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Research article

Workload analysis with the full time equivalent method approach to determine workforce required

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ABSTRACT

This research aims to to analyse the workload using the Full Time Equivalent (FTE) method to produce the optimal number of human resources. The post-pandemic economic recovery has led to increased productivity in various sectors, including PT Mada Wikri Tunggal which has experienced an increase in sales in the last three years. However, this increase in sales is inversely proportional to the number of human resources in the office sector of the company. Excessive or too minimal workload will cause inefficiency in the productivity of a company. The amount of workload that is too heavy indicates that the amount of workforce available is not balanced with the workload given, so it can cause physical and mental fatigue which results in a decrease in productivity. The data analysis method used in this research is the Full Time Equivalent (FTE) method. FTE can be assumed as a measure of the time required for the workforce to completely carry out work activities.

Keywords: *Human Resources, Workload, Workload Analysis, Full Time Equivalent*

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Abstrak

Tujuan penelitian ini adalah melakukan analisis beban kerja dengan memakai metode *Full Time Equivalent* (FTE) sehingga dapat menghasilkan jumlah SDM yang optimal. Pemulihan ekonomi pasca pandemi membuat peningkatan produktivitas di berbagai sektor. Termasuk PT Mada Wikri Tunggal yang dalam tiga tahun terakhir mengalami peningkatan penjualan. Namun peningkatan tersebut berbanding terbalik dengan jumlah sumber daya manusia yang ada di office. Beban kerja yang berlebihan atau terlalu minim akan menyebabkan ketidak efisienan dalam produktivitas suatu perusahaan. Beban kerja yang terlalu berat menunjukkan bahwa jumlah tenaga kerja yang ada tidak seimbang dengan beban kerja yang diberikan, sehingga dapat menyebabkan kelelahan fisik dan metal yang mengakibatkan penurunan produktivitas karena kelelahan tersebut. Metode analisis data pada penelitian ini adalah metode *full time equivalent*. FTE dapat diasumsikan sebagai ukuran waktu yang dibutuhkan tenaga kerja untuk melakukan aktivitas pekerjaannya secara menyeluruh.

Kata Kunci: Sumber Daya Manusia (SDM), Beban Kerja, Analisis Beban Kerja, Full Time Equivalent

1. Pendahuluan

The digital era that has been developing massively makes the competition in the industrial world even tighter in Indonesia which currently has improved its economic growth after the Covid-19 pandemic. This is certainly caused by the increasing industrial productivity to meet the market's demands. Therefore, every industry must be able to do their work thoroughly and can be completed efficiently if it is done within the shortest period. In general, the number of jobs will increase when the productivity of a company increases. In that sense, human resources are the main factor that determines the increase in productivity of a company. The availability of competent industrial human resources will encourage increased productivity and transform into a competitive industry (Mujiyono & Taufan, 2021).

Tasks often demand physical activity that can cause fatigue. Moreover, there are also several unfavourable factors such as a less conducive working environment caused by the noise from the production machines which can interfere with the concentration of the administrative workers. To cope with such jobs, workers must have sufficient physical abilities or can also apply several work design strategies, such as utilising assistive equipment, improving work methods, arranging rest schedules, and so on. These circumstances can cause excessive workload on the body and mind (Iristiadi, 2016). Workload is defined as a series or number of activities that has to be completed by an organisational entity or individual holding a certain position within a predetermined period of time (Paramitadewi, 2017). Based on this definition, it can be said that workload is related to the ability of the workforce to handle work. All workloads received by the workforce must be balanced with respect to physical capacity, cognitive abilities, and human limitations in handling these loads. This research is within the scope of the automotive industry. PT Mada Wikri Tunggal is a company engaged in the metal component and plastic industry (two and three-wheeled vehicle components). It is a local company that also supplies components to PT Astra Honda Motor.

