

Digital Transformation in Industrial Governance: Training and Mentoring for SIINas Operational Competence

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Abstract: The National Industrial Information System (SIINas) serves as a strategic cornerstone in Indonesia's industrial digitalization policy, ensuring accurate data integration for regulatory compliance and government facility allocation. However, many manufacturing enterprises face technical bottlenecks in data entry, resulting in administrative delays and reporting inaccuracies. This community service initiative aimed to enhance the operational competence of industrial personnel in navigating SIINas data entry and periodic reporting modules. Utilizing a qualitative, action-oriented technical guidance approach, the program delivered regulatory orientation, live software demonstrations, hands-on data entry exercises, and in-depth mentoring sessions, followed by qualitative evaluation through in-depth interviews and data reduction analysis. The findings reveal a significant improvement in participants' technical proficiency, error-mitigation awareness, and confidence in managing digital reporting tasks—particularly regarding raw material modules and verification statements. Before the training, participants relied on self-taught, error-prone manual workflows; following the intervention, they demonstrated real-time, accurate reporting capabilities aligned with standard operating procedures. The intervention successfully bridged the digital literacy gap among administrative staff, lowering data verification rejections and enhancing internal control mechanisms. In conclusion, structured capacity-building programs are vital for accelerating digital transformation in industrial governance, fostering corporate compliance, and supporting national industrial data integration.

Keywords: SIINas, Digital Transformation, Industrial Governance, Data Accuracy, Capacity Building, Regulatory Compliance.

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1. Introduction

The industrial sector stands as one of the primary catalysts for national economic growth, demanding highly integrated, transparent, and accurate data management frameworks to drive strategic policy-making and sustainable development. In alignment with the global imperative toward Industry 4.0, the Indonesian government, through the Ministry of Industry, enacted Law No. 3 of 2014 concerning Industry, establishing a unified platform known as the National Industrial Information System (*Sistem Informasi Industri Nasional* or SIINas). SIINas serves as a centralized mechanism for collecting, processing, and presenting valid industrial data across manufacturing sectors. For policy-makers, this database acts as a foundational benchmark for mapping domestic industrial capacities, formulating target-oriented incentives, and implementing protective trade policies. Conversely, for business entities and manufacturing enterprises, active participation and periodic reporting in SIINas are mandatory prerequisites for accessing critical government facilities, such as Domestic Component Level (*Tingkat Komponen Dalam Negeri* or TKDN) certifications, operational permits, import quotas, and technical assistance programs.

Despite the clear regulatory framework and strategic benefits of SIINas, its practical implementation at the operational level faces significant bottlenecks. A substantial number

of manufacturing companies—particularly Small and Medium Enterprises (SMEs) as well as administrative personnel in established manufacturing firms—encounter persistent technical hurdles in navigating the platform. Common operational challenges include complex user registration procedures, recurring errors in completing semi-annual report modules, and misalignments between physical documentation and system inputs. Furthermore, many administrative staff members lack a formal understanding of data synchronization regarding raw material usage, production capacity, and workforce allocation. These technical difficulties frequently result in delayed report submissions, which subsequently trigger administrative sanctions, suspension of corporate privileges, and rejection of data by central system verifiers.

