Utilization of System Application and Product in Data Processing (SAP) to Support Employee Data Management Effectiveness

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ABSTRACT

In the era of digital transformation, effective employee data management has become a crucial necessity for large companies such as PT Telkom Indonesia Regional 2. The operational complexity and need for accurate and real-time data have driven the adoption of System Application and Product in Data Processing (SAP) systems, particularly the Human Capital Management (HCM) module. This research aims to examine the utilization of SAP in supporting employee data management effectiveness, identify influencing factors, and explore implementation constraints and solutions. Using a phenomenological qualitative approach, data were collected through in-depth interviews, observations, and documentation involving five employees directly engaged in SAP HCM usage. The research findings indicate that SAP HCM provides tangible benefits in improving data efficiency and accuracy; however, its effectiveness remains hindered by limitations in user training, restricted network access, and suboptimal system integration. In conclusion, SAP HCM has strategic potential in supporting human resource management if supported by continuous training and system infrastructure strengthening. The limitations of this study lie in its narrow regional scope and purely qualitative approach; further research is recommended to encompass other regions and employ quantitative methods to strengthen the generalizability of findings.

Keywords: SAP HCM, Employee Data Management, Effectiveness, Management Information System, PT Telkom Indonesia

INTRODUCTION

Amid the accelerating wave of digital transformation across various industrial sectors, human resource (HR) management has emerged as one of the most critical aspects in ensuring organizational continuity and operational effectiveness. PT Telkom Indonesia (Persero) Tbk., as the largest state owned enterprise (SOE) in Indonesia, engaged in information and communication technology (ICT) services, plays a pivotal role in driving the nation's digital ecosystem. With core business areas spanning telecommunications infrastructure, digital platforms, data centers, and managed services, Telkom supports both public and private sector digitalization initiatives across Indonesia. The company's vast organizational structure,

comprising multiple regional operational units including Telkom Regional 2, which covers the Jakarta area poses unique challenges in aligning technology with human capital management (HCM) needs. As a state-owned enterprise operating in the field of information and communication technology, PT Telkom Indonesia faces significant challenges in managing employee data accurately, in real-time, and in an integrated manner particularly in vast and complex operational areas such as Regional 2.

To address these challenges, the company has adopted a SAP-based Enterprise Resource Planning (ERP) system, with a particular focus on the Human Capital Management (HCM) module, aimed at automating HR processes. SAP HCM provides an end-to-end solution encompassing personnel administration, attendance management, performance appraisal, training, and career development, enabling data-driven decision-making that is both efficient and targeted (Chou et al., 2023).

The relevance and urgency of this topic make it essential to explore further, both from academic and practical standpoints, especially concerning how technology can support the transformation of HR management in modern work environments. Previous studies have demonstrated that implementing SAP systems particularly SAP HCM has had a positive impact on improving the efficiency and accuracy of employee data management. Ginting (2025) found that SAP HCM plays a vital role in competency mapping and executing more objective promotion processes within Telkomsel. Similarly, Pratama Putra et al., (2023) noted that the system opens opportunities for innovation in HR management, especially in supporting workforce mobility and talent development. However, they also highlighted resistance among some users toward adopting SAP's analytical features.

Research by Washillah et al., (2024) emphasized the importance of Management Information Systems (MIS) in Telkom's HR development strategy, although interoperability between work units remains a challenge. Furthermore, Suci et al., (2021) argued that the success of HRIS implementation heavily depends on user training and system integration. Collectively, these studies underline the considerable potential of SAP in supporting effective HR management while also revealing persistent challenges related to human factors, training, and organizational adaptation.

