STAFFING MANAGEMENT INFORMATION SYSTEM AT BRC BERKAH INTERNASIONAL COMPANY OFFICE CENTER BANDUNG

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ABSTRACT

BRC Berkah Internasional company or better known as BRC (Bekam Ruqyah Center), clinic of Islamic medicine was established on 29 june 2004 is engaged in alternative health service providers and various of herbal products. Have a head office located at Kautamaan Istri street No. 199 Balong Gede Village, Regol Sub-distrct, Bandung. BRC currently has have 38 branches spread across Indonesia. Employee at BRC is called santri karya. Candidate of new santri karya must have a certificate of educational cupping. From the program of pesantren education training that is open periodically, there is mismatch between the number of reqruitment with criteria needed. The other problem are performance appraisal reports will be conducted at the time of Human Resources Evaluation, which will be the basis of the process of promotion, mutation and demotion. Impact on santri karya if work performance is not good enough can have a good result or otherwise. To help General Manager to decide the number of candidate santri karya from the monitoring needs to keep off lack or overage of santri karya, to help the promotion, mutation and demotion from existing criteria. Staffing management using Plan, Do, Check, Act. Recruitment is based on procedures and bussines rules.The Weighted Product method is used for recruitment conducted by General Manager. Performance appraisal using Behaviourally Anchored Rating Scale method for the promotion, mutation, and demotion. Functional test result, User Acceptance Test and end-user implementation testing at the enterprise evironment. This research can be concluded that the system has helped the company in doing process of acceptance of santri karya and performance appraisal.

Keywords: Management Information System, Staffing, PDCA Management, Weighted Product Method, Behaviourally Anchored Rating Scale

1. INTRODUCTION

PT. BRC Berkah Internasional or more often known as (Bekam *Ruqyah Center*) clinic is Islamic medicine clinic that was established on June 29, 2004, which engages in the filed of an alternative health and herbal products service provider. Pioneered and led by Mr. Asep Hasan Badri. BRC (Bekam *Ruqyah Center*) has a head office in Jl. Kautamaan Istri No.199 Kel. Balong Gede Kec. Regol Kota Bandung. BRC (Bekam *Ruqyah Center*). At first, BRC appeared in historical stage of Islam revival as an answer of a poor in Islam medication, and muslims condition that is drowned in not-*syar'i* medication, trapped in envious that cause *mudharat*, etc. BRC (Bekam *Ruqyah Center*) presents with abbreviation Bandung *Ruqyah Center*, but along with the development of BRC (Bekam *Ruqyah Center*) to all the cities in the country, especially the focus is in JABODETABEK, Bandung *Ruqyah Center* felt less relevant. In the first of 2008, the abbreviation of BRC changed to Bekam *Ruqyah Center*. Currently, BRC (Bekam *Ruqyah Center*) reaches 38 branches that are spreaded throughout Indonesia. Employees in PT. BRC Berkah Internasional are called *santri karya*. *Santri karya* is the employees that are recruited by the company after fulfill the approval conditions in accordance with regulations in PT. BRC Berkah Internasional as well as lifted by BRC Management as *santri karya*, with status and certain groups to be assigned and responsibility in PT. BRC Berkah Internasional.

New recruitment of *santri karya* happens after human resource evaluation if there is still deficiency in amount and needed criteria. The recruitment of *santri karya* in PT. BRC Berkah Internasional is done based on addition request for branch with increased visitors, vacancy or the opening of new branch in PT. BRC Berkah Internasional. In the process of recruitment, PT. BRC Berkah Internasional will take the candidates of new *santri karya* from BRC pesantren. New *santri karya* candidates that will

be recruited are candidates that have a training certificate of bekam education, if the candidates do not have the certificate, they have to follow a pesantren education training in PT. BRC Berkah Internasional. The training is opened in general and periodically twice a year, after 1 *syawal* dan school graduation season. The training is conducted for 4 months, 3 months in the class, and one month as apprentice in BRC clinic branch. After following the pesantren education, new candidates will be given a training certificate of bekam education from PT. BRC Berkah Internasional. This certificate is a condition that should be fullfiled by new candidates to work in PT. BRC Berkah Internasional. After following BRC pesantren education training, the candidates can already work as apprentice for 2 months, which will be decided accepted or not as an employees in PT. BRC Berkah Internasional. However, incompability occurred in number of needs and criteria that is needed in bekam education training program that is opened periodically.

