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WORKLOAD AND JOB SATISFACTION ANALYSIS AS THE BASIS OF WORK SYSTEM IMPROVEMENT

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ABSTRACT - Employees' workload can be high when the existing manpower is limited and the list of jobs to do are long. For the employee, the workload may affect their job satisfaction and their performance in the long-term. Assessment of workload and its influence to job satisfaction was done at Sustainability and Operation Department of cultivates and harvests oil palms Company in Indonesia. The workload was measured using NASA-TLX that measure mental demand, physical demand, temporal demand, performance, effort, and frustration. While job satisfaction is measured using a questionnaire about superiors' support, colleagues assistance, remuneration, and promotion. The assessment result showed that employee's workload in these departments was identified as rather high. This is coming from commonly overtime exists and high domestic traveling frequency. Besides that, there is a correlation between workload and job satisfaction. There is two correlations model, positive and negative. The high workload can improve the job satisfaction, but otherwise, it can decrease job satisfaction. To reduce the workload, information system and database suggested for the company to reduce the employee difficulty in accessing data to finish their job that caused excessive overtime.

Keywords: *Job satisfaction, NASA-TLX, workload, work system improvement*

INTRODUCTION

Each department has their own responsibilities and job descriptions that may be related to other departments. Job in every department should have different weights. Theoretically, the work itself should be able to be completed by employees. Under or overload will result in an in-work efficiency, an under-load can be an indication the employee was not utilizing well or the number has exceeded the needs. In this case, the company has to pay unnecessary employee fees. Otherwise, if there is a shortage of manpower or too many jobs with a small number of employees, it can cause physical and psychological fatigue for employees (Noy et al., 2011) and become work distress (Astainto, 2014). Both condition resulting unproductive employee because they are too tired or bored.

Based on the observations at the Sustainability Department of one company as the case in this study, the current workload was categorized as high. For example, one employee responsibility is to do early detection and prevent land fires. The employee had identified the Personal Protective Equipment (PPE/APD) availability for the company projects and to monitor hotspots in the company concession. The Sustainability Department commissioned the Safety Specialist for this. The employee had to contact regional Sustainability or directly contacts the relevant employee in each estate to identify the PPE. At the same time, the employee also had to monitor the hotspot distribution ranges and reports them to the estate if it requires follow-up and complete reports paperwork for the company. The current situation, the employee coming late on many occasion and work on the weekend to finish their job. The high workload can cause fatigue, job dissatisfaction, and lead to human error potency. Based

on the current condition, this study is tried to analyze workload and job satisfaction of employee as the basis of work system improvement at the company to reduce the workload.

RESEARCH METHODS

In this study, the research consists of 3 steps. First steps were measurement the job satisfaction. The questionnaire that used to measure applied Likert scale 1-5 which 5 represented the most satisfaction level as respondents strongly agree with the statement. This questionnaire assessed 5 aspects: remuneration, promotion/ acknowledgment, colleagues' support, and superior's (van Saane et al., 2003)

Second steps were a measurement of perceived workload using NASA-TLX is a subjective method of workload assessment (Hart, 2006). This method is commonly used because of its simplicity, less time and low cost, and has been used in many sectors (Widyanati & Larutama, 2016; Sunaryo et al, 2011). This method assesses workload from the kind of job, not the load that attaches to worker individually. NASA-TLX consists of 6 (six) scales that considered as workload which experienced by workers or employees. The six scales are Mental Demand, Physical Demand, Temporal Demand, Performance, Effort, and Frustration. (Hart, 2006). The workload assessment using NASA-TLX is explained as follows (Hoonaker et al., 2011):

1. Weighting
   In this part, respondents were faced with two workload factors and were asked to choose between them. The comparison mentioned here is the pairwise comparison. Respondents were asked to choose one of the most dominants criteria they subjectively feel. The number of tallies then accumulated.
2. Giving Score
   The questionnaire as shown in Figure 1 above was given to all the respondents, where the respondents need to give a score related to the level of workload they are experiencing.
3. Calculate Product Score
   The product score obtained from the multiplication of weighted score and rating.
4. Calculate Weighted Workload (WWL)
   The next step needed to be done is to calculate WWL. WWL was obtained from the total of the product score.
5. Calculate WWL Mean (Workload Score)
   Furthermore, WWL was divided by 15, where 15 represents the number of total weighted score. This division resulted in the workload score.
6. Score Interpretation
   The workload score derived from the calculations then compared according to the table shown below to be categorized into the workload score classification.