Despite these insights, most previous research has focused on macro-level analysis or on Telkom's subsidiaries such as Telkomsel, with limited exploration of how SAP HCM is implemented and perceived by users at the regional level. In particular, little attention has been given to the complex workplace dynamics in regions such as Telkom Regional 2, Jakarta. This has resulted in a significant knowledge gap, particularly regarding user experience, infrastructure readiness, and system integration across units. Methodologically, most existing studies employ quantitative or technical-descriptive approaches, leaving the subjective meanings and lived experiences of users largely unexplored. Yet, the success of information systems often depends not only on technological sophistication but also on users' perceptions and adaptive capacities. Consequently, there is a need for research that deeply investigates how operational-level users interpret, respond to, and adapt to the adopted system.

This study is designed to address existing knowledge gaps through a phenomenological qualitative approach, which enables in-depth exploration of employees' direct experiences in managing human resource (HR) data using the SAP HCM system. These employees play a crucial role in the processes of recording, verifying, maintaining, and utilizing employee data for both administrative and strategic purposes. This study not only highlights the technical aspects of system usage but also focuses on implementation challenges, its impact on operational efficiency, and its contribution to supporting managerial decision-making at PT Telkom Indonesia Regional 2.

Through in-depth interviews with five informants directly involved in SAP usage within the HR unit, this research aims to present a comprehensive overview of the relationship between information systems, organizational adaptation processes, and the effectiveness of HR data management. The findings of this study are expected to expand knowledge in the field of HR information systems and provide practical recommendations for policymakers at Telkom as well as other organizations that are developing more optimal ERP implementation strategies.

In light of the above, this study seeks to answer the following fundamental research questions: How is SAP utilized to support the effectiveness of employee data management at PT Telkom Indonesia Regional 2? What factors influence the effectiveness of SAP usage in managing employee data? And what challenges and solutions emerge during its implementation process?

LITERATURE REVIEW

Management Information Systems (MIS)

Management Information Systems (MIS) represent an integration of information technology, human resources, and work procedures designed to support organizational decision-making processes (Laudon & P.Laudon, 2004). MIS serves strategic functions in collecting, processing, storing, and disseminating information required for operational control and organizational planning (Alter, 2001). Within the telecommunications industry context, MIS plays a vital role in managing big data in real-time and supporting inter-unit coordination (McLeod, 1998).

This research demonstrates that the implementation of Management Information Systems (MIS) can enhance organizational efficiency, improve data accuracy, and accelerate managerial decision-making processes. As one of the modules within the ERP system operating under the MIS framework, SAP HCM holds a significant position in the processes of collecting, processing, storing, and distributing information related to human resource management. In the dynamic telecommunications industry that requires instant access to data, the presence of SAP HCM contributes substantially to the optimization of work processes, including accelerated access to employee information, improved accuracy of attendance and performance data, and the preparation of reports that support managerial policy formulation. Anatan & Ellitan, (2009) emphasize that MIS bridges information needs between organizational departments and contributes to competitive advantage. However, primary constraints in MIS implementation within large organizations include user resistance and infrastructure readiness (Syafitrah et al., 2024). These studies provide important theoretical foundations for understanding how SAP as an ERP system functions within the MIS context.

System Application and Product in Data Processing (SAP)

SAP is one of the most widely used integrated ERP systems globally. In the Human Resource Management context, SAP provides Human Capital Management (HCM) modules that automate functions such as recruitment, attendance, training, and performance evaluation (Diansari & Sutjahjo, 2018). SAP HCM enables data-driven decision-making and cross-divisional integration, though its implementation success heavily depends on user training and organizational readiness (Sitohang & Nuryanto, 2019).

Several studies have confirmed SAP HCM effectiveness. Ginting, (2025) demonstrates that SAP plays a role in competency mapping and objective promotion at Telkomsel. Chou et al., (2023) highlight improvements in HR logistics efficiency through employee data integration. However, studies such as Pratama Putra et al., (2023) and Rulis Setyowati & Hwihanus Hwihanus, (2022) indicate challenges in adopting analytical features as well as organizational cultural resistance in SAP HCM implementation. This is also reflected in the context of this research, where the majority of SAP users at PT Telkom Indonesia Regional 2 acknowledged that they have not yet fully utilized the advanced analytical and reporting features within the system.