Performance assesment report of *santri karya* in PT. BRC Berkah Internasional is conducted when human resource evaluation proses will do, which will be the basis of promotion, mutation, and demotion process. The report is conducted once a year, the assesment process is just conducted by one party, which is directly done by the leader. The promotion, mutation and demotion process are based on leader's report, The impact of the report often affects a not-quite-good performance obtains the good value or get a promotion. However, a good performance obtains the bad value or get a demotion.

Based on the problem above, a management information system is needed to help a recruitment plan of new *santri karya* in determine needs number as well as needed criteria to avoid the incompability deficiency or excess to make a good decision in doing promotion or demotion in Head Office PT. BRC Berkah Internasional Bandung.

Achived goals in this research are:

1. Helping the General Manager in determine employees number (*Santri Karya*) based on *monitoring* needs and vacancy, to avoid *santri karya* deficiency and excess in clinic branch.
2. Helping the General Manager in evaluate performance assesment that will help determining promotion, mutation, and demotion from employees criterias (*Santri Karya*).

1.1. Research Method

In this research, the used research method is descriptive qualitative. Descriptive research is to know an independent variable, either one variable or more without making any comparison or connecting with other variable. While qualitative research departs from data and uses existing theory as an explanatory material. The following figure is the plot in doing this research.

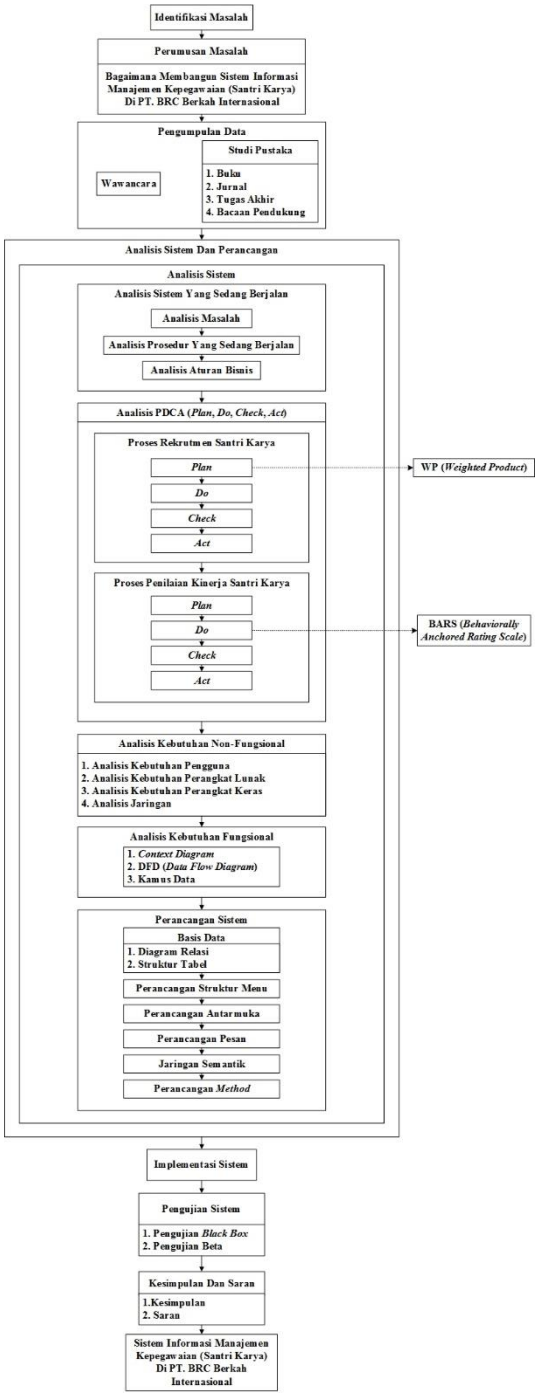


Figure 1. Research Method

2. RESEARCH CONTENTS

2.1. Information System

The role of information system in an organization may not be questioned. The support can make a company has a competitive advantage, which means a company may compete with other company using information system. The existence of information system may not be helpful only for a company, but also for a customer or consumer. For example, due to information system the bank customers can easily take money from ATM, obtain an information of savings balance or transfer using personal gadget, and even order stuff from internet[1].

2.2. Management Information System

MIS (*Management Information System*) is an information system that is used to provide used information for supporting operation, management, and decision-making in an organization. Normally, MIS produces information to monitor performance, maintain coordination, and provide information for organization operation. Generally, MIS takes data from transaction processing system[1].

