomy. After confirmation, the motivation of employees of the Ministry of Religious Affairs of Sukabumi Regency in completing work while working from home was not due to a higher level of autonomy. Employees want to complete assignments while working from home because of the need to fulfill their responsibilities as civil servants. Employees have an awareness of the workload that must be completed in accordance with the goals that have been set. Therefore, employees try to complete the work according to the target even though it is done at home. The significance value of the influence of work autonomy on intrinsic motivation according to Theurer *et al.* (2018) states that when employees have high work autonomy, their intrinsic motivation increases. This is reinforced by the results of the analysis of Diamantidis and Chatzoglou (2018) which show that work autonomy as a work factor greatly influences intrinsic motivation as a factor related to employees.

The results of the analysis show that work autonomy has a significant effect on intrinsic motivation, while intrinsic motivation has a significant effect on performance. This shows that work autonomy has an indirect effect on performance. The indirect effect is meant that autonomy has an influence on performance mediated by intrinsic motivation. This indicates that intrinsic motivation acts as a mediator between work autonomy and employee performance. This is explained by previous research that intrinsic motivation as a factor related to employees acts as a mediator between work autonomy as a work factor and employee performance (Diamantidis and Chatzoglou 2018).

The P-value on the path of intrinsic motivation to performance is 0.000 or less than 0.05. It shows that intrinsic motivation has a significant effect on performance. The creation of intrinsic motivation can encourage employees to achieve performance while working from home. This shows that a high interest or attitude in carrying out work will support the achievement of performance when working from home. It also shows that employees who have effective performance when working from home have a fairly high intrinsic motivation.

This finding is in accordance with Cetin and Askun (2018) through the results of their analysis which found that self-efficacy and intrinsic motivation had a significant effect on performance.

They explain that intrinsic motivation has an important role that affects employee performance. In addition, intrinsic motivation also acts as a mediator between self-efficacy at work and employee performance. Furthermore, Mardanov (2020) also found that intrinsic motivation has a significant effect on employee performance regarding job satisfaction. Thus, the results of this study indicate that a high level of intrinsic motivation will encourage the achievement of employee performance.

4. CONCLUSION & SUGGESTION

The results of the study indicate that the performance of employees of the Ministry of Religious Affair of Sukabumi Regency is considered less effective while working from home. It is shown by a decrease in the performance of some employees based on the result of Wilcoxon analysis. The work environment, technology infrastructure, and intrinsic motivation have a significant effect on employee performance while working from home. Meanwhile, there is no significant effect of work autonomy on performance.

The strategy that the government can do in terms of the work environment is the application of digitizing work techniques in all fields, such as online reports and online signatures. This is done to overcome the incompleteness of employee work equipment. Digitizing the work system can reduce the use of work equipment such as printing and copying documents, thereby reducing constrain in achieving performance. Furthermore, in terms of technology infrastructure, the government can cooperate with cellular service providers so that all employees can use the right provider so that they do not experience network disturbances when working from home. In addition, the government needs to provide training in the IT field so that the ability of employees to use technology increases. This will further encourage employees to achieve their performance while working from home.

In addition, to increase intrinsic motivation, it is necessary to have a truly objective performance appraisal from the leadership. This relates to the benefits that will be obtained by employees. Through objective assessment, employees will try to achieve performance to get benefits. Furthermore, there needs to be a personal approach from the leadership to employees, such as encouraging and stimulating employees to be able to complete tasks optimally while working from home because it is a duty as a civil servant.

For further researchers, other models need to be developed by including the type of work and the intensity of working from home. Differences in the intensity of working from home can result in differences in performance, as well as the type of work. The weakness of this study is that performance is measured based on perception, so it is recommended for further research to use actual performance in measuring performance effectiveness.

ACKNOWLEDGEMENT.

The author would like to gratefully acknowledge funding provided by the Indonesian Financial Fund Management Institute.

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