MODEL DEVELOPMENT IN DECISION MAKING ON VILLAGE APPARATUS PERFORMANCE MEASUREMENT AFTER WORKING FROM HOME USING WEIGHTED PRODUCT METHOD

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Abstract
These changes in performance of course affect the effectiveness of public services and the performance of the village apparatus, starting from the service system of the apparatus, the productivity of the apparatus and the accountability of the apparatus in carrying out government affairs delegated by the Regent. Given the pandemic situation which is gradually easing, the government has again changed the work system for personal public services while still adhering to health protocols. The return of the old model of public administration performance system certainly affects the productivity and accountability of village apparatus. This research was conducted to measure the Performance of Village Apparatus in Kalirejo Village, Central Lampung using the Weighted Product Method which is a decision-making method using multiplication which connects the value of the criteria, where the value for each criterion must be raised to the power of the weight of the criteria concerned. The Weighted Product Method was chosen because it was able to complete every existing alternative. The function of the Weighted Product Method determines the weight value for each alternative and the assessment criteria which have been determined. There are seven criteria used in this study. Those criteria are Education, Productivity, Public Service, Quality of Human Resources, Accountability, Facilities, and Income Per-capita. The results of this study are the development of a model which can be used as a benchmark for assessing village officials in Kalirejo village, Central Lampung as a trial object of research. This decision-making model can also be implemented with a mobile web application for a wider range of measurements with larger data.

I.   INTRODUCTION

According to the 2014 Law on Villages, it explains that the Village is a legal community unit which has territorial boundaries which are authorized to regulate and manage government affairs, the interests of the local community based on community initiatives, origin rights, and traditional rights which are recognized and respected in the government system. Republic of Indonesia. To be able to carry out the mandate of the Act, the government needs the support of government officials who are strong, professional, responsible and able to compete globally. Thus, the Village Apparatus as the executor of the mandate to accelerate the realization of the welfare of the Village community must have the ability to

manage the human resources available in their respective regions [1].

The Village Government carries out the functions of government administration, community empowerment, community services, administering public peace and order, maintaining public infrastructure and facilities, and fostering community institutions. Working From Home (WFH) is a term for working remotely, or more precisely, so workers do not need to come to the office and face to face with other workers, where all work is done at home, but with strict supervision from their superiors. WHO has announced a worldwide COVID-19 virus pandemic. President Joko Widodo in his speech issued policies and instructed Indonesians to study and worship from home. This is a strategic step taken by the government to prevent the virus outbreak which is becoming increasingly widespread in Indonesia at this time (BPS, 14/2021) [2].

Based on LAKIP data for 2020, the implementation of activities for the 2020 office administration service program was realized with a percentage of 83%; the program for improving the infrastructure of the apparatus was realized with a percentage of 55.9%; increased discipline of the apparatus was realized with a percentage of 0%; the program to improve the development of the performance and financial achievement reporting system was realized with a percentage level above 99%; financial management program was realized with a percentage rate of 100%; communication, information and mass media development program was realized 0%; sectoral statistics organizer program was realized with a percentage of 36%; the program for improving human resources in the field of communication and information was realized with a percentage of 30.3%; program to improve access and quality of public information was realized with a percentage of 99%; and the program for improving and developing an electronic-based government system was realized with a percentage of 66.6%. This indicates that the activities or programs targeted by the government have not been fully implemented yet [3].

From the explanation above, in an effort to improve post-WFH services, Kalirejo Village, Central Lampung, needs to develop tools and models for assessing the performance of Village Apparatus as an effort to improve performance in providing services to the community. The implementation of the village government can be better directed and even more advanced if the performance of the village apparatus in providing services is not slow and not formal, so that the community feels that their interests can be served well. Therefore, after the implementation of WFH, Kalirejo Village, Central Lampung, requires the development of a system or method which can

process assessments properly, effectively and objectively. With this research, the performance assessment of the Village Apparatus in Kalirejo Village, Central Lampung applies several assessment criteria which have been determined by applying the Weighted Product Method as the testing method. The measurement of the performance of the Village Apparatus was carried out to determine the performance of the Village Apparatus in Kalirejo Village, Central Lampung. The existence of this performance measurement is expected to be able to improve the quality of performance and public services in the village community.

