Formosa Journal of Science and Technology (FJST)
Vol.3, No.7, 2024: 1647-1660

Decision Support System for New Employee Admission at PT XYZ

Budi Apriyanto[1]*, Azhar Fathoni[2]
Pamulang University
Corresponding Author: Azhar Fathoni, fathonimlg@unpam.ac.aid

A R T I C L E I N F O

Keywords: Decision Support System, New Employee, Recruitment

Received: 4, June
Revised : 25, June
Accepted: 27, July

A B S T R A C T

The process of recruiting new employees is one of the important aspects in a company to get the right individuals to fill open positions. PT XYZ, as a company engaged in Transportation services is faced with challenges in the recruitment process of new employees which is still carried out conventionally. This causes a process that takes a long time, is less objective, and has the potential to cause bias. Therefore, this research aims to develop a Decision Support System (SPK) to help PT XYZ in the process of recruiting new employees.

ISSN-E: 2964-6804
DOI: https://doi.org/10.55927/fjst.v3i7.10454
https://journal.formosapublisher.org/index.php/fjst

INTRODUCTION

PT XYZ is a company engaged in Transportation services with approximately 600 employees. In recent years, PT XYZ has experienced rapid growth, thus requiring new employees to fill various positions. The process of recruiting new employees at PT XYZ is still done conventionally, namely by receiving job applications, conducting written tests, and interviews. This process takes a long time and is less objective because it is based on the subjective assessment of the interviewer. To solve these problems, it is necessary to create a decision support system that can help companies, especially managers of the Human Resources (HR) division in making decisions to determine new employees in a company. The method used in this decision support system is the Simple Additive Weighting (SAW) method, because it can determine the weight value for each attribute, then proceed with the ranking process that will select the best alternative from a number of alternatives, in this case the alternative in question is the right to be accepted as a new employee based on the specified criteria.(Sundari and Taufik, 2014)

LITERATURE REVIEW

The Simple Additive Weight (SAW) method is often known as the weighted sum method. The meaning of weighted summation is to find the weighted sum of the ratings in each alternative on all attributes/criteria. alternatives on all attributes/criteria. The total result/score obtained for an alternative is the summation by adding up all the multiplication results between the ratings compared to the identity of the attributes and the weights of each attribute. attributes and the weight of each attribute. The rating on each attribute must have previously gone through the normalization process. normalization process. The SAW method requires a matrix normalization process to a scale that can be compared with The alternative rating in the SAW method(Yusman, Nadriati and Putra, 2022).

The selection process is a process to provide opportunities to applicants who will then be made employees and placed in vacant positions. applicants who will then be made employees and placed in vacant positions. The selection process is usually carried out before the employee is declared accepted. The purpose of the selection process in employee recruitment is to employees so that these employees are able to work optimally in the company for a long period of time. long period of time (Saputri *et al.*, 2022).

There are many ways to solve a problem that occurs in a PT in selecting employees, one of which can use the Simple Additive Weighting (SAW) method because the SAW method is a method that uses giving weights to each alternative and multiplying the number of alternative weights against the criteria. The data collection method used in this research is an interview with a direct interview to PT Pelindo I there is a problem where PT Pelindo is constrained in selecting employees. Therefore the authors are interested in providing solutions to problems that occur so that they can provide benefits for users.(Yusman, Nadriati and Putra, 2022).

METHODOLOGY

This research uses a system development method which consists of several stages, namely:

Needs Analysis: This stage was conducted to understand the needs of PT XYZ in the process of recruiting new employees. Data is collected through interviews with the management and HRD of PT XYZ.

System Design: This stage is carried out to design the SPK to be developed. The system design includes system architecture, database, and user interface.

Implementation: This stage is done to build the SPK based on the design that has been made. The SPK was developed using the PHP programming language and using MySQL as the database. PHP is a complementary language to HTML that allows the creation of dynamic applications that allow data processing and data processing. All syntax provided will be fully executed on the server while only the results are sent to the browser. PHP is known as a scripting language, which is integrated with HTML tags, executed on the server, and used to create dynamic web pages such as Active Server Pages (ASP) or Java Server Pages (JSP). PHP is an Open Source software.(Hermiati, Asnawati and Kanedi, 2021).

