DEVELOPMENT OF MANAGEMENT INFORMATION SYSTEM HUMAN RESOURCES AT PT. XYLO INDAH PRATAMA

Desti Isianti[1], Utami Dewi Widianti[2]

[1,2] Informatics Engineering - Indonesian Computer University
Jl. Dipatiukur 112-114 Bandung
E-mail: destiisianti49@gmail.com[1] , utami.dewi.widianti@email.unikom.ac.id[2]

ABSTRACT

PT Xylo Indah Pratama (XIP) a national private company engaged in industrial raw materials for pencil slat products and has six divisions namely Production, Wood Supply Certification, Wood Pellet, Marketing and P2HTR. In early 2018 there were 456 employees, namely 202 permanent employees, 163 contract employees, 89 casual daily workers (BHL) and 2 temporary employees. Based on the results of the interviews that have been conducted stated that there are difficulties in determining new employees and there are still discrepancies in the education criteria for the positions needed by the company. Personnel managers have difficulty in determining which employees will be promoted because the same assessment results often occur at this time. The Personnel Manager has difficulty in monitoring employee leave permits and difficulties in monitoring retirement. Companies need a Management Information System (SIM) to assist Personnel Managers in managing human resources. SIM modeling in this study uses a POAC model (Planning, Organizing, Actuating, Controlling) that is useful for managing organizations in a company. The WP (Weighted Product) method is a method used to determine the prospective employee whose results are the recommendation of a suitable employee candidate. The AHP (Analytical Hierarchy Process) method is a method used for evaluating employee performance appraisal whose results are a decision whether the employee will get promotion and transfer.

Keywords: Management Information System, POAC Model, WP Method, AHP Method.

1. INTRODUCTION

PT. Xylo Indah Pratama is a national private company engaged in the wood processing industry, specializing in pencil slat products with a division that is Production, Certification, Wood Supply, Wood Pellet, Marketing and P2HTR and has 456 employees, namely 202 permanent employees, 163 contract employees , 89 casual daily workers (BHL) and 2 temporary employees.

Based on the results of interviews conducted with the Head of Personnel and Personnel Managers, there are several obstacles in managing human resources. Personnel managers have difficulty in determining new employees, because some of the results of the selection of new employees have the same value and there are still discrepancies in the number of employees and education criteria in the positions needed by the company. This can cause problems if there is an excess of employees, it will continue to experience problems in placing employee positions.

The next obstacle is the Personnel Manager's difficulty in determining which employees will be promoted because when evaluating the performance the appraiser does not refer to the importance of each assessment criterion but only refers to the assessment score, so that the same assessment results often occur.

PT Xylo Indah Pratama has several types of leave, namely annual leave, menstruation leave, maternity leave and sick leave. At the time of approval of the employee annual leave, the Personnel Manager has difficulty in deciding to approve or reject the annual leave permit because there are many permanent and non-permanent employee data and do not see the level of activity per division whether working on a work target or not

PT Xylo Indah Pratama has pension plans for permanent employees who have entered the age of 56 years, employee retirement decision making at this time there are obstacles, namely Personnel Managers have difficulty in monitoring pensions because the Personnel Manager is difficult to determine which employees have retired.

The purpose of this research is to build a Human Resource Management Information System at PT. Xylo Indah Pratama.

The objectives to be achieved from this research are to assist the Head of Section and Personnel Manager in terms of:

1. Planning, organizing and monitoring in terms of determining the position of new employees and the amount that suits the needs of the company.
2. Evaluate employee performance appraisal so that the resulting assessment is more accurate

and makes decision making easier for employee promotions and transfers.

3. Planning, managing and monitoring employee leave and retirement.

2. RESEARCH CONTENT

2.1 Management Information System Management

information system (SIM) is a system that provides information to its users. The information provided is explaining periodic reports or special reports in an organization or company.[1]

Management information system is a set of subsystems that are interconnected to form a single unit to perform data processing functions, receive input in the form of data, then manage it and produce output in the form of information. [2]

2.2 Human Resources Human

resources are someone who has the potential to work in an organization that is often called employees, labor or employees. With the potential of an employee must be able to realize the goals of the organization. [3] The

performance of HR itself is work performance or work results both quality and quantity that has been achieved by the HR. The quality of human resources in an institution is needed in creating high competitiveness based on the results of its performance. [4]