Table 1 Workload Classification

Workload Classification	**Score**
Low	0-9
Medium Low	10-29
Medium High	30-49
High	50-79
Very High	80-100

RESULTS AND DISCUSSION

Respondents

In this study, the respondents are the employee of Sustainability and Operation Department with total 19 employee, as seen at Table 2 below.

Table 3 Respondents of study

Aspect	Respondents	Aspect	Respondents
Gender		Position	
Male	16	Manager	11
Female	3	Officer	8
Age (year)		Work length (year)	
25-34	12	< 1	2
35-44	3	1-3	4
45-54	3	3-5	7
> 54	1	> 5	6
Education background			
Undergraduate	19		
Graduate	2		

Job Satisfaction Level

The first step of this study is distrubuting the questionnaire to the respondents.The graph provided the distribution of respondents' job satisfaction results:

Figure 1. Employees' Job Satisfaction result

According to the figure shown above, it can be observed that almost all of the employees' job satisfaction value lied near the mean value. Remuneration and superiors' support factors are under the mean value. The highest job satisfaction factor according to the graph is the colleagues' assistance with the value of 3.3. Meanwhile, the lowest job satisfaction factor is the superiors' support which value is 2.95. As seen in Figure 1, job satisfaction employee at an average level (around 3) which may lead to dissatisfaction in long term.

Workload Assessment

The next questionnaire is NASA-TLX which is used to calculate and classify the workload experienced by the respondents. Respondents were asked to assess the workload factors they perceived currently. The workload factors consist of six factors as follow: mental demand, physical demand, temporal demand, effort, performance, and frustration. The questionnaire basically consists of two sheets that had to be filled by the respondents. The first sheet is the scoring of workload factors, meanwhile, the second sheet is the rating given. The number given on the second sheet will be accumulated and multiplied to obtain the product score. Then, the product score will be accumulated to obtain the weighted workload. The average or the mean of the weighted workload will be classified according to the workload classification. The table below shows the averagely weighted workload and their classifications:

Table 3 Respondents' Average Weighted Workload and Classification

Respondents	Average WW	Workload Classification	Respondents	Average WW	Workload Classification
1	51,33	High	11	54,67	High
2	69,33	High	12	57,33	High
3	69,33	High	13	63	High
4	58,67	High	14	54	High
5	58	High	15	75,33	High
6	61,33	High	16	51,33	High
7	59,33	High	17	45,33	Medium High
8	65	High	18	45,33	Medium High
9	60,33	High	19	76	High
10	53,33	High			

Refers to Table 3, it can be concluded that as much as 89.47% of the respondents are currently experiencing high workload. Meanwhile, the rest of the respondents are currently experiencing medium-high workload with the percentage of 10.52%.
According to the results stated above, it can be concluded that respondents' job satisfaction is low, while the workloads classified as high. If these two things left uncontrolled, furthermore it might cause inconvenience in working. Based on this background, the root cause should be defined so that the right solution can be generated.

To find the root cause, the factors that cause this problem first should be defined. The first step is by doing the correlation test. The correlation test aims to calculate the correlation between variables, to know if they have a correlation or not and whether it is strong or weak.
The four-factor of job satisfaction will be tested with a correlation test for the six factors of workload. Correlation test will be done using SPSS Software with a 95% confidence level (Table 4).

