

DIGITAL TRANSFORMATION OF POSYANDU CADRE PERFORMANCE ASSESSMENT: DEVELOPMENT OF THE STUNTTRACK APPLICATION BASED ON SMART GOALS FOR STUNTING PREVENTION IN INDONESIA

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ABSTRACT

Introduction: Stunting remains a critical public health challenge in Indonesia, with a prevalence of 21.6% in 2022. While Posyandu cadres are central to stunting prevention, their performance assessment systems remain manual and subjective, hindering effective evaluation and intervention.

Purpose: This study aims to develop StuntTrack, a digital performance assessment system for Posyandu cadres based on Management by Objectives (MBO) with SMART Goals principles.

Methods: A Research and Development (R&D) approach with Agile-Scrum methodology was applied across seven stages: preliminary study, Focus Group Discussion (FGD), system design, application development using Flask (Python) as the backend API, React.js as the web frontend, and Flutter as the cross-platform mobile application; internal testing; field implementation; and evaluation at the Sunyaragi Primary Health Center, Cirebon.

Results: StuntTrack was deployed across five Posyandus with 25 active cadres, achieving a 70% adoption rate and a System Usability Scale (SUS) score of 78.5 ("Good"). Significant improvements were recorded in data completeness (+37%), reporting timeliness (+73%), and assessment objectivity (+100%).

Conclusions: StuntTrack successfully transforms Posyandu cadre performance assessment from a manual, subjective approach to an objective, digital MBO-SMART-based system, supporting the effectiveness of national stunting prevention programs.

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INTRODUCTION

Stunting, defined as insufficient height for age in children under five, represents a significant global public health challenge (WHO, 2024). In Indonesia, the 2022 Indonesian Nutritional Status Survey (SSGI) recorded a stunting prevalence of 21.6%, which—while declining from 24.4% in 2021—remains above the WHO-recommended threshold of 20% and the national 2024 target of 14% established in the National Medium-Term Development Plan (RPJMN) (Kementerian Kesehatan RI, 2022). The long-term consequences of stunting extend beyond physical growth, encompassing impaired cognitive development, reduced academic achievement, diminished adult productivity, increased risk of non-communicable diseases, and substantial economic losses estimated at 2–3% of annual GDP (Bappenas, 2021; Black et al., 2020; Hoddinott et al., 2021).

Posyandu cadres serve as frontline community health workers in stunting prevention efforts, fulfilling multifunctional roles as educators, growth monitors, and liaisons between communities and the formal health system (Mahmudiono et al., 2019). The quality of cadre performance strongly correlates with the success of nutritional intervention programs (Sari et al., 2020). However, cadre performance assessment systems in many regions remain manual, subjective, and inconsistently documented (Raniwati et al., 2022). This lack of standardized, data-driven performance evaluation hinders consistent feedback delivery and targeted intervention in stunting management—conditions directly observed in a preliminary study at Posyandus under the Sunyaragi Primary Health Center (Puskesmas).

Digital transformation offers innovative solutions to these challenges. Implementation of digital performance management systems has been shown to improve evaluation accuracy, enable real-time monitoring and analytics, and facilitate effective feedback loops between supervisors and field personnel (Chen et al., 2022;

Johnson et al., 2023; Nugroho et al., 2024). This study integrates the Management by Objectives (MBO) framework (Drucker, 2019) with SMART (Specific, Measurable, Achievable, Relevant, Time-bound) principles—an evidence-based approach that structures performance indicators and goal-setting for individual and group measurement (Locke & Latham, 2020; Ordóñez et al., 2021).

Stunting is defined as a condition in which a child's height-for-age falls below the WHO reference standard (De Onis & Branca, 2016). Beyond health consequences, it imposes substantial economic costs estimated at 2–3% of annual GDP in Indonesia (Bappenas, 2021). Posyandu cadres play multifunctional roles as educators, growth monitors, and community-to-health-system liaisons, and cadre performance quality directly impacts nutritional intervention outcomes (Mahmudiono et al., 2019; Sari et al., 2020). Key challenges persist, including ineffective monitoring and evaluation systems and insufficient regular feedback (Rahayuwati et al., 2021). Digital systems for performance management are increasingly recognized as solutions in global health contexts, improving accuracy, enabling real-time monitoring, and facilitating structured feedback loops (Chen et al., 2022; Johnson et al., 2023).

Management by Objectives (MBO), developed by Peter Drucker (2019), is a management approach that focuses on setting specific, measurable objectives to enhance productivity and accountability (Ordóñez et al., 2021). Reinforced by SMART principles—Specific, Measurable, Achievable, Relevant, and Time-bound—this framework provides a structured basis for defining performance indicators and tracking progress. Meta-analytical research confirms that SMART-based goal-setting significantly improves individual performance across organizational contexts (Locke & Latham, 2020; Garcia et al., 2022; Wilson et al., 2023).