2.3 Information Systems Management of Human Resources Human

resource management information system (HR HR) is an information system to support manager activities in my human resource function. This function was formerly called the personnel department. Now changed its name to a human resource function to show that humans in the organization are important economic resources. [5]

The HR information system is a systematic procedure for collecting, storing, maintaining and validating data needed by a company to improve HR decisions. [6]

2.4 Management Model POAC

Managementis set to achieve a goal that has been set in advance by using activities that comprise the actions of planning*(planning),*the setting*(organizing),*implementation*(actuating),*and control(controlling).[7] The POAC Management function can be seen in Figure 1 as follows:



Figure 1. POAC Model

2.5 Weighted Product Method (WP)

Method *Weighted Product* (WP) is part of a very popular multi-criteria decision analysis.Method *Weighted Product* (WP) requires a normalization process because this method multiplies the results of the assessment of each attribute. The multiplication results have not been meaningful if they have not been compared (shared) with the standard values. [8]

The preference for alternative Ai is given as follows:

$$W_j = \frac{w_j}{\sum w_j} \text{ so } \sum W_j = 1 \qquad (1)$$

$$s_i = \prod_{j=1}^{n} X_{ij}{}^{w_j} \qquad (2)$$

with i = 1,2, ..., m and j = 1, 2, ... n.

Where:

S: Alternative preference is anologized as vector S

X: Criteria value

W: Weight of criteria / sub-criteria

I: Alternative

j: Criteria

n: Number of criteria

wj: Expresses the value of positive value for the attribute of profit, and is negative for the attribute of cost

Relative preferences of each alternative, given as follows:

$$V_i = \frac{\prod_{j=1}^{n} x_{ij}{}^{w_j}}{\prod_{j=1}^{n} (x_{ij}{}^{*}) w_j} \qquad (3)$$

Description:

V_i = the largest value of the selected alternative

Π = product

Xij = alternative value i to the attribute

Wij = weight of each attribute

2.6 Method Analytical Hierarchy Process (AHP)

AHP method is a decision making technique / multivariate optimization used in wisdom analysis. In essence AHP is a comprehensive decision-making model that takes into account things that are qualitative and quantitative. [8]

Analytical Hierarchy Process Method is a method of decision making where the logical factors of experience and knowledge are tried to be optimized in a systematic process.[9]

Basically the steps in the AHP method include:

1. Creating a Hierarchy

Problems that will be solved, are broken down into its elements, namely criteria and alternatives. Then arranged into a hierarchical structure like Figure 2 below:

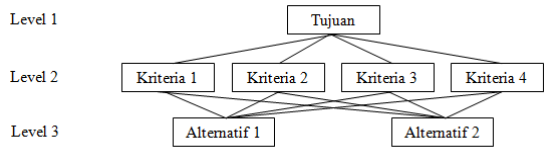


Figure 2. AHP Hierarchical Structure

2. Assessment of Criteria and Alternatives

For the various problems that exist, a scale of 1 to 9 is the best scale in expressing opinions. The values and definitions of qualitative opinions from this comparison scale can be seen in Table 1. The following:

Table 1. Pairwise Comparative Assessment Scale

Interest Intensity	Description
1	Both elements are equally important
3	Elements one is slightly more important than the other
5	Elements one is more important than on other
7	Elements is clearly more important than the other element
9	An absolute essential element of the other elements
2,4,6,8	Values between the two values are close considerations

3. Priority Determination (*Synthesis of Priority*)

In making decisions, it is important to know some of the good consistency that exists because they do not want decisions based on considerations with low consistency. The things that are done in this step are: [6]

1. Multiply each value in the first column with the relative priority of the first element, the value in the second column with the relative priority of the second element, and so on.
2. Add each row.
3. The results of the sum of the lines are divided by the relative priority elements that are synonymous.
4. Add up the quotient above with the number of elements available, the result is called λ max.
5. Calculate the Consistency Index (CI) with the formula:

   CI = (λ max-n) / n-1

Where n = number of elements based on source criteria

6. Calculate consistency ratio divided by Consistency Index (CI) with the formula:

   CR = CI / IR

Where CR = Consistency Ratio
CI = Consistency Index
IR = Index Random Consistency

7. Checks consistency of hierarchy. If the value is more than 10% then the judgment data assessment must be corrected, if a consistency ratio (CI / IR) is less than 0.1 then it is declared true.