Employee Data Management

Employee data management encompasses systematic processes of collecting, validating, storing, and analyzing information related to work history, performance, and individual development (Sinaga et al.,

2024). Digital-based HR information systems, such as SAP HCM, contribute to creating real-time, secure, and auditable data (Harsanto, 2019). The primary objectives of employee data management are to improve administrative efficiency, support HR planning, and meet regulatory requirements (Mariani & Ilmi, 2025).

These objectives become particularly relevant in the Indonesian context, where large organizations such as PT Telkom Indonesia face unique challenges in managing a vast amount of employee data spread across multiple regions. Despite having adopted SAP HCM, the effectiveness of employee data management at Telkom is still influenced by technical limitations, infrastructure constraints, and varying levels of digital literacy among users.

Core functions of data management include data entry, data maintenance, data access, reporting, and information security (Farras et al., 2025). Technology availability, HR competency, and policy support constitute primary success factors (Aulia et al., 2025). In research by Gunardi et al., (2025), HR data management at Telkom was significantly supported by SAP systems, though its effectiveness remained constrained by technical capability gaps among users. This emphasizes the importance of training and strengthening data governance.

Data Management Effectiveness

Data management effectiveness refers to the extent to which information systems can produce accurate, timely, relevant, and accessible data to support organizational performance (Sinaga et al., 2024). In the SAP HCM context, effectiveness is measured by data access speed, reporting accuracy, information security, and consistency of inter-unit integration Andriasari et al., (2023). SAP's success in HR data management heavily depends on system sophistication, user training, and organizational SOP clarity (Muflikhun et al., 2020).

Research by Ramadhani, (2016) found that SAP SuccessFactors usage at PT Telkom improved performance management effectiveness through system-based KPI monitoring. However, lack of system integration and network constraints remain challenges (Lase, 2011). This indicates the need for infrastructure updates and more holistic approaches in HR digital transformation.

METHOD

This study employs a qualitative approach, which was selected for its ability to deeply explore individuals' subjective experiences in the context of SAP system usage in real workplace environments. This approach is considered appropriate for understanding the perceptions, adaptations, and challenges faced by SAP HCM users at PT Telkom Indonesia Regional 2 in managing employee data digitally (Creswell et al., 2015). The research population encompasses all employees directly involved with the SAP system, with samples selected through purposive sampling based on their roles and responsibilities in SAP operations. The sample consists of five informants, including a Human Capital Service Supervisor and several Human Capital Support Officers who possess direct and relevant experience in human resource data management through SAP.

The primary instrument utilized in this research is semi-structured interviews with five key informants, comprising one supervisor and four officers from the Human Capital Service unit at PT Telkom Indonesia Regional 2—each of whom is directly involved in the operation and management of the SAP HCM system. These informants possess diverse lengths of service ranging from 3 to 7 years, offering a range of perspectives based on their roles and experience levels. The interviews were designed to explore their firsthand experiences with system implementation, effectiveness, and encountered challenges. To ensure data triangulation validity (Bans-Akutey & Tiimub, 2021), the interviews were complemented by direct observation conducted during the researcher's internship period at the company. This observation involved daily interactions and non-participant monitoring of how employees navigated SAP HCM in routine tasks such as attendance tracking, employee data verification,

and administrative workflows. Field notes were systematically recorded to capture contextual nuances, user behaviors, and operational realities that may not surface through interviews alone.

The data analysis technique employed follows the Miles and Huberman model, which includes data collection, data reduction, data display, and thematic conclusion drawing (Miles & Huberman, 1984). Analysis was conducted until data reached saturation point, with verification performed through source and technique triangulation (Moleong, 2005). This approach ensures that the research results possess high levels of credibility and transferability.

