

# Android Based Employee Performance Assessment System Using Management by Objective (MBO) and Behaviorally Anchored Rating Scale (BARS)

## Method

Adnin Diba Purnomo<sup>1\*</sup> Mohammad Isa Irawan<sup>2</sup>

<sup>1,2</sup> Institut Teknologi Sepuluh Nopember Surabaya, Indonesia

\*[adnindibap@gmail.com](mailto:adnindibap@gmail.com), [mii@its.ac.id](mailto:mii@its.ac.id)

### ABSTRACT

PT XYZ is a company in the digital field in Indonesia. According to PT XYZ, Employees are people who work for a company that is the key to a company. The success or failure of the organization depends on the performance of the employees at the company. PT XYZ's current performance evaluation is using the 360 degrees method. The 360 degrees method used can monitor and evaluate the performance results of each employee, but the evaluation is biased and can be very subjective, so it is inaccurate and does not reflect behavior related to employee performance. To solve this problem, "Management by Objective" (MBO) and "Behaviorally Anchored Rating Scale" (BARS) are used to create employee performance evaluation systems and applications to reduce the risk of employee performance degradation. By using the MBO method, evaluation standards and sub-standards will be developed in the performance evaluation process, while the BARS method can find out important events that occurred in PT XYZ, evaluate the scale, and obtain evaluation indicators from standards and sub-standards. Through these two methods, new work targets were generated for each division in PT XYZ. The results of each function in the employee performance appraisal application can run according to these functions, namely performing data maintenance, performance evaluation, restatement of value, performance evaluation and reporting.

**Keywords:** *Employee Performance Appraisal Application, 360 degrees, MBO, BARS.*

### 1. INTRODUCTION

Human resources in organizations and companies greatly affect the achievement of a goal, vision and mission formed by the organization or company. Every company is expected to have good personnel management in managing human resources in companies and organizations. Human resource management is the science and art of managing the relationships and roles of the workforce to be effective and efficient in helping to realize the goals of the organization, employees, and society.

With the development of the times and information technology, changing humans in completing a job. Not only in completing work but also in all aspects of human life, such as when searching for information, if previously it was limited to books, print media or orally. In this day and age, more and more people are looking for information via the internet. Currently the need for information is very large, both individuals and organizations. Humans really need information for their respective interests.

One of the increasingly rapid developments in information technology is the need for a data processing tool that functions to produce information. Companies that want to develop their business and to achieve success must follow the information age by using more sophisticated technology. The sophisticated system greatly simplifies all the activities that will be carried out.

PT XYZ is one of the digital companies located in Indonesia. As a digital company that has been operating for more than decades, the presence of qualified employees is certainly very influential for the progress and development of PT XYZ.

So far, PT XYZ has evaluated its employees using the 360-degree method. This 360 degree method is used to monitor and find out the performance results of each employee. However, the results of employee performance evaluation using the 360-degree method are less effective. Based on the data obtained, the results of employee performance evaluations using this method seem biased and can be very subjective, so that they are not accurate and do

not reflect employee behavior towards the results of their performance appraisals. There is no measurement yet related to the measurement of the 360-degree method, but related parties suggest using a correlation analysis of competence, behavior with performance, and related parties suggest using a comparison of the 360-degree method and the author will examine.

There are several disadvantages of using the 360-degree method of assessment, including: (a) the feedback process is too long, (b) it can cause tension among staff, (c) it takes too long because the data management is complicated, and (d) can lead to intimidation that causes resentment and frustration among employees. (Chopra, 2017) Other research results also reveal that the 360-degree method can be ineffective if the appraiser does not have competent competence in this regard. (Alimuddin, 2019)

Responding to the shortcomings of using the 360-degree method as a tool to evaluate employee performance, the use of other alternative methods is needed to obtain optimal employee performance evaluation results. The application of the Management by Objectives (MBO) method is very necessary as a method of performance appraisal that can increase employee effectiveness. From the results of related research, econometric results show that the MBO method should be used as a performance appraisal method along with increasing employee effectiveness. (Islami et al., 2018) In addition to MBO, performance appraisal using the Behaviorally Anchored Rating Scale (BARS) method can also be said to be effective.