Table 2. Index Value of Random

Matrix Size	Value of IR
1.2	0.00
3	0.58
4	0.90
5	1.12
6	1.24
7	1.32
8	1.41
9	1.45
10	1.49
11	1.51
12	1.48
13	1.56
14	1.57
15	1.59

2.7 Entity Relationship Diagram

Entitiy Relatioship Diagram or often called ERD is a tool in the form of a network model that uses data structures and then stored in the system in an abstract. From the description of the relationship each entity will be used in the design of the relation scheme. [10]

2.8 Analysis The Management Employee Recruitment

recruitment of new employees is opened if there is a vacancy in the position and the request of the division head when pursuing a production target if there is a shortage of employees in each division.

1. ***Planning*** **(Number and Position of Employees)**

The Personnel Section will plan human resource requirements starting from determining the number of employees and the positions needed, which will later be recruited and selected by employees.

2. ***Organizing*** **(Requirements for Employee Position) A**

check is conducted that aims to see what job conditions are from the position and the number of employees needed by the company accordingly.

Table 3. Amount and Terms of Position On Adm Production Position

Number	2 Person
Position	Adm Production
Type Employee	Permanent Employee
Terms Position	1. Male / Female min 20 years, max 28 years
	2. Minimum education D3
	3. Can communicate well and be able to work together
	4. Experienced in the same field at least 1year
	5. Deftin carrying out the work provided

3. ***Actuating*** **(employee Selection method Using WP**

After getting the amount and terms of office the right to fill vacancies that exist then this stage will do the screening of candidates.

Table 4. prospective employee Data

Calon Pegawai	Kriteria				
	Pendidikan	Pengalaman Kerja	Nilai Tes Tertulis	Nilai Tes Wawancara	Nilai Tes Kemampuan
M. Hadi Dwi Putra	D3	< 1 tahun	80	80	75
Mayang Sari	D3	Belum Pernah	75	85	75
Rina Wulandari	S1	1 tahun	85	80	80
Sulastri	SMA	Belum Pernah	80	70	70

Weighting of fuzzy number values is used to determine weighting the values on the position requirements in

Table 5. Terms of Position

No	Syarat Jabatan	Inisial	Bobot(W)
1	Pendidikan	C1	4
2	Pengalaman Kerja	C2	3
3	Hasil tes tertulis	C3	2
4	Hasil tes wawancara	C4	2
5	Hasil tes kemampuan	C5	4
∑W			15

Then the calculation will be done using formulas in the WP method.

4. Controlling

the Personnel Manager checks the results of the selection whether among the candidate candidates V1, V2, V3, V4 and V5 which will be the best choice to be chosen and accepted by the company.

Table 6. Final Results of Acceptance of Candidates for

Alternatif	Calon Pegawai	Rangking	Keterangan
V3	Rina Wulandari	I	Lolos
V1	M. Hadi Dwi Putra	II	Lolos
V2	Mayang Sari	III	Tidak Lolos
V4	Sulastri	IV	Tidak Lolos

2.9 Employee Performance Evaluation Analysis Using AHP Method

Partand Personnel Manager to organize or arrange any employee who will first perform a performance assessment.

Table 7. Employee Data Assessed

No	Employee Name	Code	Position
1	Sulistiyono	P1	Laboratory
2	Nofri Yanti	P2	Laboratory
3	Mz. Toma	P3	Laboratory
4	M. Solikin	P4	Laboratory

Table 8. Analysis of criteria and sub-criteria on Employee Performance Evaluation