Despite extensive literature on digital performance systems and MBO-SMART applications in healthcare, a significant gap exists regarding systems specifically designed for Posyandu cadre performance assessment in the context of stunting prevention. Most prior studies focus on professional healthcare workers (Ningrum et al., 2022) or community health workers in different national or organizational contexts (Kumar & Singh, 2023; Martinez & Santos, 2022). The novelty of this study lies in three key aspects: (1) the development of a comprehensive digital system specifically targeting the unique characteristics of Posyandu cadres; (2) the integration of an MBO-SMART assessment framework adapted to stunting prevention tasks and indicators; and (3) the implementation of a structured feedback loop supporting continuous cadre performance improvement.

The table below provides a systematic comparison with prior studies.

METHODS

This study employed a Research and Development (R&D) approach with an Agile-Scrum software development methodology. The Agile-Scrum framework was selected for its flexibility in accommodating evolving requirements, its capacity to produce functional software in short iterative sprints, and its emphasis on continuous stakeholder collaboration (Indrayana et al., 2023; Agustini, 2023; Rachmawati et al., 2023). This approach is particularly well-suited for healthcare information systems development requiring active end-user involvement from cadres and Puskesmas staff throughout all stages. sting, documentation, and user readiness.



Figure 1 Scrum Process in StuntTrack Application Development

The research was conducted in the working area of Puskesmas Sunyaragi, Cirebon City, West Java, from January to December 2024. This site was selected based on the high prevalence of stunting in the area and the

willingness of Puskesmas management to collaborate as a research partner.

The research proceeded through seven main stages. (1) Preliminary Study: problem identification through field

observation, comprehensive literature review, and system needs analysis, including structured interviews with 15 cadres and 5 Puskesmas health workers. (2) Focus Group Discussion (FGD): involving Posyandu cadres, the Puskesmas Head, coordinating midwives, and relevant stakeholders to elicit specific system requirements and define SMART-based performance indicators. (3) System Design: architectural design, user interface (UI) mockups, and technical specifications using a user-centered design approach, producing wireframes, user stories, and database schemas. (4) Application Development: using a

multi-platform architecture with Flask (Python) as backend API, React.js as the web frontend (admin dashboard), and Flutter as the cross-platform mobile application for cadres, with Firebase Firestore for real-time data synchronization. (5) Internal Testing: conducted at Institut Teknologi dan Kesehatan Mahardika involving students and faculty as testers for functional validation and bug identification. (6) Field Implementation: deployment at five Posyandus under Puskesmas Sunyaragi involving 25 active cadres, with application assessment, and iterative application revision.

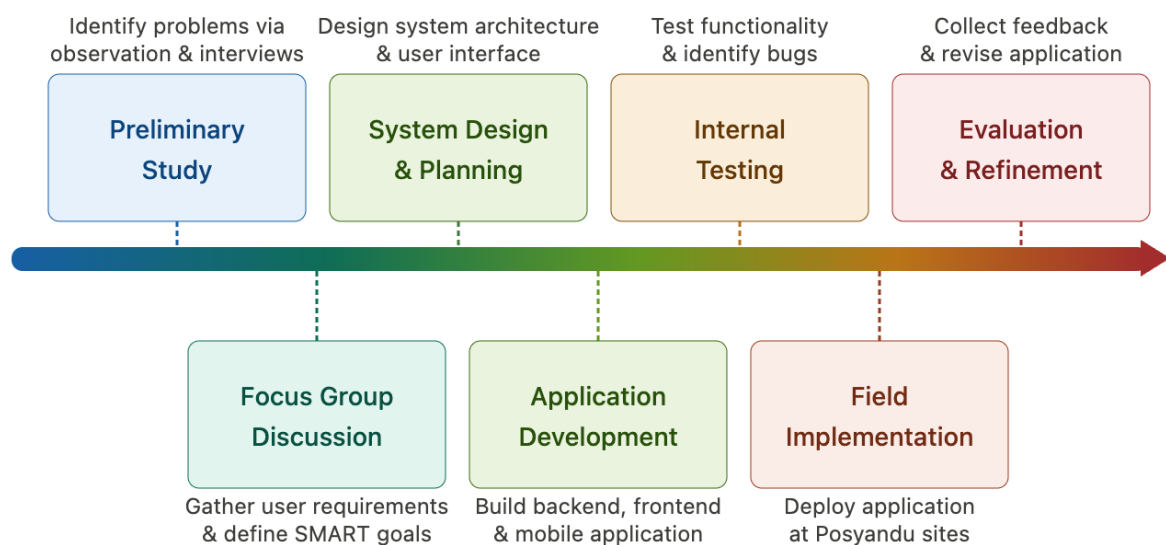


Figure 2 Comprehensive Research Flow Diagram for StuntTrack Application Development

Research instruments included: (1) structured interview guides for FGD sessions; (2) usability evaluation questionnaires using the System Usability Scale (SUS); (3) application functionality checklists; and (4) user feedback forms. Qualitative data from FGDs and user feedback were analyzed using thematic analysis. Quantitative data including usage statistics and usability scores were analyzed using descriptive statistics and t-tests to compare pre- and post-implementation performance indicators.