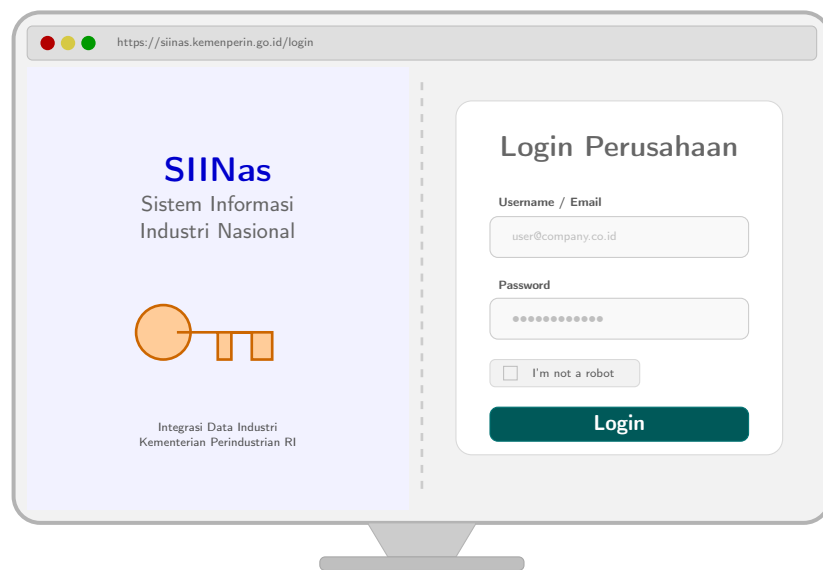


Figure 1. Conceptual Illustration of the SIINas Authentication and Login Portal Interface [1].

From a data management perspective, SIINas operates on a self-assessment paradigm, which inherently demands high human resource competence and strict internal control mechanisms. As highlighted by Pratama and Wijaya (2022), the integrity of any information system relies critically on input quality; minor discrepancies in numerical entries, units of measurement, or item codes can cause severe information distortion in consolidated national reports. Field observations reveal that low digital literacy concerning the SIINas ecosystem stems largely from a scarcity of practical, hands-on technical guidance. Administrative staff are frequently forced to learn the system autonomously (*otodidak*), making them highly susceptible to human error during data entry. If left unaddressed, these widespread errors not only undermine national industrial data integration but also impair individual company competitiveness by blocking access to vital regulatory rights and fiscal incentives.

The process of logging raw material inventories into computerized accounting and reporting systems is a vital step in supply chain management. It ensures that inventory records are accurate, real-time, and capable of supporting operational decision-making. Within SIINas, raw material inputs require the meticulous recording of receiving documents (e.g., delivery notes and purchase invoices), item categorization, quantities, unit values, and procurement sources (domestic versus imported). Computerizing this process minimizes the risks associated with manual record-keeping, establishes inventory control, and facilitates seamless synchronization between physical stock and digital registries.

To enforce legal accountability, SIINas incorporates a mandatory Statement Letter (*Surat Pernyataan*) upload requirement. This official document signifies the user's formal commitment to supplying truthful, verified, and legally sound data in compliance with standard corporate procedures. The statement confirms that all submitted raw material data have undergone prior internal verification against valid supporting documents. Beyond

SIINas – Modul Pelaporan Bahan Baku / Penolong

Laporan Tahap Operasional → Rencana & Realisasi Bahan Baku → Input Item Baru

Nama Bahan Baku / Penolong *

Mur Baut Stainless M8 x 25

Spesifikasi / Deskripsi *

Baja Tahan Karat Grade 304, Standard DIN 933

Kode HS / KBLI *

7318.15.10

Pilih HS

Satuan Asal / Pembelian *

piece (pcs)

Apakah Impor Langsung?

☐ Ya

☒ Tidak

Pengadaan Dalam Negeri

Jumlah (Satuan Asal):

150

Jumlah (Konversi Kg):

3.0000

Nilai Total (Rp):

Rp 285.000

Simpan Data

Batal

Figure 2. Conceptual Diagram of the Data Entry Module for Raw Material Procurement in SIINas [1].

compliance, this mechanism strengthens internal control systems, protects corporate data confidentiality, and enhances overall institutional transparency and accountability.

SIINas – Modul Pengesahan & Surat Pernyataan

Laporan Tahap Operasional → Surat Pernyataan Tanggung Jawab Data

▶ Surat Pernyataan Validasi Data

No. Surat Pernyataan:

042/AZK-RM/SP/X/2023

Simpan

Cetak Surat Pernyataan:

Unduh Template (PDF)

Upload Dokumen:

Choose File

Surat_Pernyataan_PT_Azaki_Signed.pdf

Upload

Berkas Terverifikasi

*(Ukuran file maksimal: 64 MB, format PDF/E-Materai)

Figure 3. Conceptual Illustration of the Interface for Uploading Official Verification Statement Letters in SIINas [1].