MySQL is one of the most popular database servers. MySQL uses the SQL language to access its database. Mysql's license is FOSS License Exception and there is also a commercial version. Mysql's tag is "The World's most popular open source database". MySQL is available for several platforms, among which are the Windows and Versilinux versions. To make administration easier for Mysql, you can use certain software, including phpmyadmin.(Ramadhan and Mukhaiyar, 2020)

Testing: This stage is done to test the SPK to make it error-free. Testing is done using various methods, such as unit testing, integration testing, and acceptance testing.

Evaluation: This stage is carried out to evaluate the SPK based on predetermined criteria. The evaluation was carried out by involving the management and HRD of PT XYZ.

RESEARCH RESULT

The SPK developed in this study consists of several modules, namely:

1. Applicant Module: This module is used to manage applicant data, such as biodata, education, work experience, and certificates.
2. Written Test Module: This module is used to conduct written tests on applicants. The written tests used include basic ability tests, general knowledge tests, and special ability tests.
3. Interview Module: This module is used to conduct interviews with applicants. The interview is conducted to assess the applicant's personality, motivation, and communication skills.

4. Assessment Module: This module is used to assess the applicant's written test and interview results. The assessment is carried out using the [specify assessment method] method.

Recommendation Module: This module is used to recommend the most suitable applicants to fill the open positions. Recommendations are made based on the assessment results.

The developed SPK has been tested and evaluated, and the results show that the SPK meets the needs of PT XYZ in the recruitment process of new employees. The SPK can help PT XYZ in selecting applicants more quickly, objectively, and free from bias.

The SAW method is often also known as the weighted sum method. The basic concept of the SAW method is to find the weighted sum of the performance ratings on each alternative on all attributes. The SAW method requires a normalization process of the decision matrix (x) to a scale that can be compared with all alternative ratings available.

$$r_{ij} = \begin{cases} \dfrac{x_{ij}}{\max_i x_{ij}} & \text{jika j ialah atribut keuntungan } \textit{(benefit)} \\ \dfrac{\min_i x_{ij}}{x_{ij}} & \text{jika j ialah atribut biaya } \textit{(cost)} \end{cases}$$

Figure 1.

Description of Each criterion:
rij: normalized performance rating value.
Xij : the value of the attribute that belongs to
Max Xij : the largest value of each criterion.
Min Xij : the smallest value of each criterion.
Benefit: if the largest value is the best

Determining the Criteria

Table 1. Criterion Determination

	Jenis Tes Psikologi	Kreteria	Bobot
C1	USIA	Cost	10
C2	PENDIDIKAN	Benefit	25
C3	TEST	Benefit	40
C4	PENGALAMAN KERJA	Benefit	20
C5	JARAK RUMAH	Cost	5

Table 2. Age Sub Criteria

Criteria	Description	Value
Age	20-25	9
	26-30	7
	31-35	5
	36-40	3
	>40	1

Table 3. Education Sub-Criteria

Kreteria	Keterangan	Bobot
	S1	9
	D3	7
Pendidikan	D2	5
	SMK	3
	SMA	1

Table 4. Test Sub Criteria

Kreteria	Keterangan	Bobot
Test	90-100	7
	80-89	6
	70-79	5
	60-69	4
	<60	3

Table 5. Sub-Criteria Work Experience

Criteria	Description	Value
Pengalaman Kerja	0-1	3
	2-3	4
	4-5	5
	6-7	6
	>7	7

Table 6. Sub-Criteria Distance from Home to Workplace

Criteria	Description	Value
Jarak	1-3 km	7
	4-6 km	6
	7-9 km	5

	10-12 km	4
	>12 km	3

Determining Alternative Data

Table 7. Alternative SAW Calculation

Nama	Nilai				
	C1	C2	C3	C4	C5
Nurul Ilmiah	22	S1	75	1	10
Zafira Salsabila	29	S1	87	3	8
Zaki Romi	38	D3	93	4	7
Ahmad Rofii	33	SMK	68	5	5
Lukito Aji	42	D2	77	7	11