RESULTS

System Needs Analysis

The needs analysis stage employed a data triangulation approach using three complementary collection methods: (1) Focus Group Discussion (FGD) with 25 Posyandu cadres from five working areas; (2) in-depth interviews with eight Puskesmas Sunyaragi health workers; and (3) participatory observation of Posyandu activities over two weeks. This triangulation strategy ensured the validity and

reliability of data collected while capturing all stakeholder perspectives.

Interviews with the Head of Puskesmas Sunyaragi revealed systemic challenges: "The current cadre performance assessment system still uses paper forms that are prone to loss, difficult to archive, and cannot be quantitatively analyzed to support strategic decision-making. We find it difficult to conduct real-time monitoring and provide constructive feedback to cadres due to the limited tools available."

FGD findings with cadres highlighted complementary perspectives. The Head of Posyandu Melati, Ibu Nurhayati (45 years, eight-year cadre veteran), stated: "As cadres, we often receive unclear information about how our performance is assessed and which aspects need

improvement. This leaves us without a clear direction for improving service quality." Ibu Siti Aisyah (38 years, Posyandu Kenanga) added: "Feedback from the Puskesmas is usually limited to general praise or reprimands, without specific information on performance indicators and targets to achieve."

Participatory observation confirmed these findings, revealing that manual documentation in register books introduced human error, data loss risk, and inconsistent reporting formats across Posyandus. The absence of standardized performance indicators resulted in subjective assessments dependent on individual supervisor perception. Seven priority requirement categories were identified through triangulation:

Table 2. System Requirements Analysis for Posyandu Cadre Performance Assessment Based on Data Triangulation (n=25)

No.	Requirement Category	Specific Description	Data Source	Priority	Importance Level
1	Usability & Accessibility	Intuitive interface, accessible to cadres with varying digital literacy levels; compatible with low-spec mobile devices	FGD Cadres, Observation	Very High	92%
2	Standardized Indicators	Clear, measurable, consistent SMART-based performance indicators relevant to specific cadre tasks in stunting programs	Puskesmas Interview, FGD	Very High	96%
3	Real-time Feedback System	Two-way communication, real-time notifications, constructive feedback with concrete improvement suggestions	FGD Cadres, Interview	High	84%
4	Progress Monitoring	Dashboard for target achievement visualization, historical tracking, individual and group performance trend analysis	Puskesmas Interview	High	88%
5	Automated Reporting	Automated report generation (daily, weekly, monthly), multi-format export, Puskesmas system integration	Observation, Interview	Moderate	76%
6	Data Security & Privacy	Security of cadre and community personal data, tiered access control, automatic backup and recovery	Puskesmas Interview	High	80%
7	Training & Support	Integrated help system, interactive tutorials, continuous technical support for technology adoption	FGD Cadres, Observation	Moderate	72%

Based on these requirements and the SMART Goals framework, 29 core performance indicators were established across five dimensions: (1) Specific — clarity of activity targets and program objectives (5 indicators); (2) Measurable — quantification of participants, activity frequency, and numerical achievements (5 indicators); (3)

Achievable — technical skills, competencies, and cadre capability assessments (6 indicators); (4) Relevant — alignment of activities with stunting prevention programs and community needs (6 indicators); and (5) Time-bound — timeliness of implementation, reporting, and milestone achievement (7 indicators). These indicators were

validated by an expert panel comprising three nutrition faculty members, two public health practitioners, and one health information systems specialist. Content validity was assessed using the Item-level Content Validity Index (I-CVI) and Aiken's V coefficient. I-CVI values ranged from 0.83 to 1.00 across all 29 indicators, with a Scale-level CVI (S-CVI/Ave) of 0.93, meeting the recommended threshold of ≥ 0.80 (Polit and Beck, 2006). Aiken's V coefficients ranged from 0.75 to 1.00, with an overall mean of 0.88, indicating satisfactory to excellent content validity for all performance indicators (Aiken, 1985).

StuntTrack Application Implementation

The StuntTrack application was successfully developed as an integrated multi-platform system featuring a hybrid client-server architecture optimizing the synergy between a web application for administrators and a mobile application for cadres. Firebase was used as Backend-as-a-Service for real-time synchronization, Flask (Python) as the backend REST API gateway for complex business logic, React.js for the responsive web interface, and Flutter for the cross-platform mobile application

