ABSTRACT

The Mandiri Farmers Group's oil palm plantation faces major challenges in human resource management, electricity availability, and communication network access. The foreman's manual recording system often results in data errors, inconsistent reports, and miscommunication between workers and supervisors, which impacts wage distribution and work efficiency.

Furthermore, infrastructure limitations such as limited electricity supply and poor cellular signal in the plantation area worsen work coordination and slow down the reporting process. To address these challenges, this study proposes the implementation of a digital-based human resource management system integrated with supporting infrastructure in the form of a solar power plant (PLTS) and LTE-based network devices.

The proposed system is designed to record worker data, job types, working hours, performance calculations, and wage calculations in real-time with online mode. Implementation involves developing software in the form of a simple, intuitive web-based or mobile application equipped with security features in accordance with personal data protection regulations.

On the hardware side, a PLTS with high-capacity storage batteries, optimally powered solar panels, and microcontroller-based power management for efficient energy use was installed. The testing process included verifying application functionality through *blackbox testing* and *alpha testing*, measuring the durability of the solar power plant system, and testing network signal stability.

Implementation results demonstrated that digitalizing work management minimizes recording errors, accelerates performance evaluation, increases transparency, and ensures smooth operations even in remote locations. By integrating information technology, renewable energy, and an independent network, this system provides an effective, efficient, and sustainable solution that can be replicated in other plantation sectors facing similar challenges.

Keywords: human resource management, palm oil, digitalization, solar power plants, LTE networks, IoT