SOFTWARE DEVELOPMENT PROJECT MANAGEMENT BASED ON WORK BREAKDOWN STRUCTURE AND ODOO ERP

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Abstract

Software Development Project Management is the most important part of the Software Development Life Cycle process. The stages in project development include Initiating, Planning, Executing, Monitoring and Controlling, and Closing. This research uses the Work Breakdown Structure approach, which is a method used in project management to break down complex work into smaller and more manageable parts. Work Breakdown Structure helps in organizing, classifying, and describing the work to be done in a project. Odoo ERP is part of the tools that can be used for project management. Testing the project module using Blackbox Testing. The test scenario includes functional testing of the project management module. Application testing shows good results and is following existing needs. The results show that software project management using the Work Breakdown Structure approach can be implemented properly with Odoo ERP tools.

Keywords: *Blackbox Testing, Odoo ERP, Software Development, Software Project Management, Work Breakdown Structure.*

1. INTRODUCTION

Project management is a systematic approach to managing projects from start to finish involving planning, organizing, implementing, supervising, and controlling to achieve project goals using available resources effectively and efficiently [1]. Project Management with the Work Breakdown Structure approach represents in the form of a hierarchical diagram that shows the relationship between deliverables and smaller sub-deliverables. At the lowest level, each element in the WBS referred to as a work package, must be identified, managed, and estimated for resources and costs [2][3].

A strong framework in project management and organization or project professionals can be done by adapting the Project Management Body of Knowledge according to specific project needs and characteristics. The project management cycle covers several aspects of project development [4][5]. There are also many tools used in project development depending on the needs. The following research uses the Odoo-ERP framework in project management implementation [6][7].

Cost management in project management is the process of estimating, allocating, controlling, and reporting costs associated with a project. The main objective of cost management is to ensure that the project is completed within the set budget [8]. Software defects in software development projects depend on software costs [9][10]. In cost

management in project development, there are several tools and techniques that can be used, such as cost-benefit analysis, value engineering analysis, cost control, and cost-related risk management [11][12]. Relevant cost information should be reported regularly to project stakeholders [13]. Project management involves preparing project financial reports that include actual cost developments, projected costs, and differences with the established budget [14].

Software project management with the Work Breakdown Structure (WBS) approach and Odoo ERP can provide a structured and efficient framework for managing software development projects. Related research shows that project development can also be described with the BPMN approach so that the success rate of testing is good and there is a minimal risk [15]. Risk management in software development is the main thing when project management is carried out [16]. Critical Success Factors (CSF) are factors that significantly contribute to the success of a project [17]. These factors are key to achieving project goals and meeting stakeholder expectations [18][19]. Regularly monitoring and controlling project progress is essential [20]. Conducting performance monitoring, measuring progress according to schedule and budget, and identifying necessary changes can help avoid delays and ensure the project stays on track [21].

The following research aims to conduct project management in software development with the Work

Breakdown Structure approach. In addition, it also uses the Odoo-ERP framework in software development project management as a whole with the concept of the Software Development Life Cycle.

2. RESEARCH METHODS

WBS is an important tool in software project management that helps in breaking down work into more manageable parts. Using the WBS approach, software projects can be divided into smaller tasks, such as requirements analysis, system design, module development, testing, and implementation. Each task in the WBS can be assigned responsibility to the relevant team or individual. WBS helps in more detailed planning, resource and time estimation, and project progress control.

Odoo ERP (Enterprise Resource Planning) is an integrated software platform that provides various modules to manage different aspects of a business, including project management. Odoo ERP has a Project Management module that can be used to plan, organize, control, and track software development projects. The module provides features such as task creation, resource allocation, budget management, progress monitoring, team collaboration, and project reporting.

Project teams can use the WBS approach to break down software development projects into smaller tasks. Each task in the WBS can be represented as a task or phase in Odoo ERP.