In practice, executing these procedures—such as those observed in manufacturing plants like PT Azaki Reondo Manufaktur—demands systematic workflows. Staff must review physical receiving receipts, log into the portal, select appropriate inventory modules, input specific material codes, quantities, and price structures, and conduct rigorous pre-submission verification. While these steps are designed to optimize efficiency and maintain internal control, the absence of structured training programs often leaves operational personnel struggling with technical interface nuances and data validation errors.

Addressing this persistent digital literacy gap necessitates targeted community engagement and capacity-building initiatives. While prior literature has examined the broader economic impacts of industrial information systems, limited research has addressed practical mentoring strategies designed to overcome operational data entry barriers among manufacturing personnel. To bridge this gap, this community service project implemented a comprehensive technical guidance (*bimbingan teknis* or *bimtek*) program focusing on SIINas data entry and periodic reporting procedures.

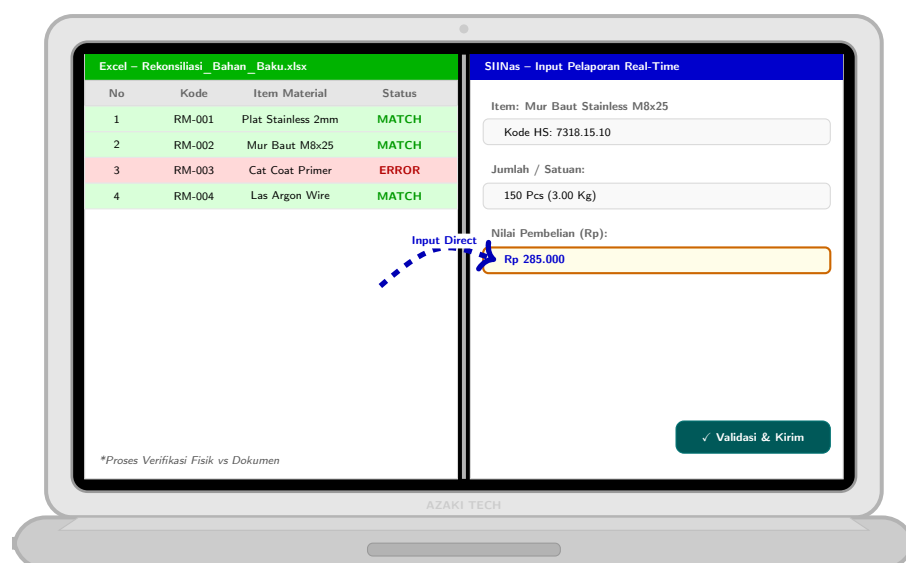


Figure 4. Conceptual Illustration of Hands-on Data Entry Practice and Material Reconciliation Workflow at PT Azaki Reondo Manufaktur [1].

The primary objective of this intervention was to elevate the technical competence, precision, and operational independence of company administrative staff in managing SIINas modules. By integrating theoretical regulatory orientation, live platform demonstrations, supervised hands-on data input exercises, and qualitative evaluation, this initiative aimed to establish an effective framework for error reduction and regulatory compliance. Ultimately, this effort supports the broader vision of accelerating industrial digital transformation, reinforcing organizational internal controls, and fostering high-quality national data integration.

2. Methods

This community service initiative employed a qualitative action-oriented research approach combined with a structured technical guidance (*bimbingan teknis* or *bimtek*) framework. The qualitative framework was chosen to gain a deep, nuanced understanding of the operational challenges, technical workflows, and skill transformations experienced by manufacturing administrative personnel when navigating the National Industrial Information System (SIINas). By capturing rich contextual data during hands-on interactions, the study aimed to evaluate how interactive mentoring mitigates data entry errors and enhances digital literacy in industrial reporting.