RESULT

Benefits of SAP in Employee Data Management

This research demonstrates that the implementation of SAP Human Capital Management (HCM) at PT Telkom Indonesia Regional 2 has provided tangible benefits in enhancing efficiency and accuracy in employee data management. SAP HCM facilitates the recording of attendance data, transfers, and performance evaluations in a faster and more integrated manner across work units. Processes that were previously conducted manually can now be monitored in real-time and documented digitally. Informant 3 (ABN) affirmed that:

"SAP aligns employee data between internal applications such as SENTRA and SAP itself, particularly in attendance aspects and disciplinary assessments, thereby ensuring data accuracy and consistency."

This supports the statement by Sinaga et al., (2024) that digital system-based employee data management not only improves administrative efficiency but also ensures the reliability of information used for HR planning.

Constraints in SAP Implementation

Despite the significant benefits provided by SAP HCM, this research identified structural and technical constraints that hinder system optimization. One of the primary constraints is the lack of formal training for SAP users. Many employees use the system based on colleagues' experience rather than official training, causing gaps in understanding of the system's more complex functions. Informant 1 (FHA) stated:

"We never received formal training on SAP, but only learned from previous users. This creates difficulties when facing technical problems."

Additionally, system access limitations that can only be used through internal intranet networks pose significant constraints, especially when the system is accessed from outside the office. Informant 5 (WR) revealed:

"SAP access is restricted to Telkom's intranet network only, and this becomes a constraint when access is disrupted or performed outside the office."

These findings align with the study by Sitohang & Nuryanto, (2019), which stated that the success of SAP implementation is significantly influenced by infrastructure readiness and user literacy regarding the system.

Impact of SAP on Performance and Decision-Making

SAP HCM has proven to not only support administration but also contribute to strategic decision-making in the HR field. Management can access performance reports, training histories, as well as transfer and attendance data in real-time as a basis for promotions and incentive provision. Informant 4 (RFY) conveyed:

"Data from SAP is very helpful in the performance evaluation process and decision-making related to promotions and incentive provision."

This demonstrates that SAP functions as a decision support system that strengthens objectivity and transparency in HR management, as also suggested by Mariani & Ilmi, (2025), who emphasized the importance of information systems in supporting HR policy planning and execution.

Identified Solutions to Address SAP Implementation Constraints

To address existing constraints, informants in this research proposed several solutions that are both practical and strategic. These solutions include continuous training, development of technical guidelines based on user roles (viewer/editor), and strengthening digital infrastructure access such as VPN usage or cloud-based SAP development. Informant 3 (ABN) suggested:

"More comprehensive training and specific guidelines according to user roles are needed, both as viewers and editors."

This solution reflects the need for a holistic approach in information system implementation, which focuses not only on technology but also on human resource development and organizational structure strengthening. These findings also support research results by Gunardi et al., (2025), who emphasized the importance of user competency development and data governance in supporting SAP effectiveness.

Discussion

Numerous benefits were perceived by respondents using SAP at PT Telkom Indonesia Regional 2, including enhanced efficiency and effectiveness in employee data management, particularly through administrative process automation, inter-application data integration, and improved information security. These findings align with Management Information System (MIS) theory, which emphasizes the importance of integrating technology, business procedures, and human roles to support effective and efficient decision-making (Erwin et al., 2024). Furthermore, these results support previous research highlighting SAP's benefits in improving transparency, accuracy, and reliability of HR data (Gunardi et al., 2025). The operational efficiency achieved through process digitalization and reduction of manual tasks strengthens the argument that ERP systems like SAP play a crucial role in organizational digital transformation, as outlined by (Amin & Aravik, 2023).

