

ABSTRACT

Rooftop Farming Center is a modern agriculture and livestock system at Telkom University Surabaya designed to address the challenge of shrinking agricultural land and as a means of regenerating plantations, agriculture, and livestock in urban areas. By utilizing the rooftops of Telkom University Surabaya buildings, this initiative supports food security by introducing modern agricultural technology to the younger generation and promoting sustainable agriculture in urban areas. The Rooftop Farming Center already uses Internet of Things (IoT) technology for irrigation system control in its agricultural operations. However, for business processes related to the sale of crops and livestock, there is currently no good, integrated system for marketing the products produced. Currently, marketing and sales are still conducted person-to-person, and payment systems are still manual.

This research aims to provide solutions to address these issues by developing a mobile application that meets the sales needs and stock management of the Rooftop Farming Center at Telkom University Surabaya. This application was developed using Flutter technology for the frontend and Node.js for the backend. This research employs a combination of design thinking and scrum methodologies, with the DT@Scrum approach as its development methodology. Design thinking is used to generate planning and ideas to ensure the solutions produced align with user needs. This method involves several iterative stages: empathize, define, ideate, prototype, and test. Meanwhile, the Scrum method is a software development methodology used to ensure the mobile application development can adapt to changes and receive feedback quickly. The DT@Scrum approach combines Scrum and design thinking into three phases: the design thinking phase, the initial development phase, and the fully integrated phase. Additionally, the quality of the application is tested through three main methods: black-box testing to ensure functionality aligns with specifications, User Acceptance Testing (UAT) to validate user acceptance of functionality, and the System Usability Scale (SUS) to measure user satisfaction and ease of use.

Testing results indicate that the developed mobile application meets the requirements of the smart farming product sales system at the Rooftop Farming

Center, with all core features—from product management, shopping cart, order processing, to digital payments—functioning properly and passing black-box testing. The UAT testing, which involved end-users from various roles such as buyers, sellers, and administrators, also confirmed that all main test scenarios were successful and the application's functionality was acceptable. Although there were some minor improvement notes such as error messages and icon sizes, the application was overall deemed to have passed the acceptance test. The usability evaluation using the SUS yielded an average score of 73, indicating that the application has a good level of usability and is positively accepted by users. As such, this application is expected to support the digital sales process for agricultural products, expand market reach, and facilitate access to stock information and purchase transactions at the Rooftop Farming Center.

Keywords: *Rooftop Farming Center, Mobile Apps, Design Thinking, Scrum, Smart Farming*