Facing the conditions of the Covid-19 pandemic, the company implemented several policies aimed at maintaining the business carried out so that it could deal with these conditions. PT Mada Wikri Tunggal has a policy to the efficiency of spending on labour costs by not extending contracts as of 2020 for some workers in all departments. Therefore, there are five positions affected by the policy of efficient spending on labour cost. Certainly, there are several workloads that will be carried out by other workers when the company's productivity has recovered. In the

last two years, PT Mada Wikri Tunggal has been gradually recovering from the impact of the Covid-19 pandemic. That can be seen from the level of sales and purchases over the past four years which illustrates the condition of recovery after the Covid-19 pandemic.

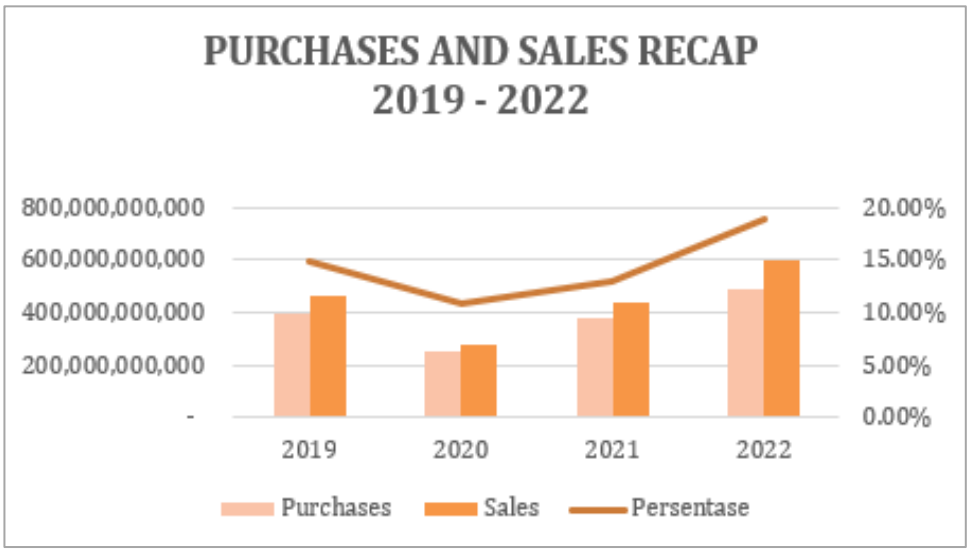

Figure 1. Purchases and sales recap (2019-2022)
Source: PT Mada Wikri Tunggal (2023)

Picture 1 shows there was an increase of the value of sales in the last two years which indicates the level of consumer purchasing power towards the company has increased, and there is also an increase in the value of purchases in the last two years due to orders made by the purchasing department to meet the company's production needs. Those increases affect the workloads which must be carried out in every part of the finance, the purchase, and the marketing department of PT Mada Wikri Tunggal. The increased workloads are not balanced with the decreased number of workers. From our interview with three heads of departments in the company, we have figured out that the increase in sales and purchases raises the amount of work, and there is also another impact that takes shape as overtime for the sake of completing work. On the other hand, the billing to consumers appears to be late as the quantity of invoices has increased.

In a previous study conducted by Yunitta Rahmuddin, Ratna Sari Dewi, and Dyah Sari Dewi, titled "Workload Analysis using Modified Full-Time Equivalent and NASA-TLX methods to optimize engineer headcount in the engineering service department," published by IOP Publishing Ltd, the research highlighted a challenge stemming from an increase in the number of projects leading to a disproportionate rise in workload relative to the existing technician capacity. As a proposed solution, the study suggested the addition of technicians in the engineering services department (Rachmuddin et al., 2021). Notably, the earlier research focused solely on samples within the engineering services department, limiting the generalizability of the findings to other departments. This present study seeks to extend the scope of the previous research by incorporating three distinct departments, aiming to provide a more comprehensive understanding of the workload dynamics across various organizational units.

In light of the aforementioned background, our focus in this final project is to address the subject of workload measurement within the corporate context. The project is titled "Workload Analysis with the Full-Time Equivalent (FTE) Method Approach to Determine

Workforce Required at PT Mada Wikri Tunggal." The chosen method is designed to assess workload systematically by measuring the time required for task completion and subsequently converting it into a Full-Time Equivalent (FTE) index value. This approach facilitates the determination of the requisite number of workers needed to successfully accomplish a specific task.