The Value Of The Result Of The Conversion To Alternative Data

Table 8. Convergence Result Value to Alternative Data

Name	Value				
	C1	C2	C3	C4	C5
Nurul Ilmiah	9	9	5	3	4
Zafira Salsabila	7	9	6	4	5
Zaki Romi	3	7	7	5	5
Ahmad Rofii	5	3	4	5	6
Lukito Aji	1	5	5	7	4

Normalization on C1 (Age) cost

In C1 normalization due to cost, using the formula for the smallest value of each criterion divided by the value of the attribute owned, it can be seen as below:

$$rii = \frac{Min\ Xij}{Xij}$$

$$r = {}_{11}\frac{1}{9}$$

$$= 0{,}11$$

$$r_{12} = \frac{1}{7}$$

$$= 0{,}14$$

$$r_{13} = \frac{1}{3}$$

$$= 0,33$$

$$r_{14} = \frac{1}{5}$$

$$= 0,2$$

$$r_{15} = \frac{1}{1}$$

$$= 1$$

Normalization C2 (Education) Benefit

In C2 normalization due to benefits, using the formula for the value of the attributes owned divided by the largest value of each criterion can be seen as below:

$$r_{ij} = \frac{Xij}{Max\ Xij}$$

$$r_{21} = \frac{9}{9}$$

$$= 1$$

$$r_{22} = \frac{9}{9}$$

$$= 1$$

$$r_{23} = \frac{7}{9}$$

$$= 0,78$$

$$r_{24} = \frac{3}{9}$$

$$= 0,33$$

$$r_{25} = \frac{5}{9}$$

$$= 0,56$$

Normalization C3 (Test) Benefit

In C3 normalization due to *benefits*, using the formula for the value of the attributes owned divided by the largest value of each criterion can be seen as below:

$$r_{ij} = \frac{Xij}{Max\ Xij}$$

$$r_{31} = \frac{5}{7}$$

$$= 0{,}71$$

$$r_{32} = \frac{6}{7}$$

$$= 0{,}85$$

$$r_{33} = \frac{7}{7}$$

$$= 1$$

$$r_{34} = \frac{4}{7}$$

$$= 0{,}57$$

$$r_{35} = \frac{5}{7}$$

$$= 0{,}71$$

Normalization C4 (Work Experience) Benefit

In C4 normalization due to *benefits*, using the formula for the value of the attributes owned divided by the largest value of each criterion can be seen as below:

$$r_{ij} = \frac{Xij}{Max\ Xij}$$

$$r_{31} = \frac{5}{7}$$

$$= 0{,}71$$

$$r_{32} = \frac{6}{7}$$

$$= 0{,}85$$

$$r_{33} = \frac{7}{7}$$

$$= 1$$

$$r_{34} = \frac{4}{7}$$

$$= 0{,}57$$

$$r_{35} = \frac{5}{7}$$

$$= 0{,}71$$

Normalization C5 (Distance from home to work) cost

In C5 normalization because of the *cost*, using the formula for the value of the attributes owned divided by the largest value of each criterion can be seen as below:

$$rii = \frac{Min\ Xij}{Xij}$$

$$r_{51} = \frac{4}{4}$$

$$= 1$$

$$r_{52} = \frac{4}{5}$$

$$= 0{,}80$$

$$r_{53} = \frac{4}{5}$$

$$= 0{,}80$$

$$r_{54} = \frac{4}{6}$$

$$= 0{,}67$$

$$r_{55} = \frac{4}{4}$$

$$= 1$$

Furthermore, after normalization is done next we do the ranking process can be seen from the table below:

Table 9. Normalization results of c1-c5 values

Description	C1	C2	C3	C4	C5
A1	1.11	25.00	28.40	8.57	5.00
A2	1.43	25.00	34.40	11.43	4.00
A3	3.33	19.50	40.00	14.20	4.00
A4	2.00	8.25	22.80	14.20	3.35
A5	10.00	13.89	28.57	20.00	5.00

