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Measurement of Workload Analysis in Determining the Optimal Number of Workers

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Abstract— The role of Human Resources (HR) is very vital in an organization, both government and private organizations. The reality of HR professionalism is often not fully realized. One of the reasons is the mismatch between employee competencies and the positions that they occupy, that is caused not only by the composition of employee skills or skills that are not yet proportional, but also the recruitment that does not refer to the needs of the organization. In order to obtain human resources that are appropriate to the needs of the organization, it is necessary to measure the employee workload so that employees can be optimal in carrying out their work. Workload measurement is needed to determine the time for an employee who meets the requirements (qualified) in carrying out certain jobs at a predetermined level of achievement. In an organization, it is necessary to arrange workload for each employee who is the responsibility of acting officials in it, so that the equal distribution of employee workload can improve employee performance and so now, of course, can improve overall organizational performance.

Keywords— *measurements, workload analysis, optimal.*

I. INTRODUCTION

As the era of globalization, the role of Human Resources (HR) is very vital in an organization both government and private organizations. Organizing the activities of an agency or organization that is effective, efficient and economical is a demand. The fulfillment of these demands is intended to realize the professionalism of Human Resources (HR) in carrying out its duties. In fact, the condition of HR professionalism is often not fully realized. One of the reasons is the mismatch between employee competencies and the position they occupy. One of the discrepancies is caused by the proportion of employees' expertise or skills that are not yet proportional. In addition, the recruitment and distribution of employees still do not refer to the real needs of the organization, this can be interpreted that the recruitment and distribution of employees are not based on the workload of agencies or organizations. The result is a swollen quantity of employees in one unit of an agency or organization without a clear job and a lack of employees in another unit. There is also a problem that the formation of organizations tends not to be based on real needs, for the example, institutions or organizations that are formed are too large while the workload is small so that the achievement of organizational goals is inefficient and ineffective.

HR needs are increasing both in terms of quality and quantity in the face of increasingly competitive competition, companies need HR who have high competence. Hiring a competent and suitable individual to fill a position is a true win-

win proposition — a win for both the new employee and the employer. Recruiting competent people for positions in which they can succeed, feel good about what they are doing, and experience the positive regard of their co-workers is highly reinforcing to everybody [1]. To get HR in accordance with the needs of the organization, workload measurements are needed so that employees can be optimal in carrying out their work. In the work that the workload of employees is something that always needs to be considered and adjusted to the abilities and skills of employees. This is caused by the measurement of workload will make employees' work in accordance with the workload that is the responsibility and prevent the possibility of overlapping work, waste and throwing responsibilities at each other if something goes wrong.

Workload measurement is needed to determine the time for an employee who meets the requirements (qualified) in carrying out certain jobs at a predetermined level of achievement. In an organization, it is necessary to arrange workload for each employee who is the responsibility of acting officials in it, so that the equal distribution of employee workload can improve employee performance and so now, of course, can improve overall organizational performance.

II. REVIEW OF RELATED LITERATURE

A. Workload

Every leader certainly expects his employees to have high performance or productivity. In fact, in the minds of the leaders there are thoughts related to the existing human resources in the company, namely:

1. How is the work efficiency of employees currently owned?
2. Are there too many employees or too few employees?
3. How to improve employees' work efficiency?

In answering those questions, the solution is through measurement of workload analysis. Based on Haryanto's opinion in Santoso [2] workload can be interpreted as the number of task activities that must be completed by someone or a group of people during a certain period of time under normal circumstances. Sutarto [3] explains that the burden of the activities of organizational units or workload of each official or employee should be evenly distributed so that there can be avoided the existence of organizational units that are too much activity and there are organizational units of too little activity as well as the existence of officials or employees too many piles of tasks

and there are officials or employees with little workload so that they appear to be too much unemployed. According to Brannicketal., 2007 in Duncel [4] Job and work analysis is essential if we are to describe, understand, and change the way people work and their work environment. It is important because it is the basis for the solution of different human resource problems.

Another opinion, according to Prabawati and Meirinawati [5] workload analysis is the process of determining the number of hours worked by people used or needed to complete a job in a certain time. Job analysis is an empirical study conducted to determine the critical skills and knowledge needed by individuals working in a specific occupation or profession [6].

It can be concluded that workload is the body's ability to accept a work. From an economic point of view, every workload received by a person must be suitable and balanced with the physical and psychological abilities of the workers who receive the workload. Based on the definition as above, there are 3 aspects in the workload analysis according to Santoso [2], namely:

1. Aspects of the tasks that must be done
2. Aspects of people or groups of people who do the task
3. Aspects of the time used to do the task

B. Aim and Objective of Workload Analysis

There are aim and objective in measuring workload analysis. The aim of the measurement of workload analysis is intended to provide an overview of the leadership about the implementation of the workload analysis needs. According to Prabawati and Meirinawati's opinion [5] workload analysis aims to determine how many personnel and the number of responsibilities or workload is best assigned to an officer. The usefulness of workload analysis can be used as a basis for determining the number of human resources needed in a company effectively and efficiently.