NO	Criteria	Sub-criteria	code
1	Communication	Able to communicate orally andwriting	KO1
		Able to listen & carry out instructions properly and be able to convey these instructions to fellowcolleagues	KO2
		Able to encourage & motivateco-workers	KO3
		Able to provide feedback toco-workers	KO4
		Able to work together & communicate with fellowcolleagues	KO5
2	Work Discipline and efficiency report	able to set presence (absence) well and menta'ati provisions and rules apply	DKK1
		Understand clearly and correctly the functions of their office	Dkk2
		understand the needs and mission of the company	DKK3
		Capable of ensuring that the work environment	DKK4
		Have a high loyalty	DKK5
3	Problem Solving	Able to identify & overcome problems that occur	PM1
		Able to collect data needed	PM2
		Able to provide suggestions & input	PM3
		Able to provide alternative solutions	PM4
		Able to run solutions properly & correctly	PM5
4	Work Achievements	Have the characteristics ofleadership	PK1
		Responsible for the results of his work	PK2
		Have a good sense of responsibility and creativity & craftsmanship	PK3
		Able to develop self potential	PK4
		Reliable, both personally and in groups	PK5
5	Occupational Health & Safety (K3)	Able to improve K3 awareness & behavior	KK1
		Able to carry out work in accordance with Operational Standards procedure (SOP) safe working	KK2
		Being able to check and understand the completeness of K3 equipment	KK3
		Able to evaluate the cause of the accident	KK4
		able to keep themselves and co-workers from the risk of workplace accidents	KK5

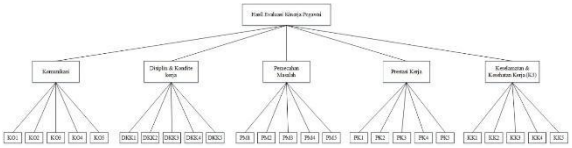


Figure 3. Evaluation of performance Assessment criteria hierarchy

Then perform calculation steps for each criterion AHP penil aian to get the results of their respective priorities. The following are the priority values obtained using the AHP method.

Table 9. List of the priority value on each - each sub-criteria

No	Criteria	Code	Priority Value
1	Communications	KO1	0,414
		KO2	0.205
		KO3	0,211
		KO4	0.113
		KO5	0.057
2	Work Discipline and efficiency report	DKK1	0.376
		Dkk2	0.210
		DKK3	0.215
		DKK4	0.128
		DKK5	0.071
3	Troubleshooting	PM1	0.384
		PM2	0.254
		PM3	0.195
		PM4	0.099
		PM5	0.069
4	Job Performance	PK1	0.422
		PK2	0.231
		PK3	0.188
		PK4	0.095
		PK5	0,064
5	Health & Safety	KK1	0,427
		KK2	0,199
		KK3	0.200
		KK4	0.120
		KK5	0.054

Here are the results ranked based employee performance evaluation. To get the results of the final value which is multiplying one by one the priority value with the results of the assessment score then added up.

Table 10. Employee performance evaluation results based on employee ratings

No	Name	Final Value	Rank
1	Sulistiyono	76.4535	II
2	Nofri Yanti	78.4166	I
3	Mz. Toma	72,5999	III
4	M. Solikin	78,4166	I

2.10 Promotion Management Analysis Position Officer

1. *Planning* (Employees who will be promoted)

Personnel Manager will determine the number of employees who will be promoted based on the results of evaluating employee performance during work in the company and length of work.

Table 11. Prospective Promotion Data

No	Employee Name	Evaluation Results	Working Lengt
1	Sulistiyono	76,4535	6 Years
2	Nofri Yanti	78,4166	1 Year
3	Mz. Toma	72,5999	8 Years
4	M. Solikin	78,4166	10 Years

2. *Organizing* (Checking Terms of Promotion)

The Personnel Manager checks or organizes the number of employees by seeing which evaluation results of a higher performance rating and the length of work that meets.

3. *Actuating* (Implementation of Promotion)

According to the results of the check it can be seen that the one who fulfills the requirements is M. Solikin because it has the highest evaluation results and working time.

Table 12. Employees selected for promotion

No	Employee Name	Results Evaluation	Work Duration
1	M. Solikin	78,4166	10 Years of

4. *Controlling* (Amount to be promoted)

Personnel Manager monitors the number of employees who will be promoted to see suitability of vacancy. If there is a discrepancy, it will be re-planned.

2.11 Management Analysis Staff Mutation

1. *Planning* (Place and Number of Employees)

Personnel Manager will determine the location or part and number of employees to be transferred.