Nevertheless, this study also identifies several constraints that have not been fully addressed, such as limited training, technical network access constraints, and insufficient compliance with standard operating procedures. These findings reinforce the research results of Isnawijayani, (2022), who stated that successful ERP implementation is significantly influenced by human resource readiness, adequate training, and management support. On the other hand, this study discovered new challenges related to SAP integration with other internal systems that still operate manually or are not fully connected. These integration gaps create redundancy, inefficiency, and delays in data synchronization across departments. For instance, some employee data input processes must be repeated due to lack of real-time connectivity between SAP and local applications like SENTRA. This indicates a misalignment between the theoretical framework of ideal enterprise information system integration (May et al., 2025) and the practical implementation observed in the field. It underscores the need for more holistic and interoperable integration strategies to fully realize the intended benefits of digital transformation.

Theoretically, these research findings enrich the literature on HR information system and ERP implementation in telecommunications company environments, particularly in the Indonesian context. This study affirms the importance of human and organizational factors in successful technology adoption, while highlighting the need for implementation strategy adjustments based on local

characteristics and requirements. From a practical perspective, these findings provide concrete recommendations for PT Telkom Indonesia Regional 2 management and similar companies to enhance training effectiveness, improve user guidelines, and optimize system integration. These implications are expected to drive the development of policies and best practices in SAP HCM utilization, thereby supporting the achievement of strategic organizational objectives and more adaptive human resource development in the digital era.

CONCLUSION

For Organizations

The implementation of SAP Human Capital Management (SAP HCM) at PT Telkom Indonesia Regional 2 has proven to provide positive impacts on the effectiveness of employee data management. This system supports administrative process automation, improves data accuracy, and accelerates real-time information flow between units. Beyond supporting operational efficiency, SAP also strengthens strategic decision-making in HR management. By providing accurate historical data and performance indicators, SAP enables managers to design promotion policies, career development, and incentive provision more objectively and transparently. These findings confirm that SAP functions not only as an administrative tool but as a strategic information system that strengthens data-driven organizational governance.

For Employees

From the employee perspective, SAP provides convenience in personal data recording and management processes, including attendance, leave applications, and other administrative documentation. However, not all users can utilize advanced features such as performance reporting or data analysis due to training limitations and a lack of technical guidance. This unpreparedness impacts the low level of comprehensive system adoption, thus the strategic potential of SAP in supporting employee career development has not been fully optimized. Therefore, continuous training is essential so that all users can understand and operate the system effectively and obtain maximum benefits from SAP integration in their work processes.

For Policymakers

The findings of this research provide important messages for policymakers, both at the corporate and national levels. The success of SAP implementation does not only rely on technical aspects but also requires organizational cultural readiness and human resource capacity strengthening. Policymakers need to promote the creation of a comprehensive HR digital ecosystem that focuses not only on software investment but also includes training, digital infrastructure strengthening, and cross-system integration. Internal corporate policies such as SOP standardization, training module development, and incentives for active users will support the success of sustainable and directed digital transformation in the HR field.

From a Practical Perspective

From a practical perspective, it is recommended that PT Telkom Indonesia Regional 2 management enhance technical training programs and guidance for all SAP HCM users. This can be accomplished through formal training, digital learning modules, and internal discussion forums as platforms for experience sharing. Additionally, the company needs to strengthen network infrastructure and ensure full integration between SAP and other internal applications, so that data management processes can run efficiently, in real-time, and without input duplication. The company is also advised to update and socialize standard operating procedures (SOPs) related to SAP usage, as well as provide fast and responsive technical support services. These strategic steps are expected to improve HR management

effectiveness through SAP HCM and provide tangible contributions to achieving comprehensive organizational objectives.

Recommendations

Future Research Recommendations

Based on the results of this study, it is recommended that future research expand the scope of investigation by involving more work units or other operational regions beyond Regional 2, thereby obtaining a more comprehensive overview of SAP HCM implementation effectiveness throughout PT Telkom Indonesia as a whole. Subsequent research could also explore other factors influencing system adoption success, such as organizational culture, employee digital literacy levels, and leadership roles in supporting digital transformation. Additionally, comparative studies between telecommunications companies or other industry sectors that have implemented SAP-based ERP systems could provide new insights regarding best practices and challenges encountered in HR information system implementation.

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