C. Types of Workload

According to Santoso [2], the types of workloads can be explained as follows:

1. The individual workload is the total time spent by a position holder to complete all main tasks, additional tasks and other tasks in a position.
2. Position workload is the total time used to complete all main tasks in a position.
3. The unit workload is the total time (standard) used to complete all the main tasks of all positions in a work unit.

III. RESULT AND DISCUSSION

A. Aspects of Workload Analysis

1. Time Norms (Fixed Variables). The time spent producing/completing products/results is relatively fixed so that it becomes a fixed variable in the implementation of workload analysis. Time norms need to be set in the working time norms with the assumption that there is no change which causes time norms change. Changes in time norms can occur due to 1) Changes in policies, 2) Changes in equipment,

3) Changes in quality of human resources, 4) Changes in organization, systems, and procedures.

2. Work Volume (Not Fixed Variable). The work volume is obtained from the target of carrying out the task to get the work/product. Each work volume that varies between units/positions is a variable in the implementation of workload analysis. Example:
 - a. The task of making weekly reports, one of the tasks of the Head of the Sub-Division of Evaluations and Reports is to make evaluation reports and activity reports. For example, effective working days in 1 year for 5 working days is 235 days, then the total of work volume for the task of making evaluations and activity reports in 1 year is $235:5=47$, the unit is frequency.
 - b. The task of making monthly reports carried out once a month. Within 1 month of effective working hours on average 20 days, the total volume of work for the task of making monthly reports in 1 year is $235:20=11.75$ rounded up to 12, the unit is frequency.

3. Effective Working Hours. To be able to do workload analysis properly and correctly, it is necessary to determine the measurement tool first, so that its implementation can be done transparently. This openness/transparency is a requirement that the implementation of workload analysis can be carried out objectively so that the results of the workload analysis report are truly accurate and can be accounted for. The criteria for measuring workload analysis are 1) Valid, meaning that the measuring instrument that will be used to measure the workload in accordance with the material to be measured. 2) Consistent, meaning that in carrying out workload analysis must be consistent time by time. 3). Universal, meaning that the measuring instrument must be used to measure various work units and work results so that there are no other measurement devices or specific to a work unit or work results.

In accordance with the criteria for measuring instruments, in the implementation of workload analysis that is used as a measurement tool is an effective working hour that must be filled with work actions to produce a variety of products that are either concrete (objects) or abstract (services).

Presidential Decree No. 68 of 1995 has determined the working hours of government agencies 37 hours 30 minutes per week. Based on these provisions, effective working hours can be calculated as a measurement tool in conducting workload analysis.

The example of calculation 1:

For 5 working days:

- i. Employees' Weekly Working Hours is 37,5 hours (2250 minutes).
- ii. Employees' Daily Working Hours is 2250 minutes: $5 = 450$ minutes (7 hours 30 minutes).

- iii. Effective Working Hours Per Day is $75\% \times 450 \text{ minutes} = 337,5 \text{ minutes}$, rounded down to 330 minutes (5 hours 30 minutes).
- iv. Effective Working Hours Per Week is $5 \text{ days} \times 330 \text{ minutes} = 1,650 \text{ minutes}$.
- v. Effective Working Hours Per Month is $20 \text{ days} \times 330 \text{ minutes} = 6,600 \text{ minutes}$.
- vi. Effective Working Hours Per Year is $12 \text{ months} \times 6,600 \text{ minutes} = 79,200 \text{ minutes} = 1,320 \text{ hours}$, rounded down to 1,300 hours.

The example of calculation 2:

- i. Effective working days are the number of days on the calendar minus holidays and leave.
For 5 working days:
A number of days per year are 365 days. Number of holidays per year is 130 days - Saturdays - Sundays are 104 days - officials are 14 days - Leaves are 12 days
Effective working days are 235 days
- ii. Effective working hours are the number of formal working hours reduced by work hours lost due to non-work (allowance) such as urinate, defects, fatigue, meal breaks and so on. Allowance averages around 25% of the total formal working hours. 1) Effective working hours per day are 5 working days = $28 \text{ hours} / 5 \text{ days} = 5 \text{ hours } 36 \text{ minutes} / \text{day}$. 2) Effective working hours per year are 5 working days = $235 \text{ days} \times 5 \text{ hours } 36 \text{ minutes} / \text{day} = 1,324 \text{ hours} = 1,300 \text{ hours}$
Those effective working hours will be a measurement of the workload generated by each work unit/position.

B. Steps of Workload Analysis

There are several things that need to be prepared to carry out workload analysis, namely job description. According to Santoso [2] Job description is a list of positions, a list of main tasks and responsibilities, reporting relationships, conditions of office and supervisory responsibilities. This list of main tasks and responsibilities will later be used as a reference to see what activities are needed in fulfilling office responsibilities. Workload analysis needs to do a review of the existing job description to:

- a. Ensure that the job descriptions obtained legally and formally can be accounted for and "up-dated", so that they are worthy of review and use for the benefit of workload analysis.
- b. Understand correctly the position to be analyzed.
- c. Complete if the information is incomplete or unclear. The basis determines the main tasks, additional tasks, daily tasks, periodic tasks, and incidental tasks.
- d. Be the basis for breaking down the tasks into stages/steps/ activities (job elements).
- e. Prepare the interview, observation, and discussion
- f. Obtain an accurate picture of the standard time specified for each task/activity (job element).