II. LITERATURE REVIEW
Previous Research Studies

Previous research conducted by Siti Mukodimah (2018) was said that the Weighted Product method is used to measure the performance index of the Village Head in Pringsewu District by using several criteria. The measurement of the village head's performance index in Pringsewu District uses several criteria used in this study such as: (1) Developing sources of income, (2) Community empowerment, (3) Community welfare, (4) Public services, (5) Unemployment rate, and the (6) Income per capita. This study focuses on awarding the village head in the Pringsewu sub-district [4]. Andreas Andoyo et al (2019) conducted a study on the Performance Measurement of Village Heads in Pringsewu Regency. The village head's performance measurement uses an assessment tool based on a mobile web application using the criteria and weighting of the Simple Additive Weighting method. The sample tested used eighteen villages spread over nine sub-districts in Pringsewu Regency. The criteria used are: (1) Gender, (2) Length of Service, (3) Facilities and Infrastructure, (4) Village Classification Based on Level of Development, (5) Education, (6) Program Achievement, (7) Community Welfare [5]. Research conducted by Winda Maharani (2021) using the partial hypothesis test method showed that the effect of working from home system on the performance of Government employees during the pandemic has a significant positive effect. This is supported by the results obtained by the value of t arithmetic > t table (8.811 > 1.665) and a significant value (0.000 < 0.05; 2). The results of the calculation of the coefficient of determination can be explained that the WFH system has an influence of 51.2% on the performance of temporary employees, 48.8% is influenced by other factors. Research conducted by Mulyaningsih (2021) using a qualitative descriptive method with a literature review technique showed the results that Consolidation for adaptation of public services during a pandemic,

especially for bureaucratic behavior, communication patterns and regulations needs to be carried out by the government centrally, accompanied by supervision as the dynamics of change that follows development of the situation so that public services for the community can continue to run in harmony, both for policy actors and the community as the goal of public service [6].

The research studies carried out focused and oriented towards the performance of the village apparatus before the COVID-19 pandemic and during Working from Home (WFH) period. This study also examines the identification of the performance of village officials after the WFH period. This research was conducted by focusing on measuring the performance of village officials after the implementation of WFH using the Weighted Product method. The results of this study are in the form of a village apparatus performance measurement model which is implemented with a mobile-based application system with the aim of becoming an assessment standard for village officials in Central Lampung Regency.

Theoretical Framework
Decision Support System

According to [7], decision support system is an interactive information system which provides information, modeling, and manipulating data. Decision support systems provide specialized interactive support for the decision-making processes of managers and other business practitioners. [8], the researcher defines a decision support system as computer-based information that produces various alternative decisions to assist management in dealing with structured and unstructured problems using data and models. Decision Support System Components consist of:
a) Data Management.
   This data includes databases which contain relevant data for various situations and are managed by software called Database Management Systems (DBMS).
b) Management models.
   This model involves financial, statistical, management science, or various other quantitative models, so that it can provide the system with analytical capabilities, and management interfaces.
c) Communication (dialogue subsystem)
   Users can communicate and give commands to the DDS through this subsystem which means providing an interface.
d) Knowledge Management
   This optimal subsystem can support other subsystems or act as stand-alone components.

Village Apparatus Performance Measurement

Performance can be known only if the individual or group of individuals has predetermined success criteria. This success criterion is in the form of certain goals or targets to be achieved. Without a target, a person's performance cannot possibly be known because there are no benchmarks [9]. The performance of the Village Apparatus is important and needs sufficient attention in order to improve and improve the quality of public services [10], [11]. Assessment of the performance of the Village Apparatus is very useful to see or assess the quantity, quality, and efficiency of services; encourage the Apparatus to better understand the needs of the community being served; and improve public services. The role of the leader in improving the performance of the Village Apparatus is behavior which is regulated and expected from the Village Head to be responsible and improve the performance of the Village Apparatus, so that work becomes effective and efficient in improving the performance of the Village Apparatus which includes initiative, supervision, and responsibility. The village performance measurement system can be used as an organizational control tool, because performance measurement is strengthened by establishing a reward and punishment system.

"Work from Home" (WFH)

"Work from Home" (WFH) means doing office tasks from home. But the term WFH is generally defined by the way employees work outside the office. A job or task can be executed from home, from a cafe or restaurant according to the wishes of the employee. This social restriction gives rise to an option so that workers or employees can remain productive at work by changing their place of work not having to be in the office, but at home. The WFH work system does have high flexibility. This is to support employees' balance between work and life. WFH is considered a solution in completing office tasks while still providing space to interact with the people closest to us [12], [13]. This social restriction is carried out so that employees can be productive at work. WFH includes solutions in completing office tasks while staying at home.