2. Theoretical background

Human Resource Management

Human resource management is defined as a process and effort to recruit, develop, motivate, and evaluate the total human resources needed by a company to achieve the company's goals (Jurdi, 2018). Also, in a journal of strategic management and business applications, it is stated that human resource management is needed to ensure that an organization or company can achieve success or goals (Mujiyono & Taufan, 2021). Human resource management encompasses two fundamental functions, as elucidated by Larasati (2018). The first function is the managerial aspect, which involves tasks directly associated with management, including the planning of employee requirements, organization of employees, direction of employees, and control of employee activities. The second function is operational, focusing on the practical aspects within a company. This involves activities such as employee placement, employee development, compensation, and ensuring the well-being and protection of employees.

Human Resource Planning

Human resource management is defined as a process and effort to recruit, develop, motivate, and evaluate the total human resources needed by a company to achieve the company's goals (Jurdi, 2018). The purpose of human resource management is to improve work motivation, contribution, and commitment by demonstrating policies and processes that ensure that the workforce is valued and rewarded for what they do and achieve and for the level of competence and capability they attain. Human resource planning cited in the human resource management learning module is broadly defined as a set of activities carried out to calculate the workforce required with future company development plans (Mujiyono, 2021). Human resources planning encompasses two distinct categories based on their scope. Firstly, there is manpower planning, a comprehensive approach that entails involvement in various facets of human resource management, including recruitment, selection, appointment, placement, training, compensation, development, and termination. Secondly, there is manpower programming, which involves detailed planning focused on specific aspects derived from comprehensive human resource planning. Examples of these specific aspects include employee career planning, training planning, and recruitment planning.

Workload

According to Vanchapo, workload is a process or task that must be completed by workers within a certain period and a certain amount of time (Vanchapo, 2020). When workers have demonstrated their ability and completed adaptation to a set of tasks, these are not workloads. However, if they fail, these tasks and activities then become workloads. Another argument stated that workload is an effort one makes based on something to complete a work request (Linda, 2014). Koesomowidjojo, as outlined in his book (2017), delineates specific indicators for discerning the workloads to be undertaken by the workforce. First and foremost is the working condition, signifying the extent of skill and knowledge possessed by the workforce relevant to their assigned tasks. Secondly, the utilization of working time is crucial, emphasizing the importance of aligning working hours with the standards stipulated by the company to avoid

either undue constraints or excessive demands that may adversely impact workforce workload. Lastly, the goals set by the company play a pivotal role, as they significantly influence the workload borne by the workforce. Any dissonance between the time allocated for task completion and the volume of work assigned can render the workload onerous for the workforce.

Workload Analysis

The method used to calculate the workload so that we can find out how much workforce is required to complete the workload is called workload analysis. Workload analysis helps determine how long it takes for workers to complete a task. This analysis will provide information about the number of workers required to complete a task, depending on the type of work in various organisational units or companies (Retnowati & Hardi, 2015).

The preparation for workload analysis involves several essential considerations to ensure a comprehensive and effective assessment. Firstly, a thorough understanding of the organization is imperative. This includes familiarity with the organization's vision, mission, structure, and business processes. Socialization of the workload analysis is also crucial, particularly for leaders in the work unit where the analysis will be conducted, ensuring clear communication and understanding. Furthermore, a meticulous review of organizational documents, such as business process charts, organizational structures, job descriptions, and qualifications of position holders, is essential. Field observation becomes imperative to validate whether the information provided in the company's documents aligns with the actual operational reality.

Designing the workload analysis tool is a pivotal step, tailored to the specific information needs of the analysis. Typically, the workload analysis form encompasses details such as the date of filling, the name of the work unit, the person filling in the form, the type of activity, the frequency, duration, and the individual responsible for the task. Before commencing data collection, it is essential to conduct a workload analysis presentation. This step involves presenting the prepared approach and methodology to all relevant stakeholders involved in the workload analysis process. Clear communication at this stage ensures alignment and understanding among all parties before delving into the actual data collection process.