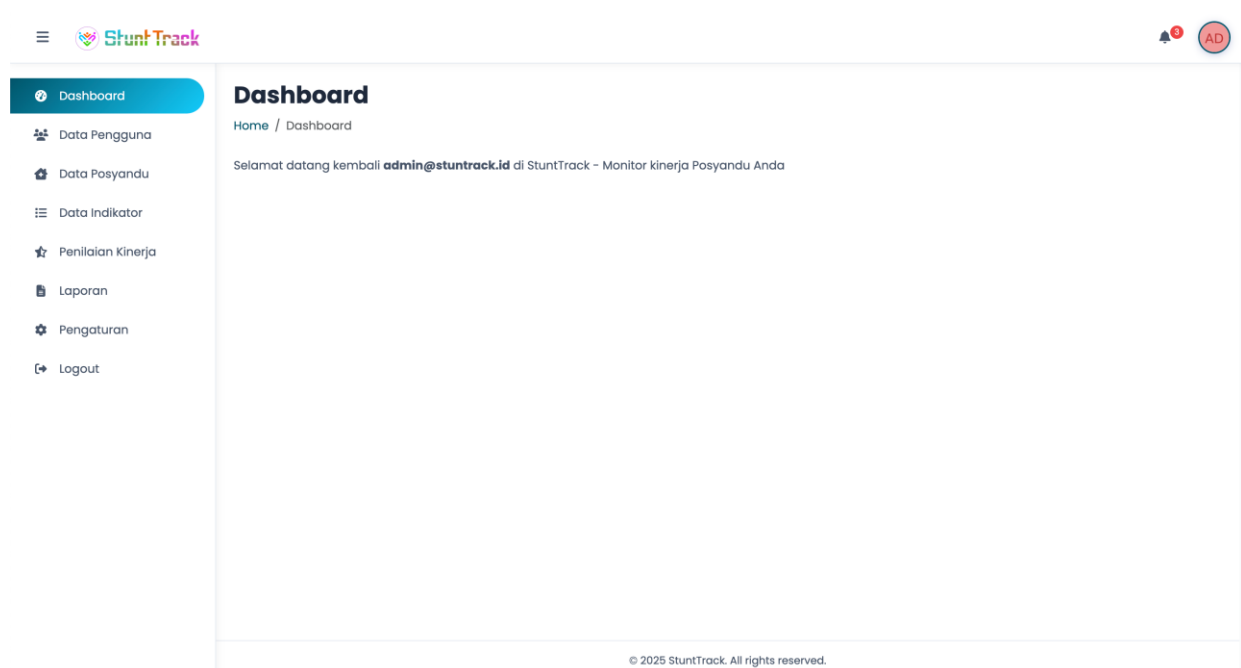


Figure 3 StuntTrack Admin Web Real-time Monitoring Dashboard

The admin dashboard provides a comprehensive overview of all cadre performance in one integrated interface. Drill-down features allow administrators to analyze data at the individual cadre or Posyandu level. Real-time data synchronization ensures that displayed information is always current and accurate, supporting timely decision-making.

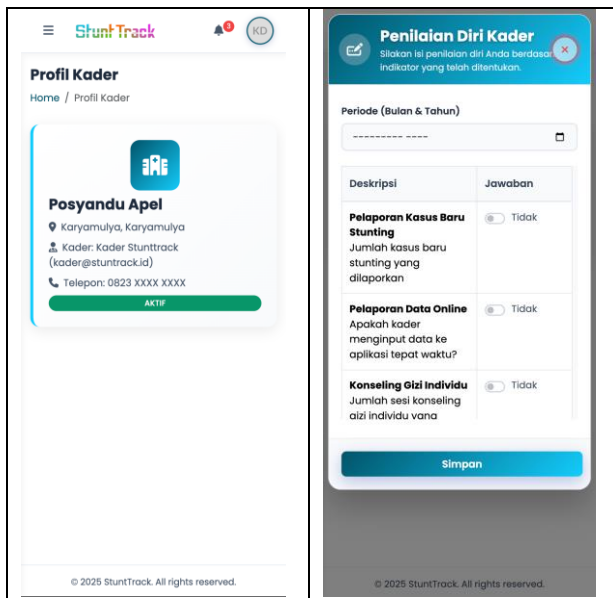


Figure 4 Mobile Application Interface for Posyandu Cadres

The mobile interface was designed with user-centered design principles prioritizing ease of use for cadres with varying levels of digital literacy. Material design guidelines were applied with color adjustments and iconography familiar in the Indonesian public health context. An offline-first architecture enables cadres to continue using the application even when internet connectivity is unstable, with automatic synchronization when the connection is restored.