III.   RESEARCH METHODS
Data and Sample Collection
Data Collection Stage
Observation is a method of collecting data through direct observation or careful and direct observation in the field or research location. In this case, the research is guided by the design and the research flow is described in the research flow framework. The research was conducted in Kalirejo Village, Central Lampung which aims to measure the performance of the Village Apparatus. From the results of initial observations in the preparation

stage of this research proposal, it was found that the performance of village officials decreased during the covid-19 pandemic, so more accurate models and tools were needed using objective weighting. In this initial data collection process, the researcher also used the Interview Technique with the Village Head. The interview stage was carried out by giving questions about the performance of village officials during the pandemic and after the implementation of WFH.

Sample Collection and Determination of Criteria

The data used in this study is data from the Kalirejo Village, Central Lampung, as a sample village which can be used as a measurement model using 7 (seven) criteria based on Table 1. The sample is tested using 2 (two) stages. In Phase 1, the sample is tested using the Equation/ Formula of the Weighted Product method manually. The results of the manual test are ranked based on the largest value. In Phase 2, the sample is tested using the application of a mobile web-based application program. The results of the manual test are compared with the manual results to see the level of accuracy of the implementation of the application program which was built.

Weighted Criteria
Weighting is done to calculate each criterion and alternative which refers to the *Likert scale*. Those are: 1 (Very Low), 2 (Low), 3 (Enough), 4 (High), 5 (Very High).

Table 1, Criteria Description

Code	Criteria
C1	Education
C2	Productivity
C3	Public service
C4	HR Quality
C5	Accountability
C6	Facility
C7	Income per capita

Weighted Product Method
Weighted Product is a multiplication technique for connecting attribute ratings, where the rating of each attribute must be raised to the first rank with the corresponding weight attribute [14][15]. The steps taken in solving the problem using the Weighted Product method are:
Normalizing or correcting the weights

$$wj = \frac{wj}{\sum wj} \qquad (1)$$

Normalizing or correcting the weights is to produce the value of $wj = 1$, where $j = 1, 2,…… $ n is many alternatives and $\sum wj$ is the total number of weight values.

Determining Vector Value (*s*)
$$Si = \prod_{j}^{n} x_{ijwj} \qquad (2)$$

With i=1, 2, ….., m and *j*=1,2,…..,n
Information:
$\prod$: Product
Si   : Score / value of each alternative
X_{ij} : Alternative value to i to attribute to *j*
W_j : The weight of each attribute or criterion
N   : Many Criteria

Determining the value of the vector (S) by multiplying all the criteria with an alternative normalization result or weight improvement which has a positive rank for the benefit criterion from the negative rank for the cost criterion, where (S) is the criterion and (n) is the number of criteria.

Determining the Value of the Vector (*V*)
$$V_1 = \prod_{j=1}^{n} x_{ijwj} \qquad (3)$$
$$\prod_{j=1}^{n} (x^n_j)_{wj}$$

With I = 1, 2,…., m
Determine the value of the vector (V) where the vector (V) is an alternative preference which is used for ranking from each number of vector values (S) with the total value of all vector values (S).

IV.   DISCUSSION
Manual Test of Weighted Product Calculation Method
Determine the best performance of the Kalirejo Village Apparatus by using a comparison of the Weighted Product method and the Simple Additive Weighting (SAW) method. The following is a discussion of the criteria and weighting values.

Table 1. Table of criteria to be tested

Number	Criteria	Percentage
C1	Education	15%
C2	Productivity	18%
C3	Public service	10%
C4	HR Quality	25%
C5	Accountability	12%
C6	Facility	10%
C7	Income per capita	10%

Table 2. C1 Education

Number	Criteria	Value
1	SMA/SMK Equivalent	2
2	D1, D2	3
3	D3	4
4	S1	5

Table 3. C2 Productivity
The criteria for work productivity according to Sedarmayanti (2009:235)

Number	Productivity
1	Work attitude

2	Skill level
3	The relationship between employees and leaders
4	Productivity management
5	Labor efficiency
6	Entrepreneurship

Table 4. C2 Sub-criteria for productivity

	Productivity sub criteria	Indicator
A	Work attitude	Village apparatus work ethic while carrying out their duties
		There is use of time.
B	Skill level	Can complete tasks.
		There are rewards and sanctions.
		Can show achievements
C	The relationship between employees and leaders	Leaders are able to coordinate.
		There is good communication.
D	Productivity management	There are work arrangements.
		There is the ability of the apparatus to achieve productivity.
E	Labor efficiency	There is a division of tasks according to the main tasks and functions.
		There are additional tasks.
		There is a clear division of tasks.
F	Entrepreneurship	Ability to operate Education
		Employees are able to take the risk.