MIS is frequently called as a *Management Alerting System* because this system gives an alert to the users (generally management) against problems or opportunities (Haag, 2000). Other terms of MIS is *management reporting system* (Zwass, 1998)[1].

2.3. Decision-making System

The understanding of decision-making from several definitions of it can be summarized that decision-making in an organization is a result of a communication process and participation that is continuous from whole organization. The decision result, which later is a procedure that is used to reach a specific purpose. The approach can be done, either individual approach or group, centralization or decentralization, participation or not, democratic or consensus[5].

Matter of decision-making, basically is a form of fulfillment from various alternative actions, which may be selected, that the process is through certain mechanism, with expectation it will produce the best decision. Making a decision-making is a way to develop the logical relationships that underlies the problem of decision-making to mathematical model, which reflect relationshop that happens among related factors[5].

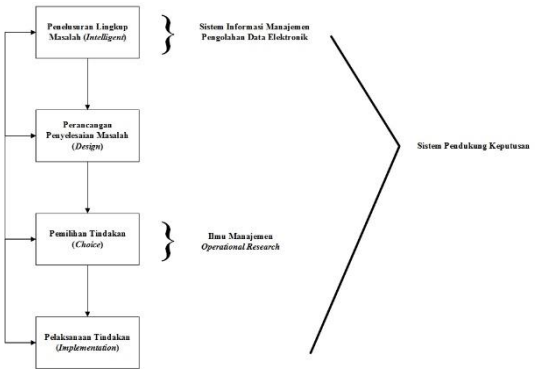


Figure 2. Phase process of decision-making

2.4. BARS (*Behaviorally Anchored Rating Scale*)

A technique that can be said as *job centered* system is method that is called BARS (*Behaviorally Anchored Rating Scale*) is method that can be inserted to *Job Centered Approach* group. In this BARS method, assesment is not pointed to *traits* or personalit traits, but to bad or good task implementation by an employee. With this modification, it is expected that assumption of assesment program of work performance is a chance for the leaders to "role playing" as a psychologist that "expertly" assess human can be removed. Moreover, this modification is expected will press subjectivity level to a minimum as possible[4].

2.5. WP (*Weighted Product*)

This WP method is different with SAW method in pretreatment to assesment result of decision atribute. In WP method, normalization process is not required because this method multiplies assesment result of each atribute. The multiply result is not significance yet before it is compared (divided) with standart value, in this case alternative ideal is often used as a standart value. Weight for benefit atribute has a function as positive exponent in multiply process among atributes, while weight has a function as negative exponent for cost atribute[2].

The following step is way to use this method:

1. Multiplying the whole atributes for an alternative with weight as positive exponent for benefit atribute and weight that has function as negative exponent on cost atribute;
2. The multiply result is added up to produce (V, at the bottom of Table 2.2) value to each alternative;
3. Finding ideal alternative value (V(A*), at the bottom of the table, with the same act as the step 1, but using the highest value for each benefit atribute and lowest value for each cost atribute (bold numbers on table l 2.2). The

result is V(A*) and it is showed in the bottom of table 2.2[2].

Metode WP method uses multiply to connect attribute rating, where rating of each attribute is exponentiated first with weigh attribute that concerned. This process is similar to normalization process. Preference for alternative A_i is given as follows:

$$S_i = \prod_{j=1}^{n} X_{ij}^{W_j} \; ; \text{with } i = 1, 2, \dots, m.$$

Where $\sum W_j = 1$. W_j is exponent positive for profit attribute, and negative for cost atribute.

Relative preference from each alternative, given as:

$$V_i = \frac{\prod_{j=1}^{n} X_{ij}^{W_j}}{\prod_{j=1}^{n} (X^*_j)^{W_j}} \; ; \text{with } i = 1, 2, \dots, m.$$

Table 1. Compability Rating From Each Alternative on Each Criteria

Alternative	Criteria				
	C_1	C_2	C_3	C_4	C_5
A_1	0,75	2000	18	50	500
A_2	0,50	1500	20	40	450
A_3	0,90	2050	35	35	800