In Odoo ERP, the project team can use the Project Management module to plan the schedule, allocate resources, and estimate project costs. The WBS can be used as a basis to structure the tasks in Odoo and organize the dependencies between them. In Odoo ERP, the project team can update the progress of project tasks, add notes, attach documents, and monitor resource usage. This information can be used to monitor and track project progress in real-time. Odoo ERP provides collaboration features that allow project teams to communicate, share information, and work together on a single platform. Teams can discuss tasks, organize meetings, and share important documents. Odoo ERP can generate informative project reports, including progress reports, cost analyses, and overall project status. These reports can help project teams and stakeholders monitor project performance.

By combining the WBS approach with the use of Odoo ERP, project teams can gain clarity and order in the management of software projects. This can help improve efficiency, reduce risks, and ensure overall project success. The selection of the right Software Development Life Cycle (SDLC) method depends on the project's needs, complexity, and desired flexibility. Each method has its own advantages and disadvantages. It is important to consider these factors and involve the project team in decision-making to select an SDLC method that suits the needs of the software project. Figure 1 shows the use of the SDLC method in software development by incorporating Odoo ERP as a tool in Project management.
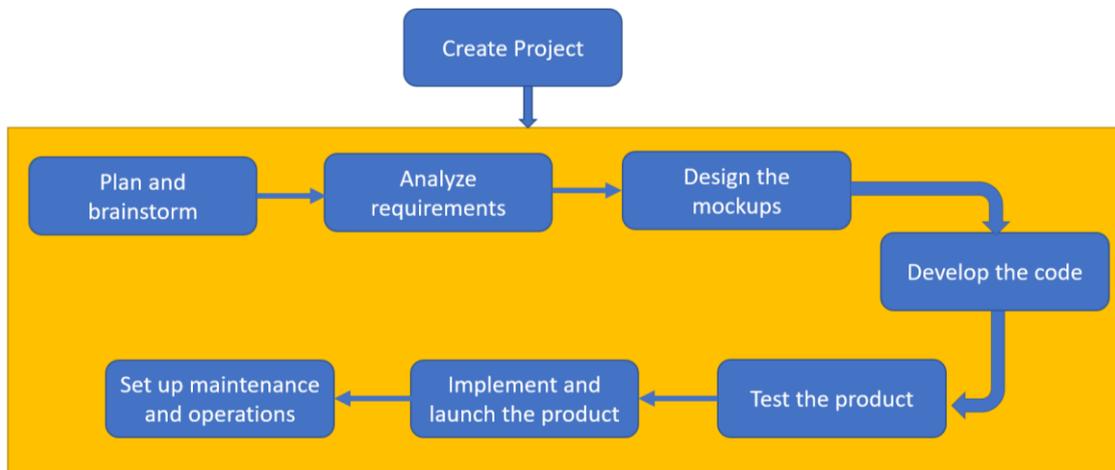

Figure 1. SDLC Management Project [22]

3. RESULTS AND DISCUSSION

The implementation of the Project with the WBS approach and Odoo ERP is shown in the following figure 2.

In Odoo ERP, the "Project Management" module is used to create and manage projects. To create a new project, you can follow these steps:
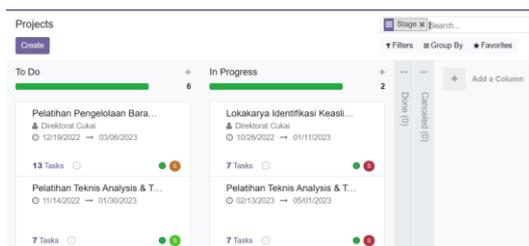

Figure 2. Create Project

a. Log in to the Odoo ERP system and have the Project Management module installed.
b. Open the Project application in the main menu of the Odoo home page.
c. On the Project page, click the Create button to create a new project.
d. On the project creation page, it is used to fill in some project information Project Name is used for the Project to describe the project name and determine the team members who will be involved in the Project. Set the project start and finish dates can also be done on project management as well as a brief description of the Project.
e. Closing Project