Recently, the incorporation of MBO and BARS as a method for conducting job appraisals seems to be effective. This is evidenced by the results of other studies which explain that the application of employee performance appraisal with the MBO and BARS methods that he designed can make it easier for managers to see and monitor the development of employee performance in each period. (Taufik et al., 2016) Designing an MBO-based performance management system and BARS also gave positive results in managing auditor performance on inspection audits. (Permana & Fitri Ikatrinasari, 2020) The combination of the MBO and BARS methods can produce a new work goal for each section. (Rahmawati,

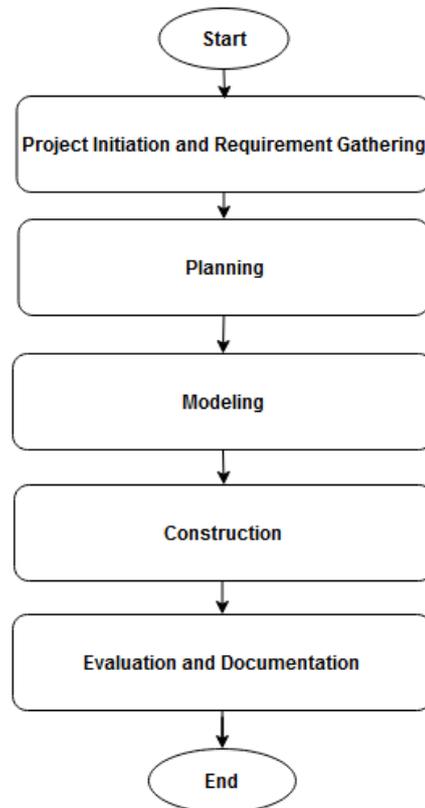
Based on several problems that have been described previously, the author tries to combine the MBO and BARS methods as a tool for evaluating employee performance at PT XYZ. In this context,

the author will also realize this performance assessment tool in the form of an android application. The goal is to make the use of this method easier and more flexible, considering that PT XYZ is also a company engaged in the digital field. The existence of this android application is also expected to avoid problems experienced by other researchers who process the data for quite a long time because it is done manually using Microsoft Excel. The choice of the Android platform is none other than because of the high statistics of Android users in Indonesia, especially in PT XYZ using the Android operating system 91.42% while the iOS operating system 8.39%.

In this study, the BARS method is expected to solve problems related to employee behavior evaluation standards.

MBO is expected to be able to evaluate performance with work standards and feedback. The use of the two related methods is expected to be able to overcome the gaps that arise in PT XYZ. The employee performance appraisal application that combines MBO and BARS in this study is also expected to be a solution for business process problems, master data processing, and employee performance evaluation.

**2. MATERIALS AND METHOD**



**Figure 1.** Research Methodology

2.1 Early stage

2.1.1. Communication

Communication is the first step in the waterfall model. At this stage there are 2 stages, namely project initiating and requirements gathering

A. Project Initiating

Project Initiating at this stage to collect data. Here are the steps:

1. Research Concepts and Models

The method used in this study is the Management by Objective (MBO) method to determine PT XYZ's assessment criteria in evaluating employee performance. The criteria for using the CSF method will be obtained in the business activities and objectives of the division. After the data is collected, it is continued with data processing using the Behaviorally Anchored Rating Scale (BARS) which is used to calculate the performance assessment of the indicators that have been obtained. The following is the scheme of the method used in this study:

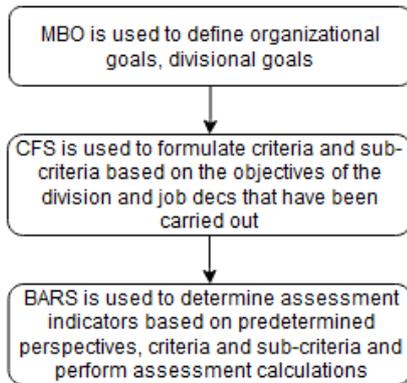


Figure 2. Schematic of Method Use

2. Data

Determination of criteria using literature studies and reviews from written sources as well as directly with resource persons. Furthermore, the distribution of questionnaires to respondents of PT XYZ employees.