2. *Organizing* (Employees will mutation)

Table 13. Recommendations EmployeeMutation

No.	Name Employee	Position	Assessment	Old Work
1	Sintia Ward	Adm Production	75.4452	3 Years
2	Cici Hernanda	Production Adm	72.4166	1 Year

3. *Actuating* (Implementation mutation)

Due to the production division only requires one Personnel Adm. then the central party will move one of the Personnel Admissions at the head office to the Production Division in the factory branch.

Table 14. Results of Employee MutationEmployee

No	Name	Position	Place of Origin	Destinatio n
1	Sintia Wardana	Adm of Production	Head Office	Factory Branch

4. *Controlling* (Place and Number of Employees)

Where this monitoring aims to avoid inconsistencies in parts or places and the number ofwho want to be transferred.

2.12 Monitoring Management Analysis Employee Leave

1. *Planning* (Number of Leave Requests) The

Head of Section and Personnel Manager will plan and determine the number of employees who will apply for leave according to the types of leave to be taken, how long to leave by seeing the remaining leave rights in accordance with the length of leave taken.

Table 15. Employee LeaveEmployee

No	Name	Type	Long Leave Leave	Remaining Leave	Date Leave	Date Submission Leave	Division
1	Turi	C1	2 Days	6 Days	15/09/2017	09/09/2017	Greder Bandsaw
2	Zailani Arifendi	C1	2 Days	6 Day	18/09 / 2017	11/09/2017	Greder Bandsaw
3	A Yoris Tauran	C1	2 Days	-	11/09/2017	05/09/2017	Ka. Greder Bandsaw

Table 16. Types of Leave

Nama Cuti	Kode Cuti	Waktu	Keterangan
Cuti Tahunan	C1	12 Hari	Setiap tahun pegawai mendapatkan jatah waktu cuti selama 12 hari setelah bekerja minimal 12 bulan berturut-turut dengan tetap mendapat upah/gaji penuh.

2. *Organizing* (Time and Type of Leave) The

Head of Personnel checks the types of leave and the time has fulfilled the rules or not. The Personnel Manager will be responsible at this stage, which will approve or not from the application for employee leave.

3. *Actuating* (Giving Employee Leave)

Personnel Manager will see the existing leave application and will approve it based on the rules that have been determined, if it is not in accordance with the rules then the leave will not be accepted.

Table 17. Results of Employee Leave Decision

No	NameEmployee	CutiType	Old Cuti	Approval	Information
1	Turi	C1	2 Days	Yes	Terms Complete
2	Zailani Arifendi	C1	2 Days	Yes	Terms Complete
3	A Yoris Tauran	C1	2 Days	**No**	**Time Leaves Out**

4. *Controlling* (Monitoring Leaves)

Manager Personnel will see how many employees are submitting leave, how many employees have been approved by the cut-off proposal by looking at the status of the activity in each section.

2.13 Monitoring Management Analysis Pension Employees

1. *Planning* (Employees who are about to retire)

This stage is the planning phase of any employee who is approaching the retirement age limit of 56 years by looking at the birth year of each employee.

Table 18. Employee Pension Monitoring Data

No.	Name	Date of Birth	Division
1	Zulaidi Siregar	28-06-1960	Production
2	Junaidi	12-12-1961	Production
3	M. Yusuf	26-02-1963	Certification
4	Nismawati	28-10-1963	Production
5	Suhartoyo	11-04-1964	Production

2. *Organizing* (Checking Employee Age Limits)

This stage is the stage where repeated checks are made on planning criteria for employee retirement according to the rules in the company, namely the age limit of 56 years.

3. *Actuating* (Employee Retirement Decision)

This stage is a process of decision of employees who will be retired and see severance data in accordance with the length of their work.

Table 19. Employee Retirement Severance

Period (MK) - Year of	Severance (x Wages Month)
MK <5 years	4 times
5 yrs = MK <8 yrs	6 times
8 yrs = MK <11 yrs	8 times
11 yrs = MK <14 yrs	10 times
14 yrs = MK <17 yrs	12 times
17 yrs = MK <20 yrs 20	14 times
20 yrs = MK <23 yrs	16 times
23 yrs = MK <26 yrs	18 times
26 yrs = MK <29 yrs	20 times

4. *Controlling* (Employee retired)

Personnel managers also monitor pensions so that planning can be done to recruit new people and

provide pension funds. Employees who have been determined to retire must submit the retirement requirements to the Personnel Admissions then they will be approved by the Personnel Manager.