Table 4 Correlation Test Results Between Workload Factors and Job Satisfaction

Test Factor	**Correlation (R)**
Work – Colleagues' Assistance	0.330
Work – Superiors' Support	0.309
Mental – Colleagues' Assistance	-0.317
Mental – Promotion	-0.351
Temporal – Superiors' Support	-0.371
Mental – Superiors' Support	-0.379

As seen in table 4, one can conclude that there are six factors that have the tendency either to affect or to be affected. There are some factors that have positive correlations, while others have negative correlations. The first factors that have positive correlations are work factor with colleagues' assistance with the r-value 0.330. The next is work factor with superiors' support with the r-value of 0.309. Meanwhile, the factors that have negative correlations are mental factors with colleagues' assistance with an r-value of -0.371, and mental factor with promotion factor with significance level -0.351. Then, the next is a temporal factor with superiors' support with r-value -0.371. Factors that have negative correlations are mental factors with superiors' support with r-value -0.379.

Worksystem Improvement

The study showed that there are some relations between workload and job satisfaction. The factors that have the proportional relations represented by the positive correlations, meanwhile the factors that have the inversed proportional relations represented by the negative correlations. Low job satisfaction will reduce their working performance. The employee workload according to the questionnaires resulting in two categories, medium-high and high and affected their job satisfaction.

The workload that are too high needs to be observed so that the solutions can be defined. To find the root cause of the problem, the fishbone diagram or cause and effect diagram is used. This diagram is expected to help generate solutions in order to reduce the workload experienced by the employees (Figure2).

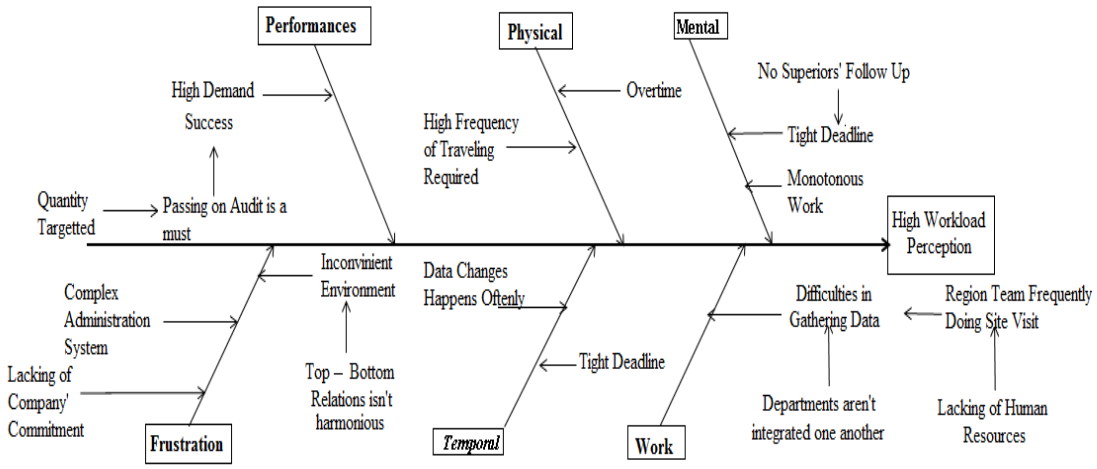

Figure 2. Fishbone diagram

The discussion presented above explain about the root cause of high workload perceived by the employees. However, for a more optimal results, this study will be focused on the problem solving on the problem with the highest priority. To decide which factor that cause significantly on this problem, the principle of Pareto diagram was used (Figure 3):