The data collection in this research was field studies, literature studies, interviews and questionnaires which were carried out online using an android application that was made. The explanation of each stage is as follows:

a. Field Study

Field studies to collect data related to research topics, which consist of: company profile, company vision and mission, business activities, department objectives, organizational structure and job descriptions.

b. Study of literature

Literature study to deepen knowledge related to research topics, by reading books and journals about employee performance.

c. Interview

Interviews to find out information directly in order to build a system that is in accordance with PT XYZ.

d. Questionnaire

Questionnaire to collect data regarding the criteria for activities at PT XYZ. The questionnaire is poured into the android application.

3. Business Process Analysis

Analyzing the results of interviews with resource persons by determining solutions to the problems as well as providing alternative assessment calculations in order to compare the current method with that carried out by the author.

Table 1. Identification of problems

No	Problem	Solution
1	There is already an assessment, but it is only done with 1 assessment method, there is no comparison with other methods	Conduct assessments with other methods
2	Assessment is only done once a year	With the method that the author proposes, it can be done periodically

4. Determining the Scope of Research

The scope of the research includes the constraints and assumptions used in this study. The following are the limitations of the research conducted:

- a. This application uses the "Management by Objectives" (MBO) method to

determine standards and sub-standards for performance evaluation, Behaviorally Anchored Rating Scale (BARS) is used as a reference for calculating performance evaluation.

- b. The views used are finance, customers, internal business processes, and learning and growth

## B. Requirements Gathering

The Requirement Gathering in this employee performance appraisal application is divided into several stages, namely user identification and data identification. Here are the stages:

1. User identification  
Perform user identification to see the characteristics of PT XYZ users which consists of several parts
2. Identify Data Needs  
Data requirements at PT XYZ consist of:
  - User data
  - Employee Data
  - Period data
  - Data section
  - Job details
  - Company Purpose Data
  - Vision Data
  - Mission Data
  - Business Activity Data
  - Destination data section
  - Job Description
  - Data Scale
  - Perspective data
  - Assessment criteria data
  - Sub-criteria data
  - Weight data
  - Follow-up data
  - Training data
  - Data critical incident
  - Data performance dimensions
  - Work Target Data
  - Scaling incident data
  - Value range data
  - Employee performance appraisal transactions
  - Value Recapitulation Data
  - Employee performance evaluation transactions

- Employee Performance Assessment Report
- Periodic Employee Performance Assessment Report
- Value Recapitulation Report
- Periodic Value Recapitulation Report
- Performance evaluation report
- Periodic Performance Evaluation Report
- Historical graph of employee performance appraisal

## 2.2. Process

### 2.2.1. Planning

The planning stage is a reference for work plans, from research to the use of PT XYZ's MBO and BARS methods for employee performance appraisal applications.

### 2.2.2. Modeling

#### A. Analysis

#### 1. Analyzing the Management by Objective (MBO) Method

##### a. Setting Company Goals

The company's goal is the first step to analyze the MBO method. The company's goals can be seen from the company's brainstorming to the community.

##### b. Analyzing the purpose and job description of the section

The purpose of the section is an activity carried out by brainstorming with the head of the section regarding the objectives of the PT XYZ section.

##### c. Analyzing Business Activities in the Company

At this stage, interviews were conducted with informants to form a mapping of business activities from PT XYZ. The results of the interviews will be validated by resource persons from the company.

##### d. Formulation of Critical Success Factors

At this stage, the success factors are formulated. Determining the CSF requires a process from various sources, including interviews and literature studies in PT XYZ's company.