The Relationship between Human Resource Planning and Workload Analysis

Comparison between the number of available human resources and the number of human resources needed by a company or organisation can form a human resource planning (Koesomowidjojo, 2017). According to Muhardiansyah, workload analysis is a process used to determine and find out the number of human resources needed (Muhardiansyah dan Widharto, 2018). The result can be the amount of workload that must be carried out by a work unit and is usually expressed in hours per person. Human resources are needed to carry out the workload and the workload must be converted into units of the number of human resources needed, by comparing the number of human resources needed with the available human resources due to possible gaps in the number of human resources. If the human resources are lacking, there has to be a new human resource planning called “manpower planning” (Koesomowidjojo, 2017). Therefore, it can be concluded that the relationship between human resource planning and workload analysis is very important because the information about effectiveness and efficiency of employee performance in completing their work within a certain period will be obtained through workload analysis.

3. Method

The research method used is descriptive quantitative. The research was conducted at PT Mada Wikri Tunggal from 15 July 2022 to 25 February 2023. PT Mada Wikri Tunggal is a company engaged in the metal components and plastic industry. In this research, the primary data was obtained from interviews and observations at the office section of PT Mada Wikri Tunggal. Meanwhile, the secondary data came from existing documents in the company, such as the number of office workers of PT Mada Wikri Tunggal, the 2022 Gregorian calendar issued by the government, purchases and sales data for the last three years, and other data related to the problem studied. Data collection guidelines were conducted to analyse the workload of the workforce as a basis for calculating the ideal number of workers to meet the principles of compliance, efficiency, and effectiveness in human resource management. Observations were made in each department for 30 working days with 10 working days in each department. In addition to making observations, interviews were also conducted to deepen the problem that had been observed. The data analysis method used in this research is the Full Time Equivalent (FTE) method. FTE can be assumed as a measure of the time required for the workforce to completely carry out work activities. The value of one FTE is equivalent to one person working full time in one calendar year. In processing data with the full-time equivalent method, there are several things that need to be prepared, including knowing the work unit under study, determining effective working time, and defining and determining the allowance of time.

4. Results and Discussion

We will explain the result of the data processing that we have completed to answer the problem statement of this research. The result of the data processing will be analysed using the full-time equivalent method. Then it will be continued with analysis to get a conclusion from the problems studied. The following are the steps of data processing in this research:

Determining the work unit under study

The work units studied in this research are the employees in the office section of PT Mada Wikri Tunggal, as stated in accordance with the problem limitation. The office section consists of three departments: the finance, purchasing, and marketing department. This section currently has 10 employees. The following are the details of work units and the number of office employees in each department:

Table 1. The number of employees in the office section of PT Mada Wikri Tunggal

Work Unit	The Number of Employees
Finance Department	
Accounting Staff	2
Finance Staff	2
Purchasing Department	
Purchasing Staff	2
Marketing Department	
Marketing Staff	4
TOTAL	**10**

Source: Data Collection

Defining the work time available

Available or effective working time for one year refers to the working and leave time stipulated in Law No. 13 of 2003 (UNDANG UNDANG REPUBLIK INDONESIA NOMOR 13 TAHUN 2003, 2003). It is stated in the article 77 paragraph 2 that working time for 5 days has 8 hours of effective working time each, so there are 40 hours of working time in one week. It is also stated that effective working time is the working time effectively used for work. Effective working time consists of effective working days and effective working hours.

Effective working days are the number of days in a year (365 days) reduced by the number of Saturdays and Sundays in a year (104 days), national holidays in a year (12 days), and 12 days of leave assuming employees use all the leave given due to illness or anything else. Meanwhile, the normal working hours per day for employees is eight hours from Monday to Friday. Therefore, to get the effective working time, we can multiply effective working days by effective working hours.