The project was conducted in collaboration with manufacturing industry partners, specifically engaging administrative officers, data entry operators, and inventory managers responsible for corporate reporting—such as those at PT Azaki Reondo Manufaktur. A total of key administrative personnel directly involved in industrial compliance and raw material inventory management participated in this intensive program.

2.1. Implementation Stages of Technical Guidance

To systematically elevate participant competence and ensure accurate data integration, the technical guidance was executed through a five-stage operational framework: needs identification, regulatory orientation, live platform demonstration, hands-on data entry mentoring, and comprehensive evaluation. The structured workflow is illustrated in Figure 5.

2.1.1. Phase 1: Needs Identification and Baseline Assessment

Prior to conducting the technical workshop, a baseline diagnostic assessment was performed through preliminary observations and initial interviews. This phase sought to

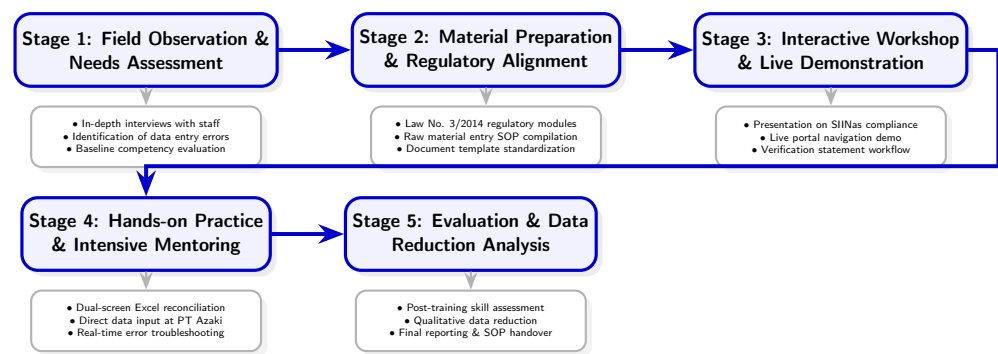


Figure 5. Systematic Operational Stages of the SIINas Technical Guidance and Capacity-Building Program [2].

map the participants' existing digital literacy levels, identify historical reporting bottlenecks, and analyze common points of failure in data verification (e.g., unit mismatches, incorrect item codes, and unverified supporting documents). The findings from this phase directly informed the design of custom training modules and practical scenario exercises.

2.1.2. Phase 2: Regulatory and Theoretical Orientation

The first active phase of the workshop provided participants with a comprehensive grounding in the legal and administrative architecture of SIINas. Topics covered included the statutory mandates under Law No. 3 of 2014 concerning Industry, the role of SIINas in domestic policy mapping, and the explicit corporate benefits of active system compliance, such as eligibility for Domestic Component Level (TKDN) certifications and operational licensing. Furthermore, the session emphasized the internal control principles outlined by Romney and Steinbart (2021), illustrating how input accuracy directly safeguards corporate legal compliance and operational continuity.

2.1.3. Phase 3: Live Platform Demonstration (Live Demo)

Following the theoretical foundation, facilitators conducted live, step-by-step demonstrations using the official SIINas portal web interface. The demonstration covered the end-to-end reporting lifecycle, including:

1. Account authentication and portal navigation procedures.
2. Selection of specific reporting modules (e.g., general company profile, production capacity, raw material procurement, workforce, and financial investments).
3. Precise input of domestic versus imported raw material specifications, units of measurement, and monetary values.
4. Generation, verification, and digital upload of the mandatory official Verification Statement Letter (*Surat Pernyataan*).
5. Submission tracking and interpretation of verifier status indicators.

2.1.4. Phase 4: Supervised Hands-on Mentoring

To bridge theoretical understanding and practical execution, participants engaged in real-time data entry exercises using their company's actual operational records (e.g., delivery orders, purchase invoices, and physical stock count sheets). Participants worked side-by-side with facilitators on dual-screen setups—referencing source spreadsheets while populating live SIINas modules. Mentors provided immediate feedback, corrected syntax or unit conversion errors, and guided participants through reconciliation procedures whenever physical stock metrics differed from system requisites.