After filling in the project information, you can proceed to other parts of the page, such as adding and managing tasks related to the Project, uploading and sharing project-related documents, communicating with project team members through the discussion feature, and if the Project involves billing, you can organize and track project bills here. When you are done filling in all the required information and setting the project preferences, click the Save button to create a new project. The new Project will be created in the Odoo ERP system and can start managing the Project, adding tasks, managing time, tracking progress, and collaborating with project team members through the features available in the "Project Management" module. Figure 3 shows the WBS for Project management.
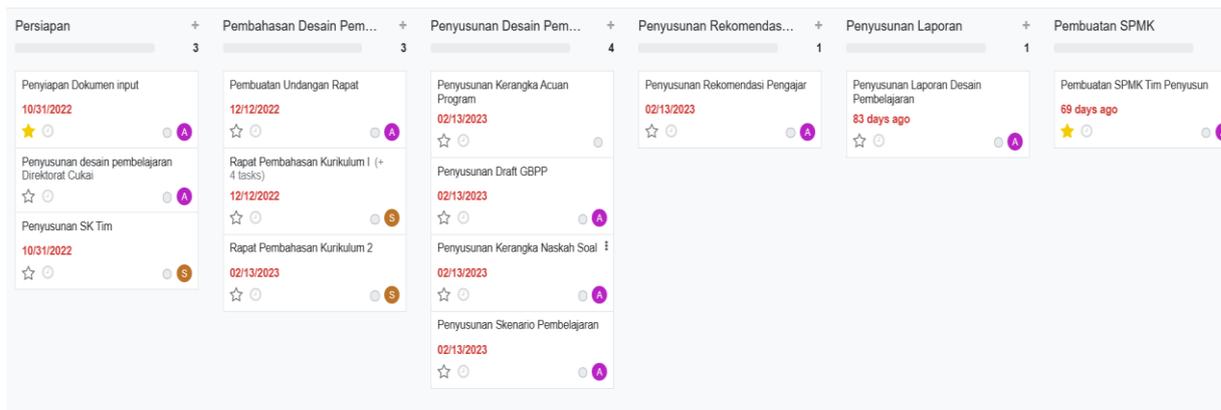

Figure 3. Create WBS ManajemenProject

Odoo ERP uses Python as the primary language for the development of its modules. Therefore, the coding structure in Odoo ERP follows the Python development standards and also uses some conventions and design patterns that are specific to Odoo. Here are some common coding structure elements used in module development in Odoo ERP, as follows.

a. Module Directory
Each Odoo module consists of a directory that contains files related to that module. The module directory usually has a name that identifies the module and contains files such as:

    __init__.py,
    __manifest__.py,
    models.py,
    views.xml,
    security/,
    data/, dan lainnya.

b. File __init__.py:
File __init__.py is an empty file used to identify the directory as a Python package.
c. File __manifest__.py:
File __manifest__.py is a module configuration file that contains information about the module, such as its name, version, description, dependencies, appearance, and others. The file is first executed when the module is installed or loaded into the Odoo system.

d. File models.py:
File models.py contains the definitions of Odoo model classes that represent business entities in the module, such as objects like Products, Customers, Orders, etc. In this file, you define the attributes, relations, methods, and behavior of the model class.
e. File views.xml:
File views.xml Manifest contains view definitions that specify how data from the model will be displayed to the user. This file uses XML syntax to define the view structure, elements, widgets, actions, etc.
f. Direktory security/:
Direktory security/ contains XML files that govern access to model objects in the module. These files define user access rights, user groups, and other security rules.
g. Direktory data/:
Direktory data/ XML files that serve as initial or configuration data imported into the Odoo system when the module is installed or loaded. These files may contain sample data, initial settings, or other configurations.

In addition, the coding structure of Odoo ERP also involves the use of Odoo's ORM (Object-Relational Mapping) to link between the model and

the database, the use of annotations to define the model's metadata, the use of decorators to set the model's behavior, and the use of Odoo's API to manipulate data and perform business operations. Figure 4 shows the manifest structure of the Projects module in Odoo ERP.

```
'name': 'Project',
'version': '1.2',
'website': 'https://www.odoo.com/app/project',
'category': 'Services/Project',
'sequence': 45,
'summary': 'Organize and plan your projects',
'depends': [
    'analytic',
    'base_setup',
    'mail',
    'portal',
    'rating',
    'resource',
    'web',
    'web_tour',
    'digest',
],
```

Figure 4. Create WBS ManajemenProject.