Table 5. C2 Productivity

Number	Sub Criteria	Value
1	If the ABCDEF criteria are met	5
2	If the ABC criteria are met	4
3	If AB criteria are met	3
4	If only A criterion is met	2

Table 6. C3 Public Services

Criteria		Sub criteria
	A	Fast Administration Service
	B	Information and communication services with the community
Public services		
	C	Village and PLIDES

		health post services
	D	Educational Development for early childhood

Table 7. C3 Public Services

Number	Sub Criteria	Value	Information
1	If the ABCD criteria are met	5	SB
2	If only ABC criteria are met	4	B
3	If only AB criteria are met	3	R
4	If only A criterion is met	2	SR

Table 8. C4 Human Resources Quality

Number	Criteria	Value
1	Education quality	5
2	Revenue quality	4
3	Health quality	3

Table 9. C5 Accountability
As for Accountability based on the thoughts of Mohamad et al (2004, p.50)

Criteria		Sub Criteria
	A	Accountability includes financial statements consisting of income, storage, and expenses.
Accountability	B	Accountability includes the results of achieving the procedure and the achievement of these goals.
	C	Accountability includes procedures with the principles of ethics, morality and legal certainty.

Table 10. Sub Criteria C5

Number	Criteria	Value	Information
1	If the ABC criteria are met	5	ST
2	If only the AB criteria are met	4	T
3	If only A criterion is met	3	R

Table 11. C6 Facilities

Criteria		Sub Criteria
Facility	A	Have computer and laptop facilities
	B	Have an internet network
	C	Have a Communication Tool
	D	Have Social Media

Table 12. Sub Facilities

Number	Criteria	Value
1	If ABCD is reached	5
2	If only ABC is reached	4
3	If only AB is reached	3
4	If only A is reached	2

Table 13. C7 Income Per-capita

Num	Criteria	Value	Information
1	0-200.0000	1	Very low
2	201.000-600.000	2	Low
3	601.000-1.000.00	3	Enough
4	1.100.000-2.000.000	4	Good
5	>2.000.000	5	Very good

The research above is about the performance decision-making system of Kalirejo Village Apparatus using the Weighted Product method. Kalirejo Village consists of 15 Village Apparatus as an index whose performance is measured. After knowing the data, then given a weight value for each criterion based on the data obtained

Table 14. Alternative Weighting of Each Criteria

Alternative	C1	C2	C3	C4	C5	C6	C7
A1	5	5	2	4	2	3	2
A2	3	4	2	4	3	3	2
A3	4	3	4	5	5	2	3
A4	5	2	5	3	3	2	3
A5	2	2	5	4	3	5	2
A6	3	5	3	4	5	4	4
A7	4	4	3	4	4	4	3
A8	5	3	2	2	3	3	3
A9	2	3	4	3	3	5	2
A10	3	3	4	3	3	5	2
A11	5	4	3	2	2	3	3
A12	4	2	2	5	5	4	5
A13	5	3	5	5	5	4	4
A14	2	3	4	5	3	4	4
A15	5	5	2	2	2	5	5

Calculate the weighted value of each criterion first. At the initial weight, W = (15, 18, 10, 25, 12, 10, 10), is improved. $\sum WJ = 1$, using $WJ = WJ \sum WJ$