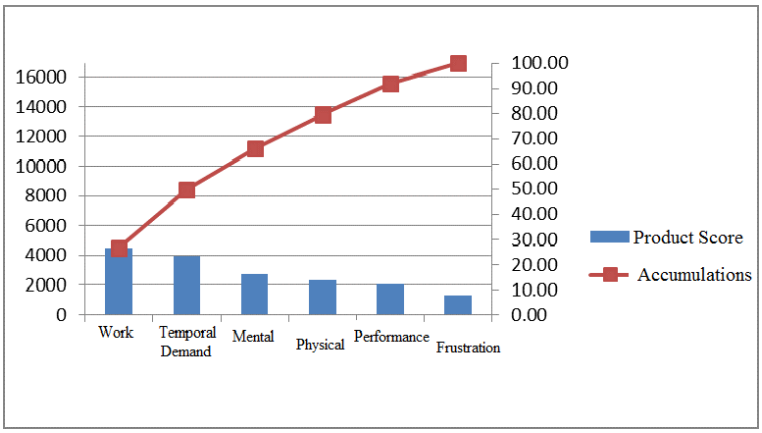

Figure 3 Pareto Diagram based on workload assessment result

According to the Pareto diagram provided above, the proposal on work system improvement will be focused on work factors. On the analysis of the fishbone diagram as shown on picture 3, one of the main root cause of the high workload perception on the work factor is the difficulty to access the needed data because departments are not integrated one to another. The improvement on the work system proposed on this study is the urgency to install an integrated database system. The data should be stored altogether on the same storage and will be managed by a certain operator, so that anyone needed that can request to the integrated database system operator. Flow diagram of proposed work system as shown below:

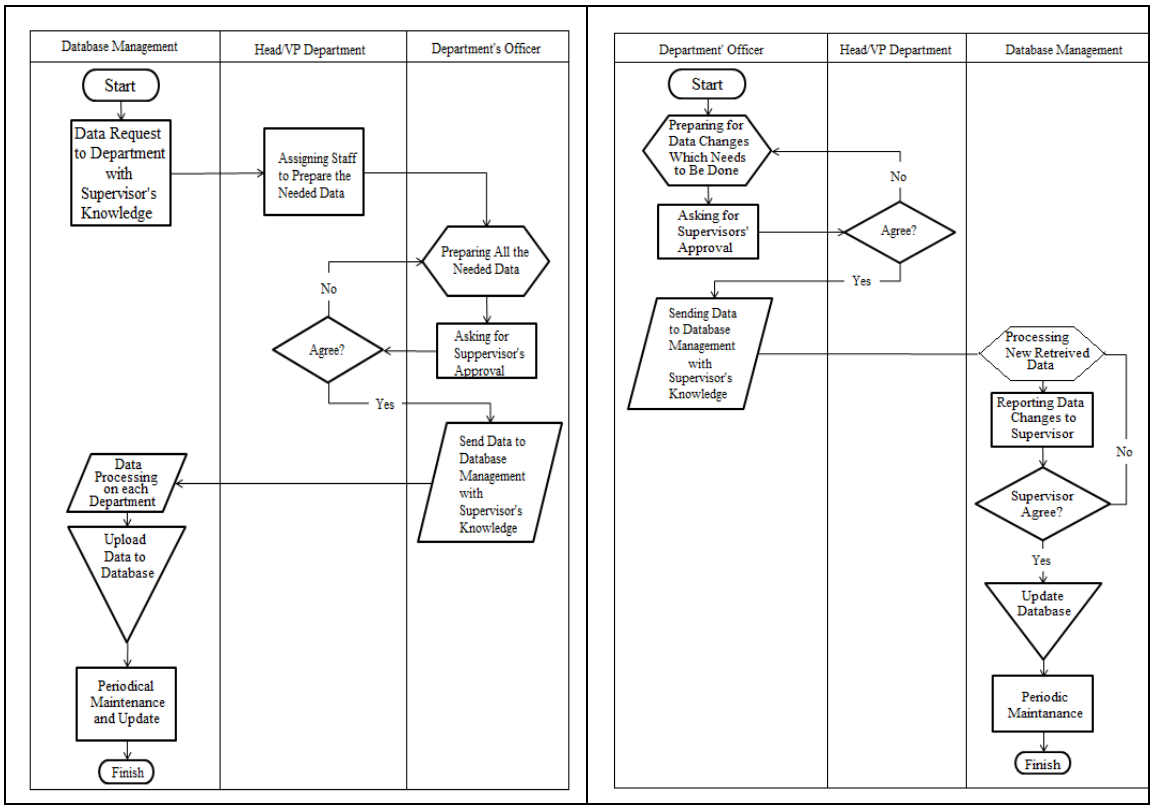

Figure 4. Flow chart Initial data collection and data request for integrated database system

CONCLUSION

There is a correlation between an employee's job satisfaction with their workload based on how it perceived by the employee. Even though the correlation value is not high, this result indicates that fair workload may increase the job satisfaction. The workload mostly caused by administration work and communication in gathering data, this the database system is proposed to reduce the workload. Hopefully, this system can increase employee satisfaction.

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