With the formula as below:

$$Vi = \sum_{j=1}^{n} Wj\ rij$$

V1 = (10 *0,11) + (25*1) + (40*0,71) + (20*0,43) + (5*1)

= 1,11 + 25 + 28,40 + 8,57 + 5

= 68,08

V2 = (10* 0,14)+ (25*1) + (40*0.86) + (20*0,57) + (5*0,80)

= 1.43 +25+ 34,40+11,43+4

= 76,26

V3 = (10*0,33) + (25*0,78) + (40*1) + (20*1) + (5*1)

= 3.33 + 19,50 +40,00 + 14,20+ 4,00

= 81.03

V4 = (10*0,2) + (25* 0,33) + (40*0,57) + (20* 0,71) + (5* 0,67)

= 2,00 + 8,25 + 22,80 + 14,20 + 3,35

= 50,60

V5 = (10*1,00) + (25* 0,56) + (40*0,71) + (20* 0,71) + (5* 0,67)

= 10,00 + 13,89 + 29,57 + 20,00 + 5,00

= 77,46

Name	Description	C1	C2	C3	C4	C5	Result	Rank
Nurul Ilmiah	A1	1.10	25.00	28.40	8.57	5.00	68.07	4
Zafira Salsabila	A2	1.43	25.00	34.40	11.43	4.00	76.26	3
Zaki Romi	A3	3.33	19.50	40.00	14.20	4.00	81.03	1
Ahmad Rofii	A4	2.00	8.25	22.80	14.20	3.35	50.60	5

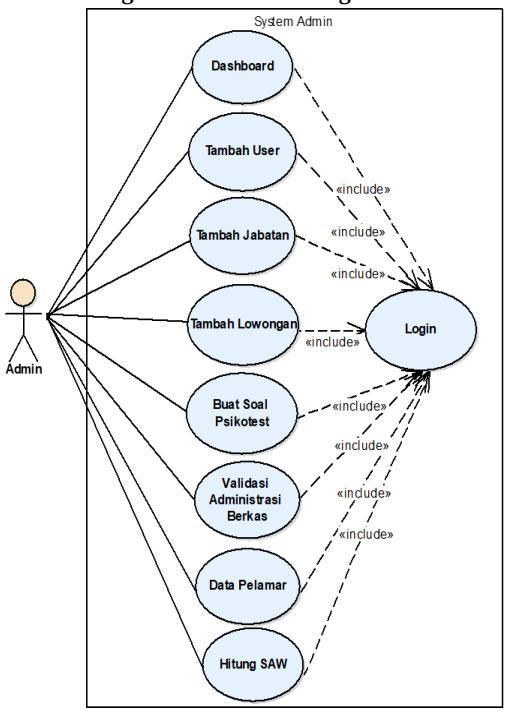
Lukito Aji	A5	10.00	13.8889	28.57	20.00	5.00	77.46	2

Use Case Diagram

In designing this system there are several models of *Use Case* diagrams of each actor, here's the picture.