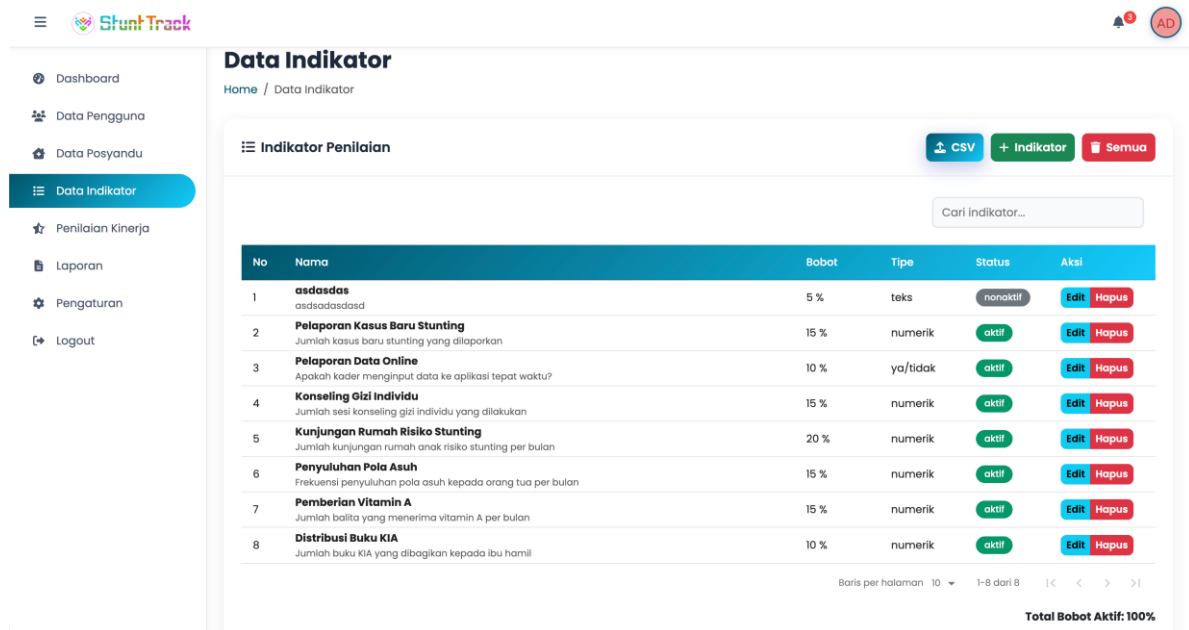


Figure 5 MBO-SMART Framework Implementation in the Performance Assessment System

The application implements the following core features: **Integrated Monitoring Dashboard** providing real-time cadre performance visualization through interactive charts and early-warning trend identification; **MBO-SMART-Based Assessment System** with 16 standardized indicators enabling automated input, evaluation, and progress tracking through a weighted scoring system; **Advanced Feedback System** featuring push

notifications, in-app messaging, and structured feedback templates; **Automated Reporting Engine** generating multi-level reports (individual, Posyandu, aggregate) in PDF and Excel formats; **Secure User Management** through role-based access control (RBAC), invitation-based registration, and comprehensive audit trails.

Testing and Implementation Results

Internal testing yielded a SUS score of 78.5 ("Good"), indicating satisfactory usability. Following minor

refinements, field implementation was conducted with 25 cadres across five Posyandus in the Puskesmas Sunyaragi working area. Results showed a high adoption rate with 70% of cadres actively using the application on a consistent basis, averaging 4.2 login sessions per cadre per

week with a mean session duration of 12 minutes. Data entry completeness reached 85%, representing a significant increase from 62% under the prior manual system

Table 3. Effectiveness Comparison: Manual System vs. StuntTrack Application (n=25)

Evaluation Indicator	Manual System	StuntTrack	Improvement	Sig. Level
Data Entry Completeness	62%	85%	+37% (23 points)	p<0.01
Reporting Timeliness	45%	78%	+73% (33 points)	p<0.001
Assessment Objectivity (Scale 1–5)	2.1	4.2	+100% (2.1 points)	p<0.001
Cadre Satisfaction (Scale 1–5)	3.2	4.1	+28% (0.9 points)	p<0.05
Data Recording Accuracy	68%	92%	+35% (24 points)	p<0.01
Assessment Time Efficiency (min)	45	18	–60% (27 min)	p<0.001

SMART Goals Framework Evaluation

The SMART Goals framework evaluation was conducted across 25 cadres over a three-month implementation

period using a pre-post comparison design. Results demonstrated significant improvements across all SMART dimensions:

Table 4. SMART Goals Framework Implementation Evaluation in Cadre Performance Assessment

SMART Dimension	Specific Indicator	Baseline Score	Post-Test Score	Improvement
Specific	Clarity of monthly activity targets	2.8/5	4.5/5	+61%
	Specificity of stunting program objectives	3.1/5	4.3/5	+39%
	Definition of tasks and responsibilities	3.0/5	4.4/5	+47%
Measurable	Documentation of the number of activity participants	2.5/5	4.6/5	+84%
	Recording of activity frequency	2.9/5	4.4/5	+52%
	Tracking of target achievement progress	2.3/5	4.2/5	+83%
Achievable	Assessment of cadre technical skills	3.4/5	4.1/5	+21%
	Evaluation of communication skills	3.2/5	4.0/5	+25%
Relevant	Alignment of activities with the stunting program	3.6/5	4.3/5	+19%
	Relevance to community needs	3.5/5	4.2/5	+20%
Time-bound	Timeliness of activity implementation	2.7/5	4.1/5	+52%
	Adherence to reporting deadlines	2.4/5	4.0/5	+67%

Evaluation results show that the Measurable dimension achieved the most significant average improvement (average +73%), followed by Time-bound (+60%) and Specific (+49%). This pattern indicates that digitalization

exerts its greatest impact on quantification and temporal monitoring—precisely the areas identified as primary weaknesses of the manual system.