$$W_1 = \frac{15}{15 + 18 + 10 + 25 + 12 + 10 + 10} = \frac{15}{100} = 0,15$$

$$W_2 = \frac{18}{15 + 18 + 10 + 25 + 12 + 10 + 10} = \frac{18}{100} = 0,18$$

$$W_3 = \frac{10}{15 + 18 + 10 + 25 + 12 + 10 + 10} = \frac{10}{100} = 0,1$$

$$W_4 = \frac{25}{15 + 18 + 10 + 25 + 12 + 10 + 10} = \frac{25}{100} = 0,25$$

$$W_5 = \frac{12}{15 + 18 + 10 + 25 + 12 + 10 + 10} = \frac{12}{100} = 0,12$$

$$W_6 = \frac{10}{15 + 18 + 10 + 25 + 12 = 10 = 10} = \frac{10}{100} = 0,1$$

$$W_7 = \frac{10}{15 + 18 + 10 + 25 + 12 + 10 + 10} = \frac{10}{100} = 0,1$$

Then calculate the vector S for alternative 1 to alternative 15 using the following formula: $Si = \prod_j^n Xij^{wj}$ (4)

$$S_1 = (5^{0,15})(5^{0,18})(2^{0,1})(4^{0,25})(2^{0,12})(3^{0,1})(2^{0,1}) = 3,35$$

$$S_2 = (3^{0,15})(4^{0,18})(2^{0,1})(4^{0,25})(3^{0,12})(3^{0,1})(2^{0,1}) = 3,13$$

$$S_3 = (4^{0,15})(3^{0,18})(4^{0,1})(5^{0,25})(5^{0,12})(2^{0,1})(3^{0,1}) = 3,73$$

$$S_4 = (5^{0,15})(2^{0,18})(5^{0,1})(3^{0,25})(3^{0,12})(2^{0,1})(3^{0,1}) = 3,04$$

$$S_5 = (2^{0,15})(2^{0,18})(5^{0,1})(4^{0,25})(3^{0,12})(5^{0,1})(2^{0,1}) = 2,99$$

$$S_6 = (3^{0,15})(5^{0,18})(3^{0,1})(4^{0,25})(5^{0,12})(4^{0,1})(4^{0,1}) = 3,98$$

$$S_7 = (4^{0,15})(4^{0,18})(3^{0,1})(4^{0,25})(4^{0,12})(4^{0,1})(3^{0,1}) = 3,77$$

$$S_8 = (5^{0,15})(3^{0,18})(2^{0,1})(2^{0,25})(3^{0,12})(3^{0,1})(3^{0,1}) = 2,81$$

$$S_9 = (2^{0,15})(3^{0,18})(4^{0,1})(3^{0,25})(3^{0,12})(5^{0,1})(2^{0,1}) = 2,93$$

$$S_{10} = (3^{0,15})(3^{0,18})(4^{0,1})(3^{0,25})(3^{0,12})(5^{0,1})(2^{0,1}) = 3,12$$

$$S_{11} = (5^{0,15})(4^{0,18})(3^{0,1})(2^{0,25})(2^{0,12})(3^{0,1})(3^{0,1}) = 2,93$$

S_{12}
$= (4^{0,15})(2^{0,18}) (2^{0,1})(5^{0,25})(5^{0,12})(4^{0,1})(5^{0,1})$
$= 3,65$

S_{13}
$= (5^{0,15})(3^{0,18}) (5^{0,1})(5^{0,25})(5^{0,12})(4^{0,1})(4^{0,1})$
$= 4,36$

S_{14}
$= (2^{0,15})(3^{0,18}) (4^{0,1})(5^{0,25})(3^{0,12})(4^{0,1})(4^{0,1})$
$= 3,49$

S_{15}
$= (5^{0,15})(5^{0,18}) (2^{0,1})(2^{0,25})(2^{0,12})(5^{0,1})(5^{0,1})$
$= 3,25$

Table 15, the results of ranking the performance of the Kalirejo Village Apparatus using the Weighted Product (WP) method

Number	Alternative	Results
1	A1	0,06
2	A2	0,06
3	A3	0,07
4	A4	0,06
5	A5	0,05
6	A6	0,07
7	A7	0,07
8	A8	0,05
9	A9	0,05
10	A10	0,06
11	A11	0,05
12	A12	0,07
13	A13	0,08
14	A14	0,06
15	A15	0,06

V.   CONCLUSION

Based on the research conducted, it can be concluded that the use of a decision support system with the Weighted Product method to determine the performance of the Kalirejo Village Apparatus can be used as a solution to solve problems in determining performance appropriately by applying several criteria in making this decision: (1) Education, (2) Productivity, (3) Public Services, (4) Quality of Human Resources, (5) Accountability, (6) Facilities, (7) Per capita income based on the criteria and the predetermined weight value of the Village Apparatus performance assessment.

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