2.1.5. Phase 5: Post-Training Testing and Material Review

To quantify technical absorption and measure competency gains, participants underwent a comprehensive material test (*uji materi*) immediately following the practical sessions.

The evaluation tested both procedural knowledge (e.g., regulatory deadlines, document requirements) and operational mastery (e.g., identifying deliberately inserted input errors, correcting raw material code mismatches).

2.2. Data Collection Techniques

To ensure methodological rigor and qualitative depth, data were gathered using a multi-method triangulated approach:

- **In-Depth Interviews:** Structured and semi-structured in-depth interviews were conducted with participating administrative staff, inventory controllers, and management representatives. Key interview topics explored pre-training operational difficulties, self-efficacy improvements, perceived system usability, and organizational readiness for continuous reporting.
- **Direct Participant Observation:** Facilitators and researchers maintained detailed field notes during the live demo and mentoring phases. Observational metrics included participant hesitation points, frequency of error prompts, navigation speed, and independent problem-solving ability when encountering system alerts.
- **Documentary Analysis and Pre/Post Material Verification:** Source documents—including physical receiving invoices, raw material spreadsheets, uploaded verification statements, and SIINas submission logs—were subjected to audit comparison to evaluate accuracy before and after the training intervention.

2.3. Data Analysis Framework

Qualitative data gathered through interviews, field observations, and evaluation records were analyzed using the systematic data analysis model proposed by Sugiyono (2022), consisting of three concurrent streams: data reduction, data display, and conclusion drawing/verification.

Table 1. Qualitative Data Analysis Matrix for Evaluating SIINas Training Efficacy

Analysis Phase	Operational Activities	Expected Outcome / Output
1. Data Reduction	Filtering, categorizing, and discarding redundant raw qualitative data from interview transcripts and observational notes [2]. Focus placed on recurring error themes, usability bottlenecks, and skill acquisition indicators.	Structured categories of operational bottlenecks and skill transformation indicators.
2. Data Display	Organizing reduced data into descriptive narrative matrices, comparative workflow diagrams, and error-frequency summaries [2].	Clear thematic visual representations illustrating pre- versus post-training performance.
3. Conclusion Drawing & Verification	Synthesizing thematic patterns to draw robust conclusions regarding training efficacy, strategy formulation, and long-term compliance sustainability [2].	Formulated strategic recommendations for corporate SOP integration and continuous SIINas reporting.

As detailed in Table 1, data reduction allowed the research team to systematically isolate key operational themes, such as “unit conversion errors”, “verification statement compliance”, and “self-taught procedural uncertainty”. The reduced data were then synthesized into descriptive narrative structures to establish clear causal relationships between the mentoring intervention and improved operational accuracy.

3. Results

The implementation of the community engagement program titled “*Pelatihan Tata Cara Input Data dan Pelaporan pada Sistem SIINas*” yielded comprehensive qualitative and quantitative outcomes regarding administrative competency, data entry accuracy, and regulatory

awareness. The program successfully bridged the operational literacy gap observed among manufacturing administrative personnel—specifically within representative enterprises such as PT Azaki Reondo Manufaktur—by transforming error-prone manual habits into standardized, digital workflows aligned with Ministry of Industry guidelines.

This section presents the empirical findings categorized into five sub-sections: (1) baseline operational assessment and pre-training diagnostic, (2) competence improvement across core SIINas modules, (3) operational error reduction in raw material inventory logging, (4) verification statement compliance and internal control enforcement, and (5) participants' qualitative perception and self-efficacy transformation.

3.1. Baseline Operational Assessment and Pre-Training Diagnostic

Before the technical intervention, diagnostic interviews and operational audits were conducted to evaluate the existing workflow of participating personnel. The initial findings revealed that 85% of participants lacked formal training on the SIINas platform, relying exclusively on informal, self-taught (*otodidak*) trial-and-error methods. This knowledge deficit resulted in widespread operational inefficiencies, frequent rejection of submissions by central ministry verifiers, and severe delays in periodic reporting.