Problem that will be solved with WP method. Previously, will be done weight correction first. First weight W = (5, 3, 4, 4, 2), will be corrected so the weight total $\sum W_j = 1$, with $W_j = \frac{W_j}{\sum W_j}$:

$$W_1 = \frac{5}{5+3+4+4+2} = \frac{5}{18} = 0{,}2778$$

$$W_2 = \frac{3}{5+3+4+4+2} = \frac{3}{18} = 0{,}1667$$

$$W_3 = \frac{4}{5+3+4+4+2} = \frac{4}{18} = 0{,}2222$$

$$W_4 = \frac{4}{5+3+4+4+2} = \frac{4}{18} = 0{,}2222$$

$$W_5 = \frac{2}{5+3+4+4+2} = \frac{2}{18} = 0{,}1111$$

Then vector S is counted as follow:

$$S_1 = (0{,}75^{-0{,}2778})(2000^{0{,}1667})(18^{0{,}2222})(50^{0{,}2222})(500^{-0{,}1111}) = 2{,}4187$$

$$S_2 = (0{,}5^{0-0{,}2778})(1500^{0{,}1667})(20^{0{,}2222})(40^{0{,}2222})(450^{-0{,}1111}) = 2{,}4270$$

$$S_3 = (0{,}90^{-0{,}2778})(2050^{0{,}1667})(35^{0{,}2222})(35^{0{,}2222})(800^{-0{,}1111}) = 1{,}7462$$

Vector V value that will be used for ranking can be counted as follow:

$$V_1 = \frac{2{,}4187}{2{,}4187 + 2{,}4270 + 1{,}7462} = 0{,}3669$$

$$V_2 = \frac{2{,}4270}{2{,}4187 + 2{,}4270 + 1{,}7462} = 0{,}3682$$

$$V_3 = \frac{1{,}7462}{2{,}4187 + 2{,}4270 + 1{,}7462} = 0{,}2649$$

Highest value is on V_2 so the alternative A_2 is the choosen alternative as the best alternative. In other words, Kalasan will be choosed as a location for setting up a new warehouse [8].

2.6. *Santri Karya* Recruitment Analysis Using PDCA Cycle Approach (*Plan, Do, Check, Act*)

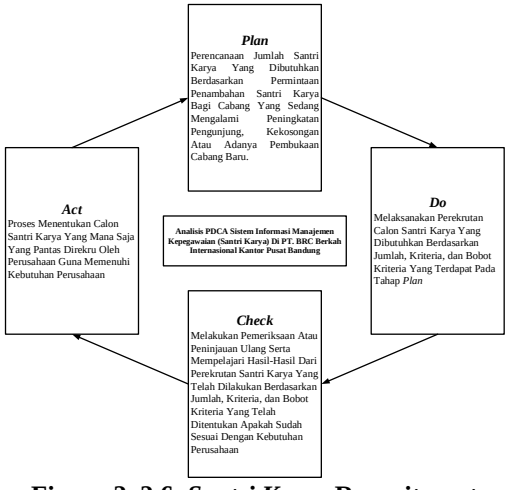


Figure 2. 2.6. *Santri Karya* Recruitment Analysis Using PDCA Cycle Approach (Plan, Do, Check, Act)

Plan

Early stage on the *santri karya* recruitment is where the Management of PT. BRC Berkah Internasional through General Manager will conduct numbers plan, criteria and weight criteria for new santri karya candidate that will be recruited. Needs and vacancy in BRC clinic branch based on Operational Coordinator report to Employement Staf. Before determining number of needs, criteria dan weight kriteria for the candidates, General Manager will evaluate first for filling needs and vacancy in clinic branch with promotion, demotion, mutation. If it can be done, the company will do promotion, demotion, and mutation first. If promotion has done, demotion, and mutation still run into needs and vacancy in clinic branch so the General Manager will determine number of needs, criteria and weight criteria for recruitment new candidates.

Assumed on Figure 3, General Manager has done evaluation for filling needs or vacancy in clinic branch with promotion, demotion and mutation.