Tabel 2. Total time available

Days in a year	365 days
Saturdays and Sundays in a year	104 days
National holiday in a year	14 days
12 days leave	12 days
Total effective working days in a year	**235 days**
Effective working hours per day (minutes)	**480 minutes**
Total effective working hours in a year (minutes)	**112800 minutes**

Source: Data Collection

Defining and determining the allowance of time

The allowance of time is the time given to workers in carrying out activities that are not related to their work such as resting, eating, going to the toilet, and so on. The purpose of determining the allowance of time is to assess the leniency in an activity or job. The following is the allowance of time in the office section of PT Mada Wikri Tunggal based on the results of observations and interviews we have conducted:

Table 3. Allowance of time

No.	Activity	Frequency	Waktu (Minutes)	Total (Minutes)
1	Toilet	3	5	15
2	Break 1	1	15	15
3	Break 2	1	45	45
4	Ibadah	2	5	10
5	Peregangan	1	10	10
Total Allowance of Time (Per Day)				**95**

Source: Data Processing

Defining and calculating the workload of workers

The process of defining and calculating the workload of workers involves several key steps: Firstly, it is essential to define the frequency of each task within every work unit. In the context

of the office work units at PT Mada Wikri Tunggal, a thorough understanding of the frequency of each task is a prerequisite.

Secondly, the amount of time required to complete each task in each work unit must be determined. To accomplish this, the research employs a time study, utilizing a stopwatch to measure the completion time of each task. This method is rooted in the principles of Federick W. Taylor, dating back to 1881, where employee performance is recorded and used to establish performance standards.

The third step involves identifying the number of workers assigned to carry out each task. This information is crucial for the subsequent calculation. Following these preliminary steps, the total activity time is calculated. This computation is based on the frequency of tasks multiplied by the completion time, further multiplied by the number of workers handling the tasks, and ultimately adjusted for the number of effective working days in a year. Lastly, the total workload of employees in each work unit is calculated using the Full-Time Equivalent (FTE) method.

Table 4. Workload calculation results with FTE method

Work Unit	Total Activity Time	Allowance of Time	Total Time Available	FTE	Classification
Accounting	296460	22325	112800	1.413054078	Overload
Finance	277860	22325	112800	1.33060727	Overload
Tax	96435	22325	112800	1.052836879	Normal
Purchasing	275784	22325	112800	1.321405142	Overload
Marketing	339040	22325	112800	0.800897606	Underload

Source: Data Processing

Table 4 shows there are three work units which have FTE value considered overload (more than 1.28): the accounting, finance, and purchasing work unit. The tax work unit turned to be the only work unit with FTE value considered normal. Meanwhile, the FTE value in the marketing work unit is considered underload (0–0.99).

Calculating the workforce required

After obtaining the result of the workload calculation using the FTE method, the next step is to calculate the workforce required in the work unit with the following formula:

Workforce = Task frequency x duration x actual workforceTotal time available−allowance of time

Table 5. Calculation result of workforce required

Work Unit	Total Activity Time	Allowance of Time	Total Time Available	Workforce Required	Rounding
Accounting	296460	22325	112800	3.27	4
Finance	277860	22325	112800	3.01	3
Tax	96435	22325	112800	1.06	1
Purchasing	275784	22325	112800	3.04	3
Marketing	339040	22325	112800	3.74	4

Source: Data Processing

Table 5 shows the result of the calculation of workforce required in the office section of PT Mada Wikri Tunggal, in which the accounting work unit requires 4 employees, the finance work unit requires 3 employees, the tax work unit requires 1 employee, the purchasing work unit requires 3 employees, and the marketing work unit requires 4 employees.

Based on the result of the workload calculation described, a comparison is obtained between the number of employees required and the actual employees in the office section of PT Mada Wikri Tunggal. Workforce comparison at PT Mada Wikri Tunggal with the cost of additional workforce in a year and overtime wages is as follows:

Table 6. Workforce comparison

Work Unit	2022	Workforce required based on FTE calculation	Cost of additional workforce in a year		Overtime wages in 2022
Accounting	2	4	IDR	122,400,000	Rp 18,025,000
Finance	2	3	IDR	61,200,000	Rp 19,125,000
Tax	0	1	IDR	61,200,000	-
Purchasing	2	3	IDR	61,200,000	Rp 17,350,000
Marketing	4	4			

Source: Data Processing

Discussion

After calculating the workload with the FTE method, we have figured the workload values and the ideal number of workers required to fill positions in the office work unit at PT Mada Wikri Tunggal.