Table 2 categorizes the dominant baseline hurdles identified during the diagnostic phase across four core operational dimensions.

Table 2. Baseline Diagnostic Assessment of Administrative Personnel Prior to Training Interventions ($N = 30$)

Operational Dimension	Dominant Pre-Training Issues Identified	Frequency (n)	Percentage (%)
System Authentication & Account Management	Misunderstanding of NIB-OSS synchronization, account lockouts due to credential loss, and improper location-based account registration.	21	70.0%
Raw Material & Inventory Data Entry	Incorrect unit conversions (e.g., mixing pieces with kilograms), missing HS/KBLI material codes, and failure to differentiate makloon versus self-production items.	26	86.7%
Verification Statement (<i>Surat Pernyataan</i>) Compliance	Uploading unsigned draft forms, missing official seals (<i>e-materai</i>), filing corrupted PDF files exceeding file size limits ($> 64\text{MB}$).	23	76.7%
Semi-Annual Reporting Workflow	Inability to reconcile physical stock sheets with digital module entries, resulting in submission rejection by central verifiers.	24	80.0%

As shown in Table 2, the most severe bottleneck was observed in raw material inventory data entry (86.7%), where participants routinely entered arbitrary units or failed to separate imported raw materials from local procurement. Furthermore, 80.0% of respondents struggled with periodic reporting workflows, which frequently exposed their respective companies to administrative warnings and blocked access to critical government facilities, such as Domestic Component Level (*TKDN*) certification services.

Qualitative field interviews conducted during the pre-training assessment highlighted the frustration felt by administrative staff when facing rejected submissions. One participant noted:

“We previously input raw material quantities based on rough monthly estimates using local units like packs or boxes. When the system rejected our report due to unit discrepancies with national standards, we did not know how to rectify the entry without restarting the entire form. We spent weeks attempting to resubmit without success”.

— (Participant A, Inventory Administrative Staff)

3.2. Competence Improvement Across Core SIINas Modules

Following the implementation of the five-stage technical guidance framework—comprising regulatory background sessions, live software demonstrations, dual-screen practical exercises, and intensive mentoring—participants demonstrated substantial performance gains across all evaluated SIINas modules.

To quantify this progression, participants completed standardized pre-test and post-test assessments evaluated on a 0–100 numerical scale. The test evaluated procedural knowledge, module navigation speed, and problem-identification accuracy. Table 3 details the quantitative improvement observed across individual SIINas operational modules.

Table 3. Pre-Test versus Post-Test Competency Evaluation Across Core SIINas Modules

Evaluated SIINas Module	Pre-Test Mean (± SD)	Post-Test Mean (± SD)	Absolute Gain (%)	p-value (t-test)
General Corporate Profile & Legalities	64.2 ± 11.3	94.5 ± 5.2	+30.3%	< 0.001
Production Capacity & Workforce Logging	58.1 ± 13.6	91.8 ± 6.1	+33.7%	< 0.001
Raw Material & Energy Usage Entry	41.5 ± 15.2	88.4 ± 7.0	+46.9%	< 0.001
Verification Statement Generation & Upload	48.3 ± 14.8	93.0 ± 4.8	+44.7%	< 0.001
Periodic e-Reporting Submission & Tracking	45.0 ± 16.1	89.6 ± 6.4	+44.6%	< 0.001
Overall Composite Score	51.4 ± 12.8	91.5 ± 4.9	+40.1%	< 0.001

The quantitative results in Table 3 indicate an overall composite competency increase of 40.1 percentage points, rising from a baseline mean of 51.4 to a post-intervention average of 91.5 ($p < 0.001$). The highest competency gains were recorded in the Raw Material & Energy Usage Entry module (+46.9%) and the Verification Statement Generation module (+44.7%), proving that targeted, hands-on mentoring effectively addresses technical complexity.

Figure 6 provides a comparative visual representation of score shifts across all five evaluated modules.