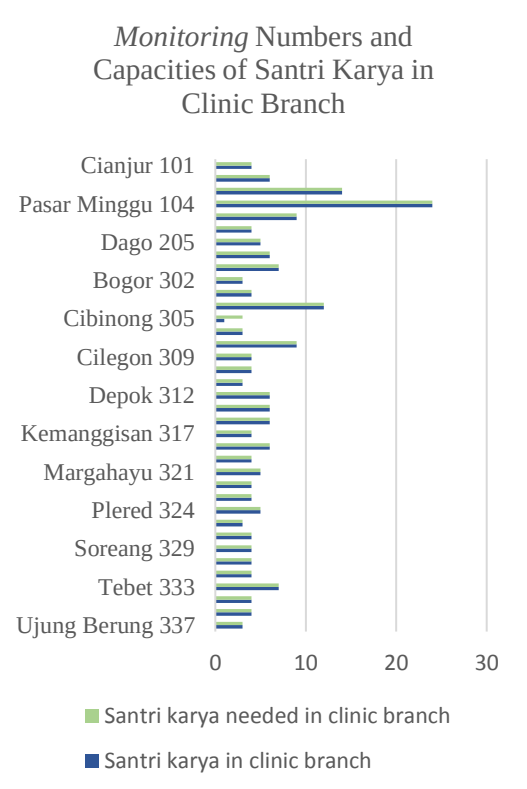


Figure 3. *Monitoring* Numbers and Capacities of Santri Karya in Clinic Brach

Based on *monitoring* numbers and criteria of santri karya, occurred deficiency of santri karya in clinic branch Cibinong as much 2 (two) therapist santri karya. Next step is General Manager will determine criteria and weight criteria of santri karya that will be recruited by the company.

The following criteria and weight criteria that has been determined by General Manager in Table 3.3, Table 3.4, and Table 3.5, selection process is helped with using WP (*Weighted Product*) method.

Table 2. Determination of Requirement of Santri Karya Position

Position	Requirements
Therapist	1. Man/Woman at Max 40 Years Old
	2. Min Education Highschool or equal
	3. *Fresh Graduate* is more liked
Clinic Admin	1. Man/Woman at Max 40 Years Old
	2. Min Education Highschool or equal
	3. *Fresh Graduate* is more liked
	4. Ever use Application with Website basis
Branch Hed	1. Man/Woman at Max 40 Years Old
	2. Min Education D3/S1
	3. *Fresh Graduate* is more liked
	4. Have a Result Value of Interview ≥ 70

Table 3. Fuzy Weight

Fuzy Number	Weight Value
Very Less	1
Less	2
Enough	3
Good	4
Very Good	5

Table 4. Criteria of Candidate Recruitment of New Santri Karya

No.	Criteria	Initial
1.	Level of Education	K1
2.	Age	K2
3.	Term Pass	K3
4.	Result Value of Interview	K4

Table 5. Criteria Value of Education Level

Education Level	Weight Value
Highschool/equal	1
D1	2
D2	3
D3	4
S1	5

Table 6. Age Criteria Value

Age	Weight Value
> 37 yo to ≤ 40 yo	1
> 32 yo to ≤ 37 yo	2
> 27 yo to ≤ 32 yo	3
> 22 yo to ≤ 27 yo	4
≥ 17 yo to ≤ 22 yo	5

Table 7. Criteria Value of Term Pass

Term Pass	Weight Value
> 4 years to ≤ 5 years	1
> 3 years to ≤ 4 years	2
> 2 years to ≤ 3 years	3
> 1 years to ≤ 2 years	4
≤ 1 year	5

Do

This step is application from all that have planned on plan step before, if in this step after the placement of promotion, demotion, and mutatuin cannot fulfill the needs and vacancy in clinic branch, so the General Manager will process recruitment of new santri karya. Based on Figure 3.19, after General Manager evaluate human resource evidently that the company still lack two therapist santri karya, so the recruitment of new therapist santri karya will be done, with data and criteria of new candidates in Table 8.

Table 8. Data and Criteria Santri Karya Candidates

New Santri Karya Candidates	Criteria		
	Level of Education	Age	Term Pass
Arya Sentosa	Highchool	18 yo	3 Months
Rahmat Wiguna	S1	23 yo	5 Months
Dadang Sahrozi	Highschool	22 yo	2 Years 1 Months

Table 9. Normalized Data Dan Criteria New Santri Karya Candidates

New Santri Karya Candidates	Criteria			
	Level of Education	Age	Term Pass	Test Value of Interview
Arya Sentosa	1	5	5	70
Rahmat Wiguna	5	4	5	85
Dadang Sahrozi	1	5	3	80

After obtaining values data of santri karya candidates, steps from the recruitment candidates use WP (*Weighted Product*) method is as follow:

a. Define first weight from each criteria which has been determined, this first weight value can change with the set condition drom the company for recruitment. General Manager determines first weight for each criteria, which is level of education level is 5, age weight is 4, term pass weight is 4, and interview test result weight is 3. As for each criteria gives reference weight as follow:

   W = (5, 4, 4, 3). Amount = 16

b. Then performed repairs of weight using the formula:

$$Wj = \frac{Wj}{\sum Wj}$$, so gain $\sum Wj = 1$

Way to solve is as follow:

$$W1 = \frac{5}{5+4+4+3} = \frac{5}{16} = 0{,}3125$$

$$W2 = \frac{4}{5+4+4+3} = \frac{4}{16} = 0{,}25$$

$$W3 = \frac{4}{5+4+4+3} = \frac{4}{16} = 0{,}25$$

$$W4 = \frac{3}{5+4+4+3} = \frac{3}{16} = 0{,}1875$$

So gain:

$\sum W = 0{,}3125 + 0{,}25 + 0{,}25 + 0{,}1875 = 1$

c. The next step is determining vector S value

$$S_i = \prod_{j=1}^{n} X_{ij}^{w_j}$$

Simplify is as:

$$Si = K1^{W1} + K2^{W2} + K3^{W3} + K4^{W4}$$

Way to solve is as follow:

$S1 = 1^{0,3125} * 5^{0,25} * 5^{0,25} * 70^{0,1875}$
$= 1 * 1{,}4953 * 1{,}4953 * 2{,}2180 = 4{,}9592$

$S2 = 5^{0,3125} * 4^{0,25} * 5^{0,25} * 85^{0,1875}$
$= 1{,}6535 * 1{,}4142 * 1{,}4953 * 2{,}3002 = 8{,}0428$

$S3 = 1^{0,3125} * 5^{0,25} * 3^{0,25} * 80^{0,1875}$
$= 1 * 1{,}4953 * 1{,}3161 * 2{,}2742 = 4{,}4755$

From calculation before, so gained the value for S vector is as follow:

Table 10. S Vector Values

New Santri Karya Candidates	S Vector Values
Arya Sentosa	4,9592
Rahmat Wiguna	8,0428
Dadang Sahrozi	4,4755

d. Then it will determine vector V value that is used for calculating alternative choise with using formula:

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

Simplify:

$$\text{V1} = \frac{Si}{S1 + S2 + \cdots Sn}$$

Way to solve is as follow:

$$\text{V1} = \frac{4{,}9592}{4{,}9592 + 8{,}0428 + 4{,}4755} = \frac{4{,}9592}{17{,}4775} = 0{,}2837$$

$$\text{V2} = \frac{8{,}0428}{4{,}9592 + 8{,}0428 + 4{,}4755} = \frac{8{,}0428}{17{,}4775} = 0{,}4601$$

$$\text{V3} = \frac{4{,}4755}{4{,}9592 + 8{,}0428 + 4{,}4755} = \frac{4{,}4755}{17{,}4775} = 0{,}2560$$

From calculation before, so gained the value for V vector is as follow:

Table 11. Vector V Value

Employee Candidates	Vector V Value
Arya Sentosa	0,2837
Rahmat Wiguna	0,4601
Dadang Sahrozi	0,2560

Check

This step is checking step and reconsideration as well as learning the results from application in step do. In this step will be done evaluation to result from placement process and recruitment new therapist santri karya candidates that has been done before, which compare the placement to make sure the placement has right, and done evaluation of recruitment result new candidates. Either the recruitment result is suitable with the needs and vacancy in clinic branch or not.

Table 12. Recruitement Ranking of New Santri Karya Candidates

Alternative	New Santri Karya Candidates	Values	Ranking
V2	Rahmat Wiguna	0,4601	I
V1	Arya Sentosa	0,2837	II
V3	Dadang Sahrozi	0,2560	III

Act

This step is the step that will be determined by the General Manager, from the result in check step before either has suitable with the first plan from placement to recruitment the new therapist of santri karya candidates. Based on Table 13, so gained among alternative choice of the new therapist V1, V2, and V3 with the highest value is V2, second is V1, and third is V3. So V2 = "Rahmat Wiguna", and V1 = "Arya Sentosa" will be choosen to be best alternative choice for being choosen by the company to fill needs or vacancy in clinic branch.

2.7. Performance Assesment Analysis Using PDCA (*Plan*, *Do*, *Check*, *Act*) Cycle Approach

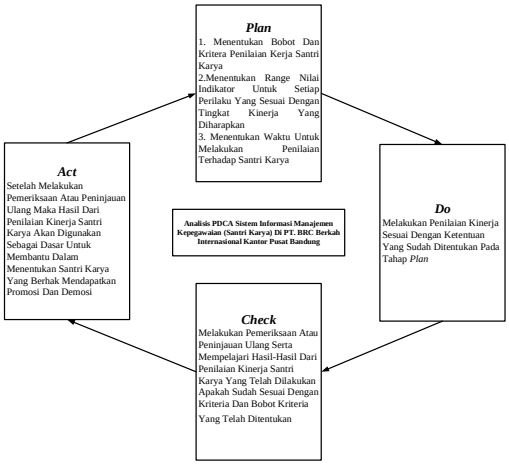


Figure 4 2.7. Performance Assesment Analysis Using PDCA (Plan, Do, Check, Act) Cycle Approach