Table 20. Results of Employee Pension

No	Name	YearLog	Old Job	Severance
1	Joseph M.	12-07-1991	27 Year	20 times
2	Nismawati	07-03-1995	23 Year	18 times

2.14 Non-Functional Requirements Analysis

Analysis of non-functional requirements is the analysis needed to determine system specification requirements. This needs analysis also determines the input specifications needed by the system, the output that the system will produce and the processes needed to process input.

2.14.1 Hardware Analysis Hardware

is one component that makes a program work.

Table 21. Required Hardware Specifications

No.	HardwareName	Specifications
1	Intel	Dual Core
2	RAM	2 or 4 GB
3	Hard Drive	320 GB
4	Monitor	LCD 15
"5	Keyboard	StandardUSB Optical
6	Mouse	USB Optical Standard
7	Network	Wifi

2.14.2 Analysis Software

Tool soft is one of the important things in supporting the performance of a system.

Table 22. Software Required Specification

No.	Software Name	Specifications
1	Operating System	*Microsoft Windows* 7,*Microsoft Windows* 8,*Microsoft Windows* 10
2	Internet Browser	Google Crome, Mozilla Firefox
3	Web Server	XAMPP
4	Database	MySQL
5	PDF	Adobe Reader

2.15 Analysis Database

Analysis It aims to analyze the data that will be applied in the system and explain the data that is needed so that the system fits the needs of the user.

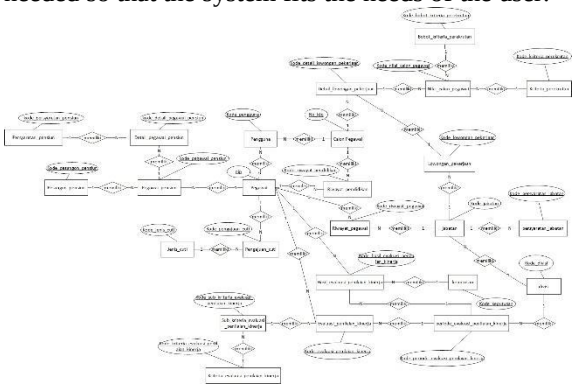


Figure 4. ERD SIM SDM

2.16 Functional Need

Analysis Analysis of functional requirements aims to find out the process of information flowing through the software. To illustrate the information process, generally used tools are Context Diagram, Data Flow Diagram, Process Specification.

2.16.1 Context Diagram Context

diagram is a model that runs widely about how data is used or data that is transformed to describe the flow of data into a system.

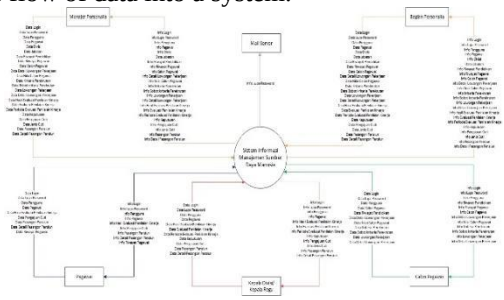


Figure 5. HR Context Diagram

2.16.2 DFD Level 1Level 1

DFD is the result of a decrease in context diagram of human resource management information system can be seen in Figure 5:

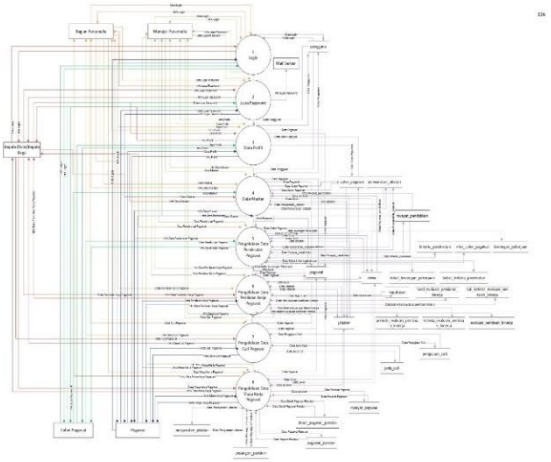


Figure 6. Level 1 DFD SIM SDM PT. Xylo Indah Pratama

2.17 Implementation and Testing of Systems

2.17.1 Interface Implementation

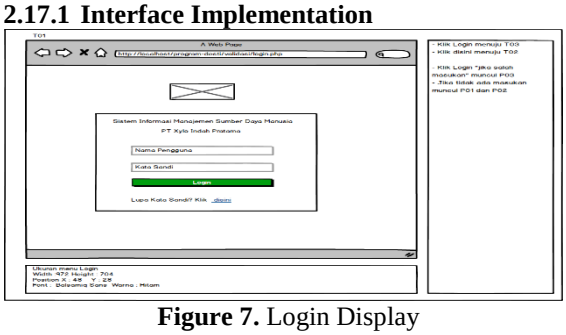


Figure 7. Login Display

2.17.2 Blackbox Testing

Is a test performed by only observing the results of execution through test data and functional checking of the software.

Table 23. Blacbox Test Plans

No	Item Test	Testing Details
1	Login Login	1. Verification
2	Forgot Password	1. Enter email
3	Data Processing Employees	1. Add employee 2. data Edit employee data
4	Processing Data Education History	1. Add education 2. history data Edit education history data
5	Profile Data Processing	Edit profile data , edit username, and edit password

2.17.3 Testing User Acceptance Test (UAT)

Applications that have been built will be tested using the user acceptance test (UAT) which aims to confirm that the system that is in testing can meet business needs to provide confidence that the system tested works correctly and can be used before being officially given to end users. The testing process will be carried out by the company representative, namely the Head of Personnel Section at PT. Xylo Indah Pratama

2.17.4 Testing End Users

Testing end users is carried out on users within PT. Xylo Indah Pratama by asking a few questions or referred to as interviews, it aims to see the quality of the human resource management information system whether it is in line with the expectations of the users or not.

3. CONCLUSION

3.1 Conclusion

After analyzing, designing and testing the system, it can be concluded from the development of human resource management information system at PT. Xylo Indah Pratama that will be built as follows:

1. Can help the Section Head and Personnel Manager in planning, organizing and controlling determine the number and position of employees needed by the company.
2. Can assist the Head of Personnel and Personnel Manager in evaluating employee performance appraisal so that the resulting assessment is more accurate and makes decision making easier for employee promotions and transfers.
3. Can assist the Head of Personnel and Personnel Manager in planning, organizing and monitoring leave and employee retirement.

3.2 Suggestions

Based on the results that have been achieved in building a Human Resource Management Information System at PT. PT. Xylo Indah Pratama still has shortcomings, it can be developed more broadly by going to the next stage, namely:

1. The Human Resource Management Information System that is built can be developed in the future much better, like the online written test feature and there are online job advertisements and fixes. to develop a wider system by going to the next stage, namely *Enterprise Resource Planning*.

REFERENCES

[1] Jr. Raymond McLeod, Sistem Informasi Manajemen, Jakarta : Prenhallindo, 2001.

[2] Yakub, Pengantar Sistem Informasi, Yogyakarta : Graha Ilmu, 2012.

[3] M. Manullang, Dasar-dasar Manajemen, Jakarta : Ghalia Indonesia, 1983.

[4] Pardosi. Jhonli, Tambunan. M. Mangara dan Syahputri. Khalida, "Pengukuran Kinerja Dengan Menggunakan Integrasi 360 Feedback Dan AHP Di PT. S," Teknik Industri, vol. 3, no.2, pp. 1-7, 2013.

[5] V. Rivai, Manajemen Sumber Daya Manusia untuk Perusahaan, Jakarta : Rajagrafindo Persada, 2003.

[6] H. Nawawi, Manajemen Sumber Daya Manusia, Jakarta : Aksara, 2001.

[7] G. R. Terry, Principles of Management, Bandung : Alumni, 1979.

[8] Pratiwi. Heny, Buku Ajar Sistem Pendukung Keputusan, Yogyakarta : Deepublish, 2016.

[9] Herdiyanti. Astri dan UD. Widianti, "Pembangunan Sistem Pendukung Keputusan Rekrutment Pegawai Baru Di PT. ABC," Komputer dan Informatika, vol. 2, no. 2, pp. 49-50, 2013.

[10] Bin Ladjamuddin. Al-Bahra. Konsep Basis Data dan Implementasi, Yogyakarta : Graha Ilmu, 2004.