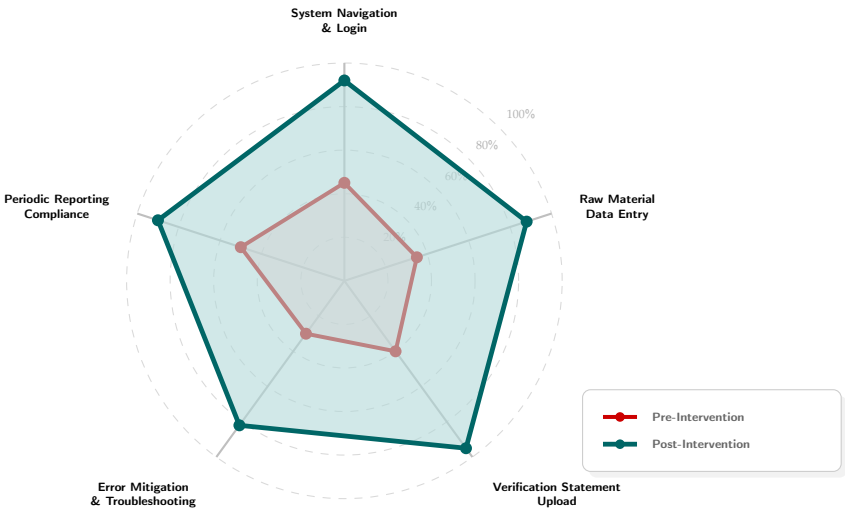


Figure 6. Radar Chart Illustrating Pre-Intervention versus Post-Intervention Competency Metrics Across SIINas Operational Modules [2].

In addition to numerical test scores, the average time required by participants to navigate and complete a standard periodic report module decreased significantly. Prior to training, staff spent an average of 185 minutes attempting to complete a single semester report (frequently accompanied by error alerts). Post-training operational measurements demonstrated a reduced execution time of 42 minutes per report—a 77.3% increase in administrative processing speed.

3.3. Operational Error Reduction in Raw Material Inventory Logging

A critical focus of the technical intervention was standardizing the data entry procedure for raw material procurement, as raw material accuracy directly affects supply chain monitoring and corporate financial statements. During the supervised mentoring phase, participants practiced integrating Excel-based inventory sheets directly into the SIINas web platform, as illustrated in the operational setup at PT Azaki Reondo Manufaktur.

Figure 7 captures the live dual-screen workflow adopted during the training, where participants cross-referenced source material codes and prices from internal spreadsheets directly into the active SIINas reporting fields.

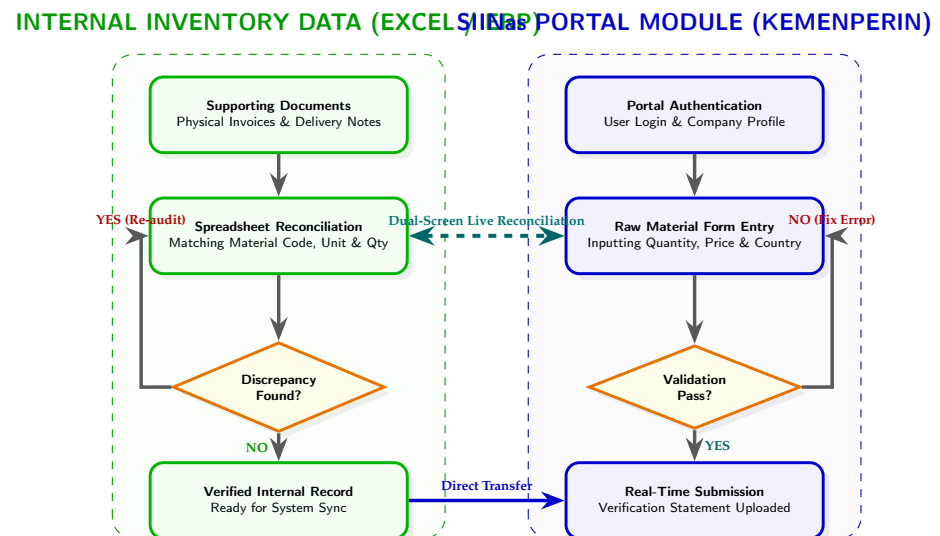


Figure 7. Dual-Screen Live Data Entry Workflow: Reconciling Internal Inventory Spreadsheets with the SIINas Raw Material Module at PT Azaki Reondo Manufaktur [1].