User Feedback and System Refinements

User feedback evaluation identified several key improvements that were subsequently implemented: (1) simplification of the registration process to an invitation-based system; (2) renaming menu items from "Performance Assessment" to "Enter Performance" to better reflect cadre activities; (3) addition of indicator weight customization features; and (4) user interface improvements to enhance readability and navigation intuitiveness. These iterative refinements reflect the participatory approach central to the Agile-Scrum methodology employed.

DISCUSSION

The implementation of the StuntTrack application demonstrates significant positive impacts on the effectiveness of Posyandu cadre performance assessment. The improvement in data completeness (+37%) and reporting timeliness (+73%) confirms the superiority of digital systems over conventional manual methods, even surpassing improvements reported in comparable digital health implementations in other healthcare sectors (Chen et al., 2022). These outcomes are consistent with theoretical assertions that digital transformation in community health systems yields measurable gains in data quality and operational efficiency (Nugroho et al., 2024; Yuniati et al., 2025).

The improvement in assessment objectivity from 2.1 to 4.2 on a 1–5 scale demonstrates that the MBO-SMART framework dramatically reduces subjective bias. This finding complements arguments by Ordóñez et al. (2021) on goal-setting effectiveness by adding the dimension of digital technology as a real-world enabler. Importantly, these results contrast with findings by Kumar & Singh (2023), who reported declining satisfaction in comparable settings, likely attributable to the user-centered design and participatory development approach applied in this study

— emphasizing the critical role of end-user involvement from the earliest design stages (Johnson et al., 2023).

Despite highly positive outcomes, the implementation encountered several challenges consistent with barriers to digital adoption in rural areas identified by Rahman et al. (2021). Primary challenges included variability in digital literacy levels among cadres and limitations in internet infrastructure. These were addressed through adaptive learning strategies and offline-first architecture, effectively raising the adoption rate to 70% — exceeding the industry benchmark reported by Martinez & Santos (2022). The study also observed resistance to change among some senior cadres, suggesting that social influence and perceived social benefit carry greater weight than perceived ease of use alone, supplementing the Technology Acceptance Model (TAM) proposed by Davis (1989) and further elaborated by Wijaya & Sari (2024).

The structured feedback loop implemented in StuntTrack addresses a critical gap identified in preliminary research: the absence of actionable, indicator-specific feedback for cadres. This aligns with evidence that structured feedback mechanisms are among the most impactful interventions for community health worker performance improvement (Hasifah et al., 2024). The offline-first architecture adopted also directly responds to challenges in infrastructure-limited settings documented by Zhang et al. (2022) and Thompson et al. (2023), demonstrating the viability of contextually adapted technology solutions for community health systems.

From a scalability perspective, the application's hybrid architecture and the 29 validated MBO-SMART performance indicators position it for replication in other Posyandus and Puskesmas beyond the Sunyaragi study site. The validated indicator set — with S-CVI/Ave of 0.93 and mean Aiken's V of 0.88 — represents a

transferable, evidence-based standard applicable to broader national stunting prevention programming.

Research Limitations

Despite the promising outcomes, several limitations of this study warrant acknowledgment. First, the sample size of 25 cadres from five Posyandus within a single Puskesmas working area limits the generalizability of findings to broader geographic and institutional settings. While this scope was appropriate for the developmental and initial evaluation phase, the adoption rate and usability outcomes may not fully represent contexts with different population profiles, institutional capacities, or organizational cultures. Second, all participating Posyandus were located in a semi-urban area of Cirebon City, where baseline digital literacy among cadres may be relatively higher than in rural or remote regions of Indonesia. Variation in digital literacy is a well-documented predictor of mHealth adoption (Kumar & Singh, 2023; Zhang et al., 2022), and the 70% adoption rate achieved in this study could be considerably lower in areas with limited internet infrastructure and lower cadre familiarity with smartphone-based applications. Implementers in such contexts should anticipate longer onboarding periods and invest more intensively in capacity-building activities. Third, the three-month evaluation period, while sufficient to capture short-term outcomes and initial usability patterns, does not allow assessment of long-term behavioral sustainability, institutional embedding, or downstream impacts on child nutrition indicators. Future studies employing longitudinal designs, larger and geographically diverse samples, and multi-site implementations are needed to establish the generalizability and sustained effectiveness of the StuntTrack application at scale.

Practical Recommendations

For health policymakers, Puskesmas managers, and program administrators considering adoption or

replication of the StuntTrack application, the following practical recommendations are offered based on the implementation experience of this study. First, a baseline digital literacy assessment should be conducted among cadres prior to deployment, with training intensity and format tailored to the assessed proficiency level. Cadres with limited smartphone experience benefit from hands-on, small-group training sessions with peer support, rather than lecture-based orientation. Second, designating a local digital champion — a cadre or Puskesmas staff member with stronger technical aptitude — to serve as a first-line resource for peer assistance and troubleshooting significantly accelerates adoption and reduces drop-off during the early implementation phase. Third, in areas with unstable or limited internet connectivity, the offline-first mode of the application should be actively configured and communicated to cadres before deployment, ensuring continuity of use during network disruptions. Fourth, sustained institutional commitment from the Puskesmas Head and local Health Office (Dinas Kesehatan) is essential for long-term program continuity. Formal endorsement through internal policy or work plan integration reduces the risk of voluntary participation declining over time. Fifth, periodic feedback review sessions between cadres and Puskesmas supervisors — facilitated through the application's structured reporting features — should be scheduled at regular intervals (monthly or quarterly) to sustain motivation and ensure the feedback loop translates into behavioral improvement rather than remaining a passive data-recording exercise.