Plan

In this step, before performance assessment done by the Management of PT. BRC Berkah Internasional, they determine weight and assessment criteria. Performance assessment is conducted once a month by the leader. In this step, it will be conducted determining value range and indicator for each behavior that is suitable with the expected performance level. Performance assessment is helped by using BARS (*Behaviorally Anchored Rating Scales*) method. With this BARS (*Behaviorally Anchored Rating Scales*) method, it describes the behavior that reduce bias happened in performance assessment on santri karya. The following is the criterias, wright, range and value indicator that has been determined by the company.

Do

After determining weight, criteria, period and assessment time in accordance with condition that has been determined, so the next step is conducting performance assessment.

Check

This step is checking step entirely either the result of performance assessment that is done is suitable with the company expected or not. This check is conducted by check the whole assessment result from each santru karya.

After getting the whole assessment result from each santri karya, General Manager will conduct performance assessment report check as a reference to help giving decision for promotion, mutation and demotion.

Act

This step is evaluation step of performance report of santri karya. Moreover, this evaluation result will be used as the basis reference in next planning and placement, as well as the reference to determine promotion, demotion, and mutation.

2.8. Basis Data Analysis

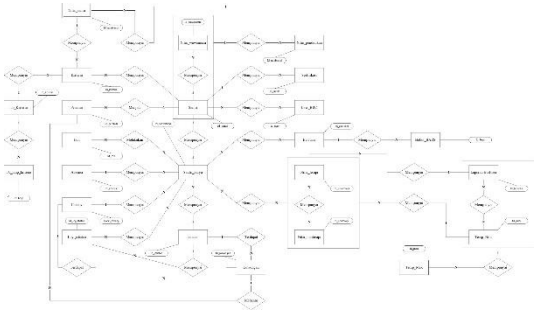


Figure 5. ERD (*Entity Relationship Diagram*)