Use Case Diagram Admin

Figure 2. Use Case Diagram Admin



Applicant Use Case Diagram

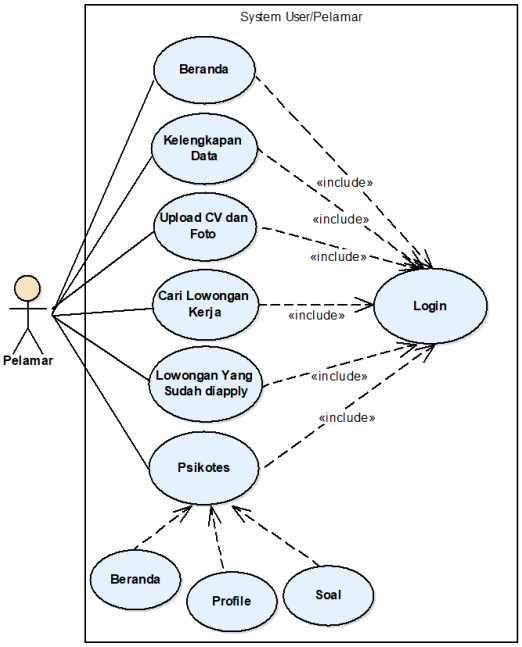


Figure 3. Use Case Diagram Applicant

Use Case Diagram of Manager

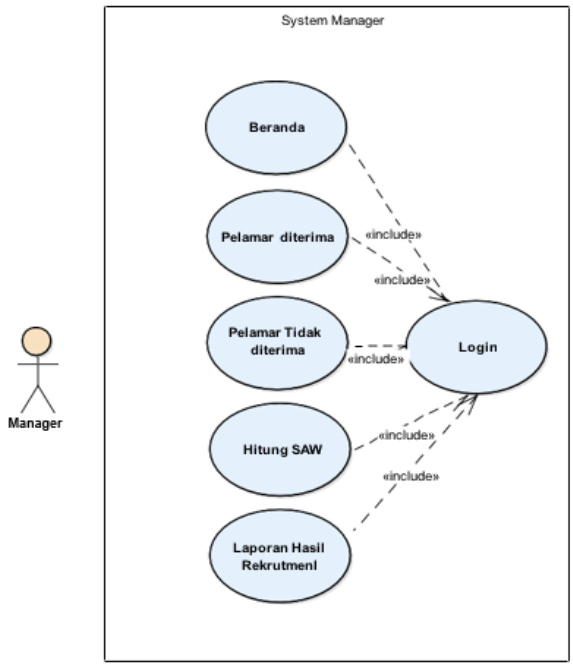


Figure 4. Use Case Diagram of Manager

CONCLUSIONS

This research has successfully developed a SPK to assist PT XYZ in the recruitment process of new employees. The SPK can help PT XYZ in selecting applicants more quickly, objectively, and free from bias. This SPK is expected to help PT XYZ in getting the right employees to fill open positions, so as to improve company performance.

RECOMMENDATIONS

At PT XYZ, using a Decision Support System (DSS) for new hire admission can significantly expedite and guarantee efficiency. The following suggestions are specific to your company:

1. Establish System Objectives: Clearly state the goals you have for the DSS. This can entail shortening the hiring process, raising candidate caliber, or strengthening adherence to HR regulations.
2. Data Integration: Include pertinent data sources in the DSS, such as application tracking systems, performance records, HR databases, and compliance data. This guarantees that judgments are founded on thorough information.
3. Decision Models: Create decision models inside the DSS to automate regular choices like background checks, interview scheduling, and CV screening. These models must to be adaptable to various departments and job types.
4. Analytics and Reporting: Use reporting tools to monitor important metrics such as retention rates, cost per hiring, and time to hire. HR managers and executives will be able to learn more about hiring patterns and performance with the use of customizable reporting options.
5. Interaction with Current Systems: To minimize effort duplication and to take advantage of current data, make sure there is a smooth interaction with the current HR and IT infrastructure.

6. Training and Support: Provide hiring managers and HR staff thorough instruction on how to use the DSS efficiently. There should be a fast support system in place to handle any problems or questions.
7. Consistent Improvement: Assess and update the DSS frequently in response to user comments and modifications to hiring procedures. This guarantee that the system will continue to be useful and efficient throughout time.
8. Pilot Testing and Feedback: To find any possible problems and get input for improvement, carry out pilot testing with a small sample of users prior to full deployment.

By using these suggestions, PT XYZ will be able to improve the quality of its hiring procedure, increase the effectiveness of its decision-making process, and eventually draw and hold on to top personnel.

FURTHER STUDY

This research opens up various directions for further research and practical action in the context of the development of new employee recruitment systems. you can consider the following avenues:

1. Advanced Data Analytics: Explore advanced analytics techniques such as predictive analytics and machine learning. These can help in forecasting hiring needs, identifying patterns in candidate data, and predicting candidate success based on historical data.
2. Natural Language Processing (NLP): Implement NLP algorithms to automate the parsing and analysis of resumes and candidate profiles. This can assist in extracting relevant information quickly and accurately, thereby speeding up the initial screening process.
3. Enhanced Decision Models: Develop more sophisticated decision models that consider a broader range of factors beyond traditional qualifications, such as cultural fit, diversity metrics, and potential for growth within the organization
4. Blockchain for Verification: Investigate the use of blockchain technology for verifying credentials and enhancing the security and transparency of candidate information. This could streamline background checks and reduce the risk of fraudulent claims.