As according to Santoso [2] important things to consider in looking at the job description related to workload analysis are as follows:

- a. Make sure that the job description contains only the main tasks, or does it include additional tasks? This will affect the calculation of workload and individual workload
- b. Make sure that the job description is divided into daily/routine tasks, periodic tasks (weekly, monthly, quarterly, yearly) or there is no information about the frequency of tasks. This will make easier to obtain data on completion of tasks and activities
- c. Ensure that the formulation of the tasks in the job description is still abstract or already concrete / real (observable and measurable) in the form of activities (job elements). This will make easier because there is no need to think about the activities of the job assignments
- d. Ensure that whether certain tasks in the job description of a position stand-alone (although still a series of processes) or also the duties of other positions (duplication). Therefore, it is necessary to look at the tasks in the job description of other relevant positions so that the analysis is not confused with the questionnaire data and interview results (except data observation)

C. Steps of Data Collection

After the analyst did review the job description, the necessary step is to collect data from the position holder to find out the actual tasks performed in achieving the main responsibility tasks listed in the job description. Data collection methods can be done with 3 things, namely:

- a. After the analyst did review job description, the necessary step is to collect data from the position holder to find out the actual tasks performed in achieving the main responsibility tasks listed in the job description. Data collection methods can be done with 3 things, namely:
- b. Observations were made on the time of completion of the task elements (activities) whose truth was considered "doubtful".
- c. The interview was conducted by two parties, namely the interviewer who asked the question by interviewing who gave the answer to that question. The interview is related to the job description and time spent carrying out the work.

The following are the steps of data collection:

- a. Preparation step: 1) Determine measurement variables, 2) Make a list of each positions' job, 3) Break down the tasks into activity stages, 4) Make a measurement recording sheet format.
- b. Filling the logbook step
- c. Validation step: 1) Confirmation Interview, 2) Calculation of 'Adjustment' Time, 3) Expert Discussion
- d. Filling the data to worksheets step
- e. Data analysis step [2]

D. Preparation Step

- a. Determining the measurement variable from workload analysis means analyzing the task and time.

- i. The task is a series of activities (task elements) carried out to achieve a goal. The task can be broken down into several activities so as to facilitate the measurement of the processing time. Tasks are distinguished according to their importance / main priority tasks, additional tasks, and other tasks, and according to the recurrence of daily tasks, periodic tasks, and incidental tasks.
 - ii. Time, according to the use of time, can be grouped into 2 types in the context of completing assignments. Cyclical Time is the time that is directly related to the completion of the activity and noncyclical time/allowance is the time used to unwind, relieve boredom or 'refreshing'. The time unit used to obtain more accurate results, the time is calculated in minutes and days. Apart from facilitating the calculation, it is also in accordance with the general standard of working time in Indonesia, which is 8 hours/day.
- b. Making a list of job assignments is to determine/arrange job assignments based on the job description.
 - c. Breaking down the tasks into actionable steps is breaking down tasks into activities. After obtaining the order of tasks per position then the next step is to break down the task into stages of activities that can facilitate the measurement of time. Creating a measurement recording sheet format (Logbook) is making a Logbook that will be used by the incumbent to be analyzed to fill his activities.

E. *Filling the logbook Step*

The challenge that is often experienced in filling a Logbook is that they are confused in classifying the activities that they do, whether classified as main tasks, additional tasks, other tasks, daily tasks, periodic tasks or incidental tasks. Errors in filling out the types of tasks can result in invalid data and data that cannot be used properly to determine the actual workload of the job. Therefore, the analyst must play a role in ensuring that this type of task is carried out correctly by verifying that filling has been made to the position holder.

F. *Validation Step*

The validation step in the workload analysis is the stage to ensure that they write the actual activities they do, not write the expected activities in their positions.

Three things that need to be validated by the analyst to the position holder in filling out the Logbook conducted by the analyst are an activity, time, and type of task. Activities must be in accordance with the types of tasks performed, for example the activity listed is making monthly reports but written by "TH" code which means daily tasks. The next stage of validation is to determine the time of adjustment. Adjustment time is a calculation to 'normalize' an individual time data that might be influenced by things that are difficult to control, such as skills, experience, and so on.

G. *Filling the Data to Worksheets and Data Analysis Step*

How to enter the validated primary data into the workload analysis worksheet.

IV. CONCLUSIONS

A. *Conclusion*

The purpose of the measurement of workload analysis is intended to provide an overview of the leadership about the implementation of the workload analysis needs. The usefulness of workload analysis can be used as a basis for determining the number of human resources needed in an organization effectively and efficiently. Measurement of workload analysis has several stages namely the stage of data collection, the preparation stage of filling the look book stage, the validation stage and the stage of filling data into the worksheet and data analysis.

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