Accounting Work Unit

Based on the results of calculations using the FTE method in chapter IV, it is found that the workload of accounting staff is 1.417 or 141.7%, which means it exceeds the ideal workload standard of 100%. As for the calculation of workforce required, it shows that the accounting work unit requires 4 employees. As of now, the company actually has 2 employees in this work unit, so according to the calculation of FTE workload and the calculation of workforce required, it is necessary to add 2 employee sto this unit. However, it needs to be considered if adding workers will increase labour costs in a year of IDR 122,400,000 (assuming a net salary of IDR 5,100,000 a month). On the other hand, when the works are completed without additional workers, the company must bear overtime wages of IDR 18,025,000.

Finance Work Unit

Based on the results of calculations using the FTE method in chapter IV, it is found that the workload of accounting staff is 1.33 or 133%, which means it exceeds the ideal workload standard of 100%. As for the calculation of workforce required, it shows that the accounting work unit requires 3 employees. As of now, the company actually has 2 employees in this work unit, so according to the calculation of FTE workload and the calculation of workforce required, it is necessary to add 1 employee to this unit. However, it needs to be considered if adding workers will increase labour costs in a year of IDR 61,200,000 (assuming a net salary of IDR 5,100,000 a month). On the other hand, when the works are completed without additional workers, the company must bear overtime wages of IDR 19,125,000.

Tax Work Unit

Based on the results of calculations using the FTE method in chapter IV, it is found that the workload of tax staff is 1.05 or 105%, which means it is in accordance with the ideal workload standard of 100%. As for the calculation of workforce required, it shows that the tax work unit requires 1 employee. However, the tax staff position is concurrently held by the head of the accounting work unit as of now, so to make it in accordance with the FTE workload calculation and the calculation of the required number of workers, it is necessary to add 1 employee to this unit.

Purchasing Work Unit

Based on the results of calculations using the FTE method in chapter IV, it is found that the workload of accounting staff is 1.321 or 132.1%, which means it exceeds the ideal workload standard of 100%. As for the calculation of workforce required, it shows that the accounting work unit requires 3 employees. As of now, the company actually has 2 employees in this work unit, so according to the calculation of FTE workload and the calculation of workforce required, it is necessary to add 1 employee to this unit. However, it needs to be considered if adding workers will increase labour costs in a year of IDR 61,200,000 (assuming a net salary of IDR 5,100,000 a month). On the other hand, when the works are completed without additional workers, the company must bear overtime wages of IDR 17,350,000.

Marketing Work Unit

Based on the results of calculations using the FTE method in chapter IV, it is found that the workload of marketing staff is 0.8 or 80%, which means it does not exceed the ideal workload standard of 100%. As for the calculation of workforce required, it shows that the marketing work unit requires 4 employees. As of now, the company actually has 4 employees in this work unit, so according to the FTE workload calculation and the calculation of workforce required, there is no need for additional employees in this unit.

5. Conclusion

Based on the results of data processing and workload calculations using the FTE method for each work unit in the PT Mada office section it was concluded that there are three work units that have an FTE overload value including the accounting, finance, and purchasing work unit. Also, there is one work unit that has a normal FTE value, namely the tax work unit. Meanwhile, there is one work unit that has an FTE underload value, namely the marketing work unit. Based on the results of the calculation of workforce required, it is found that the accounting work unit requires 2 additional employees. The finance, tax, and purchasing require 1 additional employee respectively. Meanwhile, the marketing work unit does not require additional employees as the workload carried out by this work unit does not exceed the standard ability of the existing workforce. We hope that this research will help the company to optimise the number of workers in the office department. We also hope that the company will consider conducting a review in making the workforce requirement policies in the future. On top of that, the FTE workforce required calculation template can also be used in departments other than the office to determine the ideal number of employees needed to complete a task.

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