- e. **Identify Success Factors**  
When the criteria and sub-criteria have been determined, it is continued with the identification with perspective
2. **Analyze the Behaviorally Anchored Rating Scale (BARS)**
  - a. **Determination of Critical Incident Technique**  
When developing critical event technology, it can be done by giving the company a questionnaire. By asking questions about important events that often occur at PT XYZ.
  - b. **Determination of Performance Dimension**  
In terms of performance, evaluation indicators will be generated, and indicators will be obtained from key events, and adjusted to the views, criteria and sub-criteria of each section.
  - c. **Determination of Scaling Incident**  
Through brainstorming with the company to determine the employee performance appraisal scale, an extended event was obtained, and the extended event was used in the evaluation process
  - d. **Making Assessment Rubric**  
Formulated assessment rubric for indicators that have been found, performance assessment according to indicators in each section.
  - e. **Creation of Individual Work Goals and Weighting**  
Individual work targets and weights by conducting a

questionnaire with the company. The weights and targets are validated by the company.

- f. **Final Instrument (BARS Calculation)**
  - Formula for each Indicator  $Value = scale \times weight$  (1)  
Note: Weight in decimal
  - Formula for each sub-criteria  
 $Sub-criteria\ value = sub-criteria\ value\ 1 + sub-criteria\ value\ 2 + sub-criteria\ n$  (2)
  - Formula for each criterion  
 $Criteria\ value = criteria\ value\ 1 + criteria\ value\ 2 + criteria\ n$  (3)
  - Formula for Final  
 $final\ average = sum\ of\ terms$  (4)

**Table 2.** Final Score Scale of Employee Performance Assessment

Scale	Letter Grades
1	Very Bad
2	Bad
3	Enough
4	Well
5	Very Good

**B. Design**

Design is the stage to determine system requirements in an application design for employee performance appraisal at PT XYZ. This stage focuses on System Flowcharts, Conceptual Data Models, Physical Data Models, Data Flow Diagrams, Table Structures, and Input and Output Design.

The Trial Scenario Design is carried out to plan the test design for the performance evaluation application. Master data input and output design, performance evaluation, score restatement, performance evaluation and reporting.

**2.2.3. Construction**

Construction is an activity to build or build an installation efficiently, based on everything decided at the design

stage (engineering) and application testing.

2.3. Final Stage

2.3.1. System Evaluation

System evaluation is a planned activity to assess a problems that occur using the instrument and the results can be compared with benchmarks in order to obtain conclusions and solutions to the problems assessed in the system created

2.3.2. Documentation

Documentation is a systematic activity or process in collecting, searching, investigating, using, and providing documents to obtain information, information, knowledge and evidence and disseminate it to users.

**3. RESULT**

3.1. System Specification

System requirements analysis is used to determine the specifications of the system used in building the performance appraisal application of PT YZ by using the Management by Objective (MBO) and Behaviorally Anchored Rating Scale (BARS) methods. The system requirements consist of software and hardware.

3.1.1. Software requirements in the process of making employee performance appraisal applications using the MBO and BARS methods include:

**Table 3.** Software Requirements Analysis

Component	Specification
Operating system	Windows 10 64 bit
Databases	Google Sheet
Programming Language	Kotlin
Platform	Android

3.1.2. Hardware requirements in the process of making employee performance appraisal applications include:

**Table 4.** Hardware Requirements Analysis

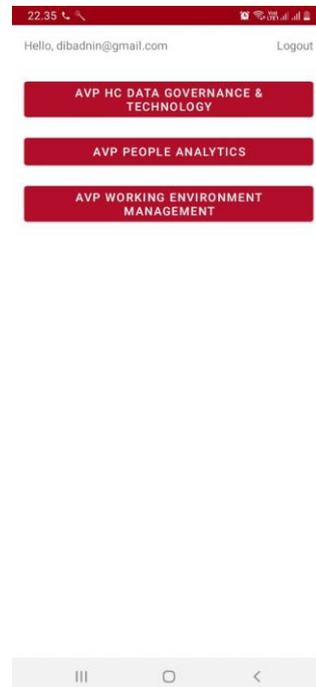
Component	Specification
Processor	Intel i7 or higher
Memory	SSD

3.2. System Implementation

System implementation is the stage of implementing the system that will be carried out if the system is approved including the program that has been made at the system design so that it is ready for operation.



