

## I. INTRODUCTION

In the digital era, project success is highly dependent on the effectiveness of project management in supporting the company's project monitoring team [1][2]. Previous research shows that existing project monitoring systems are less effective because they are prone to data loss and are difficult to control. Therefore, project monitoring software can help companies overcome existing problems [3][4]. In this case, PT GSP, a pension fund company subsidiary of the Pension Fund of PT PLN (Persero), which is engaged in Digital Payment, Payment Gateway, Biller Aggregator, and ICT Services, has various business projects that must be managed properly to run as intended. However, based on the interview, the current monitoring project information system in GSP is still using the manual way like using Microsoft Excel, which causes the process to be inefficient and inaccurate. As a result, it causes several issues like the projects in delays, cost overruns, or project failure.

To overcome these issues, it is necessary to implement automatic monitoring, accelerate project monitoring schedules by following technological advances, and monitor projects in real time through mobile applications for monitoring company project information [5][6]. In detail, the mobile application is software that can be used with smartphone for tasks such as word and number processing at the user's command [7][8]. Many developers use Flutter framework to create applications or websites, so the mobile application will be created using the Dart or Flutter programming language in Visual Studio Code IDE [9][10]. By using monitoring applications, companies can collect accurate and up-to-date information on project status in real time, offer tools to control project scheduling, human resources, quality, and assist in project planning and supervision [1].

During the application development process, there is always the possibility of changes or improvements to the system so that failures can occur. Hence, to monitor changes, the Agile method with the Scrum pattern is the right choice [11]. Scrum pattern is not only responsive to change, meaning it can accommodate and even leverage changes to improve the system, but also emphasizes iteration in each development cycle [12]. The Scrum pattern increases the chances of success in creating a business monitoring application that can be adapted to changes and user needs by developing and refining the application in stages [13]. The Scrum pattern in Agile methodology allows for flexibility and adaptability, which is critical in the dynamic mobile application development environment [14]. Furthermore, it could improve the development process by breaking it down into smaller, manageable tasks and emphasizing regular feedback and adaptation. On the other hand, the previous research states that mobile applications should be tested for quality from the point of view of both the development process and product deliverables [15]. Furthermore, an important step is system design using UML (Unified Modeling Language) visual modeling for system communication in object-oriented software development [7].

The company's project monitoring application is complex because it involves various components and functions that must work efficiently. After the system is developed, the system will be rigorously tested to ensure that the system is feasible to use and meets functional and non-functional needs. This comprehensive test aims to improve application quality, find bugs, reduce the risk of failure, and increase user satisfaction [16]. For example, testing could be using the UAT method and the decision table in black-box testing. UAT testing evaluates the system through respondents using questionnaires to ensure the system is accepted and meets user needs [17][18]. On the other hand, Black-box testing is an extensive approach that assesses an application's functionality without focusing on its internal mechanisms, guaranteeing that all application components operate as anticipated [19]. Further, black-box testing is an approach in which the tester does not need to know the inner mechanisms or structure of the product being tested. Instead, decision tables are used to determine the outcomes of different inputs. This approach particularly benefits testing systems with various possible inputs and outcomes [20]. In addition to functionality testing, non-functional testing ensures the mobile application works properly and accurately. Therefore, in this study we demonstrated step-by-step to implement the Scrum pattern in the development process of the mobile monitoring application with deeply analysis.