Tabel 1. Management Project Based on Blackbox Testing

Requirement	Scenario	Expected Result	Testing Result
Create Project	Create a new project in the project management module	New Project Saved in database	Success
Create Task	Add tasks from the project that has been created	Each project results in several tasks being created	Success
Create Team	Add project work team from registered users	Project Team Management is running well	Success
Cread Read Update Delete	The Save, Change, and Delete data features in each project module run well	The process according to no errors	Success
View Kanban	Displays all data lists that have been added	All data displayed is as needed	Success

Black box testing will only reach the input and output of the software system without any knowledge related to the internal program. This black box testing is done to describe the tester's perspective, which is like only seeing a black box. The test can also be done to ensure that users can log in without this information to maintain the program's security.

Generally, this type of testing is also more focused on testing various essential aspects of an application and integration between each of its main components. This functional testing can also be done to test the system thoroughly. The following is the implementation of WBS in Project Management.

Tabel 2 WBS Project

Activity	Description	Start Date	End Date	Level Effort(hours)	Duration (days)	Predec essor	Person in Charge
Project Objectives Definition	Creating a project encompasses the software's objectives, benefits, and expected impact.	11/10/2022	31/10/2022	15	2	1.2	Project Manager
Plan and Design.	Create a project plan that includes steps to take, team requirements, and expected deadlines.	1/11/2022	30/12/2022	16	3	1	Project Manager
Technology Selection.	The use of this technology supports the desired scale and functionality.	02/01/2023	15/01/2023	16	3	1	Project Manager

4. DISCUSSION

4.1. Project Management

WBS is a collaborative activity that involves project team members in developing, clarifying, and agreeing on the hierarchical structure of the work to be performed in the project. WBS is important in project management because it helps break down the project into more manageable parts, ensures a clear understanding of the tasks to be accomplished, and facilitates resource allocation and schedule planning.

During the software project management process using the WBS approach, project team members interact to identify the key deliverables of the project and break them down into smaller, manageable components. Team discussions include the identification of tasks to be performed, the sequence of work, dependencies between tasks, and the allocation of required resources.

Functions of WBS for project management, namely To define the scope of project work to be carried out and to further detail (decomposition) into important components to control.The decomposition of the scope of project work depends on management's need for control with an adequate level of detail representation on the WBS. Provide the project management team with a framework based on project status and progress reports.

4.2. Effectiveness WBS

Project management research related to Odoo ERP can involve various aspects related to the use, implementation, and management of projects using Odoo as an ERP platform. Evaluation of the Effectiveness of Odoo ERP in Project Management can involve evaluating the extent to which Odoo ERP is effective in assisting project management. The focus can be on assessing the project management features provided by Odoo, the ability of Odoo to integrate different aspects of the project, and the benefits gained in terms of efficiency, productivity, and error reduction. Factors that can be considered include implementation planning, data migration process, user training, integration with existing systems, and impact on project performance.

5. CONCLUSION

The conclusion of using the Work Breakdown Structure (WBS) approach in software project management using Odoo ERP is that the WBS approach helps in creating an organized structure for software projects. By breaking down the project into smaller, manageable tasks, the WBS helps identify the work to be done, grouping similar tasks, and ensuring transparency in project management. By using a WBS, project managers can more easily control software projects. WBS allows project managers to monitor the progress of individual tasks, identify delays or problems, and take necessary corrective actions. This helps in keeping the project on track and achieving the set goals.

Additionally, Odoo ERP provides a project management module that can be used to build WBS and manage software projects. Odoo ERP provides features such as scheduling, progress monitoring, cost tracking, resource management, and reporting that can be used to support WBS implementation and better project management.

WBS can assist the project management team in monitoring and managing software projects. Odoo ERP as a Project management tool has pretty good reliability. This can be shown by the process produced in the following study. The failure rate in software development can be minimized and further optimized.

6. ACKNOWLEDGMENT

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