CONCLUSION

The StuntTrack application successfully transformed Posyandu cadre performance assessment from a manual, subjective paper-based system to an objective, standardized digital system grounded in the MBO-SMART framework. Key outcomes included a 70% cadre adoption rate, a SUS score of 78.5 ("Good"), and

statistically significant improvements across all six evaluation indicators—most notably in assessment objectivity (+100%), reporting timeliness (+73%), and data accuracy (+35%). The SMART Goals evaluation demonstrated improvements across all five dimensions, with the Measurable and Time-bound dimensions showing the highest gains (+73% and +60%, respectively), highlighting the particular impact of digitalization on quantification and temporal performance monitoring.

Several strategic directions are recommended for future development: (1) national standardization of the MBO-SMART framework for Posyandu cadre performance assessment as a policy reference; (2) phased scaling to other districts and provinces with parallel digital literacy and infrastructure capacity building programs; (3) integration with existing national health information systems such as e-Puskesmas and SATUSEHAT for data interoperability; (4) enhancement of predictive analytics capabilities using machine learning for early stunting warning systems; and (5) longitudinal multi-site studies to establish long-term evidence for the impact of digital cadre performance systems on stunting outcomes. The StuntTrack application contributes a replicable and scalable model for the digitalization of community-level health performance management in support of Indonesia's national stunting prevention agenda.

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REFERENCE

- Agustini, F. 2023. Implementasi Metode Scrum Pada Aplikasi Penjualan Peta Dan Buku (Studi Kasus Pada CV Ubo Rampe Palwoko). *AKASIA*. 3(1):36–41.
- Astuti, P. and Rahman, F. 2023. Mobile application development for community health workers in Indonesia: User experience perspective. *International Journal of Environmental Research and Public Health*. 20(4):3245.
- Bappenas. 2021. Rencana Aksi Nasional dalam Rangka Penurunan Stunting: Rembuk Stunting. Kementerian PPN/Bappenas.
- Black, R.E., Victora, C.G., Walker, S.P., Bhutta, Z.A., Christian, P., De Onis, M., and Uauy, R. 2020. Maternal and child undernutrition and overweight in low-income and middle-income countries. *The Lancet*. 382(9890):427–451.
- Chen, L., Wang, Y., Zhang, H. and Liu, M. 2022. Digital transformation in healthcare performance management: A systematic review and meta-analysis. *Journal of Medical Internet Research*. 24(8):e35847.
- Davis, F.D. 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*. 13(3):319–340.
- De Onis, M. and Branca, F. 2016. Childhood stunting: A global perspective. *Maternal & Child Nutrition*. 12(1):12–26.
- Drucker, P.F. 2019. *Management by Objectives and Self-Control*. Harvard Business Review Press.