2.9. Context Diagram

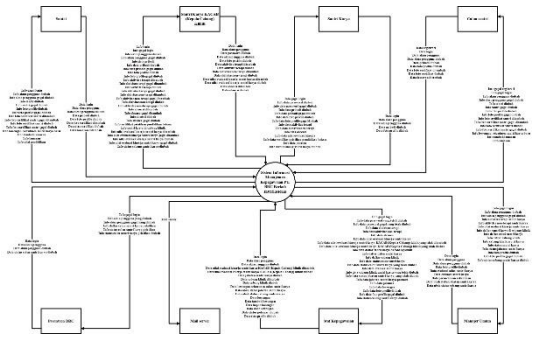


Figure 6. Context Diagram

2.10. DFD (*Data Flow Diagram*)

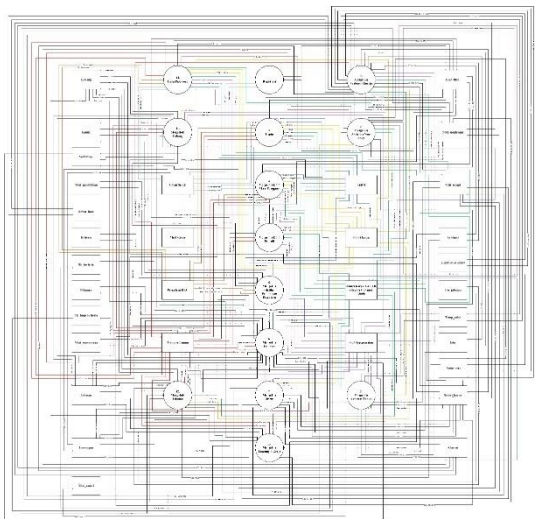


Figure 7. DFD (*Data Flow Diagram*) *Level* 1

2.11. Relation Table

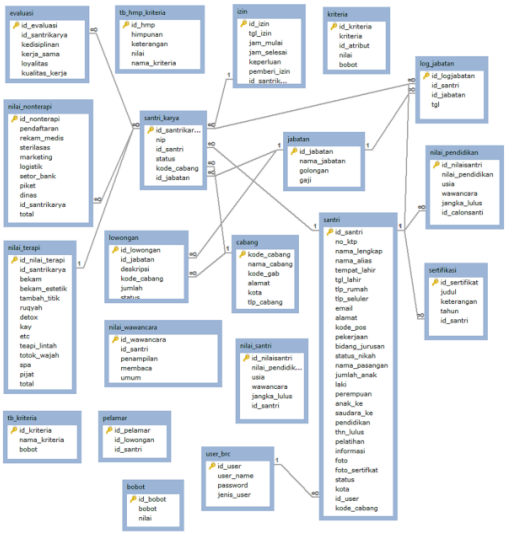


Figure 8. Relation Table

2.12. Interface Design

Interface design is picture of interface view that will be used by the user for interacting with information system of employment management in head office PT. BRC Berkah Internasional Bandung.

For interface design of General Manager can be seen on Figure 9.

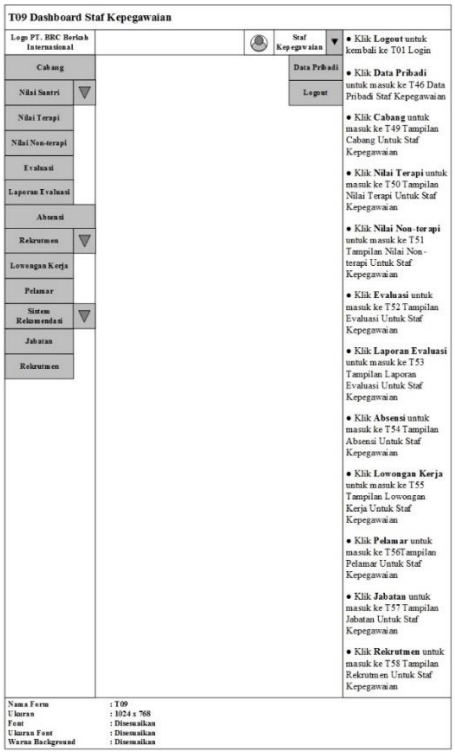


Figure 9. General Manager Interface

2.13. Conclusion of *Black Box* testing

Based on the testing result with test sample case that has been conducted, it can be conluded that processes on the system have already correct. Process error filter in user interface has quite maximum. System functional has produced the expected output.

2.14. Testing Conclusion of UAT (*User Acceptance Test*)

Based on the result of UAT (*User Acceptance Test*) testing that has been conducted to the information system of employement management (santri karya) in head office PT. BRC Berkah Internasional Bandung, it can be concluded that system can be resumed to end-user approval testing step, if there is a condition accepted with note so the system will firstly fix along with the note that is given by the previous user before enter to end-user approval step.

3. CLOSING

3.1 Conclusion

Based on the obtained result in this research and the preparation of this essay, so it can be concluded that:

1. This Information system of employement management can help General Manager in determining employees number (santri karya) based on monitoring of needs or vacancy in clinic branch.
2. This information system of employement management can help General Manager to evaluate performance assesment that can help in determining promotion, mutation, and demotion from criterias in employees (santri karya).

3.2 Suggestion

Based on the whole processes in develop this information system of employement management (santri karya), there are suggestions that is given for further development, which is fix and develop the system more widely for the needs of the interest party in management from top level to the operasional level to produce a better result for PT. BRC Berkah Internasional.

BIBLIOGRAPHY

[1] Kadir. 2014. *Pengenalan Sistem Informasi Edisi Revisi*. Yogyakarta: Andi.

[2] Basyaib. 2006. *Teori Pembuat Keputusan*. Jakarta: Grasindo.

[3] Pressman. 2012. *Rekayasa Perangkat Lunak*. Yogyakarta: Andi.

[4] Ruky. 2001. *Sistem Manajemen Kinerja Performance Management System*. Jakarta: Gramedia Pustaka Utama.

[5] Kusrini. 2007. *Konsep dan Aplikasi Sistem Pendukung Keputusan*. Yogyakarta: Andi Amikom.

[6] Arief. 2011. *Pemrograman Web Dinamis Menggunakan PHP dan MySQL*. Yoyakarta: Andi.

[7] Ladjamudin. 2005. *Analisis dan Desain Sistem Informasi*. Yogyakarta: Graha Ilmu.

[8] Kusumadewi, Hartati, Harjoko, Wardoyo. 2006. *Fuzzy Multi-Attribut Decision Making (Fuzy MADM).* Yogyakarta: Graha Ilmu.

[9] Pressman. 2010. *Rekayasa Perangkat Lunak*. Yogyakarta: Andi.