**Figure 3.** Login



**Figure 4.** Choose the position to be assessed

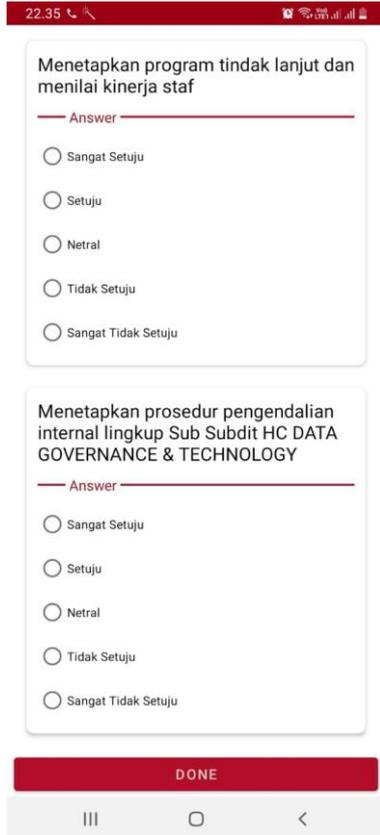


Figure 5. Fill Quetioner



Figure 6. Final Result

### 3.3. Application Trial Results

The following are application test results from the performance appraisal page on the performance appraisal application.

**Table 5.** Test Results of Employee Performance Assessment Pages

No	Purpose	Input	Result
1	Login	Enter your registered email	Figure 3
2	do an assessment	fill quetioner	Figure 5
3	see the results of the assessment	click done when finished filling out the questionna ire	Figure 6

### 3.4. System Evaluation

This stage is used to determine whether the functions in the performance appraisal application can run according to the previous design. System evaluation can be seen from the overall results of system trials that have been successful and the comparison of the accuracy of the calculation results between the results of calculations in the application and Microsoft Excel.

The design objectives through the trial design of the whole have been fulfilled. This can be proven in the implementation of the system which shows the success of the master data processing, performance appraisal process to report generation. In knowing the accuracy of the results in the calculation of the assessment, a comparison is made between the results of calculations from Microsoft Excel and the application of employee performance appraisal. The assessment process calculated using Excel with the performance appraisal application resulted in a very good score and an average overall score of 95.2%.

4. DISCUSSION

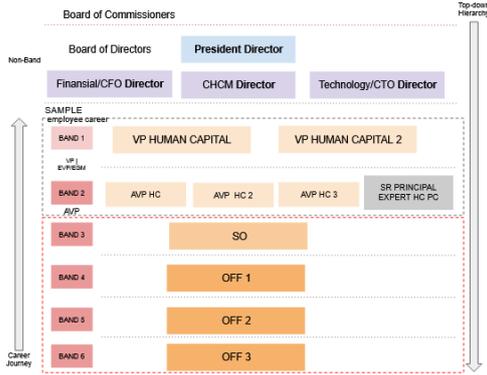


Figure 7. PT XYZ Organizational Structure (especially Human Capital)

After the author and resource persons discussed, it was decided that for the calculation of the data there were 2 options for the questionnaire rules, namely:

Table 6. Questionnaire respondent rules

No	Role	Pro	Kontra
1	BAND 1-2	Strategic	Job Decs According To Contract Management
2	BAND 1-6	Many Samplings	Distribution of Job Depending on the Boss

Based on the table above, the author agrees with the informants to use the first rule, namely in Band 1-2 with a total of 8 respondents.

5. CONCLUSION

Employee performance appraisal using the MBO and BARS methods is a more detailed research method for each position. The assessment that is usually used uses general questions for the questionnaire. After using the MBO and BARS methods, the results are in accordance with the job description so that they are more focused on working on each position held.