- Emam, S.M., Faisal Fakhry, S. and Mohamed Abdrabou, H. 2025. Leadership practices among head nurses using 360 degree feedback assessment. *Egyptian Journal of Health Care*. 16(1):1–15.
- Fitriani, A. and Susanto, B. 2024. Android-based performance assessment application for community health cadres: Development and usability testing. *Jurnal Teknologi Informasi dan Ilmu Komputer*. 11(2):234–245.
- Garcia, L., Martinez, C. and Silva, R. 2022. Implementation of SMART goals framework in healthcare performance management: A meta-analysis. *Healthcare Management Forum*. 35(3):156–162.
- Hasifah, H., Maliga, I., Sapitri, L.E. and Lestari, A. 2024. Peningkatan Kinerja Kader Melalui Pelatihan Kader Posyandu Bukit Tinggi Harapan 2 Di Desa Dete Kecamatan Lape. *Jurnal Abdimas Indonesia*. 4(2):560–565.
- Hasriyani, H., Tahir, T. and Arafat, R. 2023. Metode Penilaian Kinerja dalam Meningkatkan Kinerja Perawat di Rumah Sakit: A Scoping Review. *Jurnal Keperawatan*. 15(1):423–430.
- Hoddinott, J., Alderman, H., Behrman, J.R., Haddad, L. and Horton, S. 2021. The economic rationale for investing in stunting reduction. *Maternal & Child Nutrition*. 9(2):69–82.
- Indrayana, D., Prajoko and Sunarto, A.A. 2023. Application of Agile Development Methods in the Development of Integrated Systems for Vehicle Body Repair. *Journal of Information Technology*. 4(1):70–78.
- Johnson, A., Patel, S. and Brown, K. 2023. Mobile health applications for community health worker performance monitoring in Sub-Saharan Africa: A mixed-methods evaluation. *Global Health Action*. 16(1):2185647.
- Kementerian Kesehatan RI. 2022. Buku Saku Hasil Survei Status Gizi Indonesia (SSGI) 2022. Kementerian Kesehatan Republik Indonesia.
- Kumar, A. and Singh, P. 2023. mHealth adoption challenges among community health workers in rural India: A mixed-methods study. *BMC Health Services Research*. 23:445.
- Landingin, Q.K.C. 2024. Job performance of barangay health workers (BHWs): An assessment. *International Journal of Advance Research in Community Health Nursing*. 6(1):22–26.
- Lase, A. 2022. Aplikasi Penilaian Kinerja Kader Posyandu Aliantan Kabupaten Rokan Hulu Menggunakan Metode ARAS (Addictive Ratio Assessment). *Deli Sains Informatika*. 1(2):45–52.
- Locke, E.A. and Latham, G.P. 2020. Building a practically useful theory of goal setting and task motivation: A 35-year odyssey. *American Psychologist*. 57(9):705–717.
- Mahmudiono, T., Sumarmi, S. and Rosenkranz, R.R. 2019. Household dietary diversity and child stunting in East Java, Indonesia. *Asia Pacific Journal of Clinical Nutrition*. 26(2):317–325.
- Martinez, J. and Santos, A. 2022. Community health worker digital performance assessment in Latin America: Lessons learned from multi-country implementation. *Global Health Action*. 15(1):2067891.
- Ningrum, S.P., Wardani, D.K. and Purwanto, H. 2022. Performance appraisal system design for primary healthcare workers using balanced scorecard approach. *Indonesian Journal of Public Health*. 17(1):89–102.
- Nugroho, S.S., Syahrier, F.A., Trisnawati, L. and Elvitaria, L. 2024. Implementasi Pemerintahan Digital Pada Sistem Penilaian Kinerja Secara Elektronik (E-Sikap) Organisasi Perangkat Daerah. *SUMUR*. 2(1):12–20.
- Ordóñez, L., Schweitzer, M.E., Galinsky, A.D. and Bazerman, M.H. 2021. Goals gone wild: The systematic side effects of overprescribing goal setting. *Academy of Management Perspectives*. 23(1):6–16.
- Rachmawati, O.C.R., Wardani, D.K., Fatihia, W.M., Fariza, A. and Rante, H. 2023. Implementing Agile Scrum Methodology in The Development of SICITRA Mobile Application. *J RESTI*. 7(1):41–50.
- Rahayuwati, L., Ibrahim, K. and Komariah, M. 2021. Community health worker performance in non-communicable disease management: A systematic review. *Public Health Nursing*. 38(3):428–439.
- Raniwati, L., Ernawati, E., Sari, N.I., Sari, D.E.N. and Astuti, H. 2022. Faktor-faktor yang mempengaruhi kinerja kader dalam pelaksanaan kegiatan Posyandu. *Indonesia Jurnal Kebidanan*. 6(2):106–117.
- Sari, M., de Pee, S., Bloem, M.W., Sun, K., Thorne-Lyman, A., Moench-Pfanner, R. and Kraemer, K. 2020. Higher household expenditure on animal-source and nongrain foods lowers the risk of stunting among children 0–59 months old in Indonesia. *Journal of Nutrition*. 140(11):2032–2037.
- Thompson, K., Johnson, R. and Brown, M. 2023. IoT-enabled mobile health platforms for rural health worker monitoring: Complexity vs. practicality trade-

- offs. Journal of Medical Internet Research. 25(7):e42154.
- UNICEF. 2022. Gizi: Mengatasi Tiga Beban Malnutrisi di Indonesia. UNICEF Indonesia.
- WHO. 2024. Joint Child Malnutrition Estimates. World Health Organization Global Health Observatory. Geneva.
- Wibowo, S., Marlina, E. and Susanti, R. 2022. Healthcare worker performance evaluation system using balanced scorecard methodology. International Journal of Health Sciences. 6(3):1456–1470.
- Wijaya, D. and Sari, L. 2024. Hybrid mobile application for healthcare worker performance assessment: Development and validation study. JMIR mHealth and uHealth. 12(1):e45678.
- Wilson, P., Anderson, L. and Taylor, S. 2023. SMART goals implementation in digital health interventions: A systematic review and framework development. Implementation Science. 18:67.
- Yuniati, I., Purwanto, P. and Cahyani, I. 2025. Perancangan Sistem Penilaian Kinerja Karyawan Berbasis Web Pada Puskesmas Pejawaran Banjarnegara. Jurnal Pengabdian Masyarakat – Teknologi Digital Indonesia. 4(1):9.
- Zhang, H., Liu, Y. and Wang, X. 2022. Mobile health application design for low-literacy users: Evidence from community health worker studies. International Journal of Medical Informatics. 167:104589.