REFERENCES

A.S Rosa, & M. Shalahuddin. (2014). *Rekayasa Perangkat Lunak Struktur dan Berorientasi Objek.* Bandung: Informatika.

Agung, R. (2017, Juni). Perancangan Sistem Informasi Penjualan dan Pendistribusian Bibit Benih Ikan pada BBI (Balai Benih Ikan) Perikanan Limapuluh Kota Secara Online Menggunakan Bahasa Pemrograman PHP. *Komputer Teknologi Informasi, Volume 4, Nomor 1, ISSN :2356-0010*, 1-8.

Erfian Junianto, Y. P. (2015). PERANCANGAN SISTEM TRACKING INVOICE LABORATURIUM PADA PT SUCUFINDO (PERSERO) BANDUNG. *Jurnal Informatika*.

Hanif, a., & Robert, M. (2015, Agustus). Analisis Pengembangan dan Perancangan Sistem Informasi Akademik Smart Berbasis Cloud Computing pada Sekolah menengah Umum Negeri (SMUN) di Daerah Istimewa Yogyakarta. *Jurnal Telematika, Volume 8, No. 2, ISSN : 1979 – 925X , e- ISSN : 2442 -4528*, 63-91.

Hidayat, R. (2017). Pengaruh Citra Merek dan Harga terhadap Keputusan Pembelian pada Sekolah Tinggi Ilmu Manajemen Sukma Medan. *Jurnal Ilman*.

Hidayatullah, P., & Kawistara, J. K. (2017). Pemograman Web. *ISBN 978-602-6232-24-3*.

Jatnika, & Irwan. (2010). *TESTING DAN IMPLEMENTASI SISTEM*. Retrieved from http://www.hendra-jatnika.web.id

Kristanto, & Andri. (2008). *Perancangan Sistem Informasi dan Aplikasinya.* Yogyakarta: Gava Media.

Moorhead, & Griffin. (2010). *Perilaku Organisasi.* Jakarta: salemba Empat.
Nofriansyah. (2014). *Konsep Data Mining Vs SIstem Pendukung Keputusan.* Yogyakarta: Deepublish.

Putra, M., Eko, Yulianti, Liza, & Indr, K. (2014). Sistem Informasi Akademik SMP Negeri 2 Talang Empat Berbasis Web. *Jurnal Sistem Informasi* .

Reed. (2011). *Kognisi Teori dan Aplikasi.* Jakarta: Salemba Humanika.

Rusli, S. (2015, Agustus). Desain Sistem Informasi Order Photo Pada CreativeStudio Photo Dengan Menggunakan Bahasa Pemrograman Visual Basic
.Net 2010. *Jurnal Momentum, 17*, 86-93.

Sagita, Awan, R., Sugiarto, & Hari. (2016). Penerapan Metode Waterfall PadaSistem Informasi Penjualan Furniture Berbasis Web. *AMIK BSI Jakarta*.

Sarwono. (2009). *Psikologi Sosial.* Jakarta: Salemba Humanika.

Sugiarti, Y. (2018). *Dasar-Dasar Pemrograman Java Netbeans Database, UML, dan Interface.* Bandung: PT. Remaja Rosakarya.

Susanti, M. (2016). Perancangan Sistem Informasi Akademik Berbasis Web pada SMK Pasar Minggu Jakarta. *Jurnal Informatika*.

Whitten, Jeffery, Bentley, Lonnie, & Dittman. (2004). *Metode Desain dan Analisis Sistem.* Yogyakarta: Andi.

Wibowo, & Angga. (2007). *16 Aplikasi PHP Gratis untuk Pengembangan Situs Web,.* Yogyakarta: SmitDev.

Zaldi, M., Satya Yoga Sena, V., & Iba Ricoida, D. (2010). Perancangan Sistem Informasi Akademik Berbasis Web Pada SMA PGRI 1 Palembang. *Jurnal Sistem Informasi*.