From the implementation of the application made, the results that are expected by each Human Capital are obtained, because they are in accordance with existing conditions, so that VP and AVP can monitor and evaluate work according to the Management Contract made at the beginning of the year.

6. REFERENCES

[1] Alimudin. (2019). Digital Library Unismuh Makassar. <https://digilib.unismuh.ac.id/document/detail/9147/>

[2] Aulia, N., Batarius, P., & Siki, YCH (2020). Location Based Service (LBS) Application for Android-Based Information and Location Search for Halal Restaurants in Kupang City. *Paradigm - Journal of Computer And Informatics*, 22(1), 7–16. <https://doi.org/10.31294/p.v22i1.7654>

[3] AWANI, NR (2018). DESIGN OF PERFORMANCE APPRAISAL USING BEHAVIORALLY ANCHORED RATING SCALES (BARS) METHOD IN PRODUCTION DIVISION AT PT TUNGGAL INTI KAHURIPAN. Telkom University. <https://openlibrary.telkomuniversity.ac.id/home/catalog/id/147147/slug/perancangan-performance-appraisal-using-method-behaviorally-anchored-rating-scales-bars-pada-divisi-hasil-di-pt-single-core-kahuripan.html>

[4] Chopra, R. (2017). 360 Degree Performance Assessments: An Overview. *Global Journal of Enterprise Information Systems*, 9(3), 102. <https://doi.org/10.18311/gjeis/2017/16029>

[5] Firdaushafa, A. (2020). Performance Assessment of Manufacturing Employees with Behaviorally Anchored Rating Scale Method.

[6] Islami, X., Mulolli, E., & Mustafa, N. (2018). Using Management by Objectives as a performance appraisal tool for employee satisfaction. *Future Business Journal*, 4(1), 94–108. <https://doi.org/10.1016/j.fbj.2018.01.001>

[7] Karman, J., & Mulyono, H. (2019). The Design of a Geographic Information System for the Location of Tourist Attractions in Lubuklinggau City Based on Android. *J-SAKTI (Journal of Computer Science and Informatics)*, 3(2), 411. <https://doi.org/10.30645/j-sakti.v3i2.160>

[8] Permana, R., & Fitri Ikatrinasari, Z. (2020). DESIGNING OF PERFORMANCE MANAGEMENT SYSTEM FOR AUDITOR CERTIFICATION BODY USING MANAGEMENT BY OBJECTIVE AND BEHAVIORALLY ANCHOR RATING SCALE.

[9] Proceedings on Engineering Sciences, 2(2), 179–186. <https://doi.org/10.24874/pes02.02008>

Rahmawati, Y. (2020). TA : Application of Employee Performance Assessment Using Management by Objective (MBO) and Behaviorally Anchored Rating Scale (BARS) Methods on CV Radef Solution.

[10] Sibarani, NS, Munawar, G., & Wisnuadhi, B. (2018). Android Application Performance Analysis On Java and Kotlin Programming

Languages. Proceedings of the Industrial Research Workshop and National Seminar, 9, 319–324.

<https://doi.org/10.35313/IRWNS.V9I0.1116>

- [11] Siti, (, Evita, N., Ode, W., Muizu, Z., Tri, R., Atmojo, W., & Evita, SN (2017). Employee Performance Assessment Using the Behaviorally Anchore Rating Scale Method and Management by Objectives (CASE STUDY AT PT QWORDS COMPANY INTERNATIONAL) In PEKBIS (Journal of Economics and Business Education) (Vol. 9, Issue1)[https://pekbis.ejournal.unri.ac.id/index.php/JPEB/article /view/4051](https://pekbis.ejournal.unri.ac.id/index.php/JPEB/article/view/4051)
- [12]Taufik, T., Fithri, P., & Prathama, YE (2016). Employee Performance Appraisal System Application Design with MBO and BARS (Case Study of HEPP Maninjau). *Journal of Industrial SystemOptimization*,13(2),760.<https://doi.org/10.25077/josi.v13.n2.p760-770.2014>