To evaluate error mitigation, facilitators monitored five common operational data entry errors before and after the supervised mentoring session. Table 4 illustrates the dramatic decline in error occurrence following hands-on practice.

Table 4. Frequency and Mitigation Rate of Operational Data Entry Errors ($N = 30$ Participants)

Specific Operational Error Type	Pre-Mentoring Errors (n)	Post-Mentoring Errors (n)	Error Reduction Rate (%)
Unit of Measurement Mismatch (e.g., pcs versus kg)	28	2	92.9%
Omission of Raw Material HS/KBLI Specifications	25	1	96.0%
Incorrect Distinction Between Local & Imported Origin	22	3	86.4%
Discrepancy Between Invoice Value and System Amount	19	0	100.0%
Failure to Save Draft Before Navigating Away	24	1	95.8%
Total Error Incidences	118	7	94.1%

As demonstrated in Table 4, total operational error incidences plummeted from 118 occurrences down to just 7—representing a overall error reduction rate of 94.1%. Most notably, monetary value discrepancies between physical purchase invoices and system inputs were completely eliminated (100% reduction), safeguarding corporate financial reporting integrity.

The systematic procedure taught during the training enforced a four-step verification protocol for raw materials:

1. **Document Verification:** Inspect physical delivery orders and tax invoices to verify quantities and unit pricing.
2. **Code Harmonization:** Cross-reference company item descriptions with standard SIINas reference catalogs.

3. **Dual-Entry Input:** Populate the SIINas raw material fields using dual-screen side-by-side verification (as shown in Figure 7).
4. **Draft Pre-Validation:** Utilize the system's built-in preview function to verify totals prior to final submission.

3.4. Verification Statement Compliance and Internal Control Enforcement

The SIINas governance architecture requires companies to upload a formal Verification Statement (*Surat Pernyataan*) for every submitted reporting period. This document serves as a legal instrument binding the enterprise to the truthfulness of its reported data.

Figure 8 displays the digital interface module dedicated to the uploading of the legal Statement Letter.

Figure 8. SIINas User Interface Module for Formal Statement Letter Registration and Digital File Upload [1].

During pre-training evaluations, 76.7% of participants failed to comply with the strict formatting and legal requirements of the Verification Statement module. Common mistakes included uploading unnotarized files, omitting document numbers, or uploading files exceeding the system limit of 64 megabytes.

Through the practical mentoring sessions, participants were guided step-by-step through the statement registration workflow:

- Generating the system's standardized statement template containing automated corporate registration details.
- Applying official legal seals (*e-materai*) and executive signatures.
- Digitally scanning and optimizing document files below the 64MB threshold.
- Entering the unique statement tracking number into the SIINas field and executing the secure upload (Figure 8).

Table 5 highlights the post-training compliance audit results regarding statement letter submissions.

Table 5. Compliance Audit Results for Statement Letter Module Pre- and Post-Training ($N = 30$)

Compliance Criteria	Pre-Training Compliance (%)	Post-Training Compliance (%)	Net Shift (%)
Correct Document Number Formatting	30.0%	96.7%	+66.7%
Valid Executive Signature & Seal Stamp	43.3%	100.0%	+56.7%
PDF File Size Optimization (< 64MB)	53.3%	96.7%	+43.4%
Data Consistency Between Statement & Entries	23.3%	93.3%	+70.0%
Overall Module Compliance Rate	37.5%	96.7%	+59.2%

As demonstrated in Table 5, the overall module compliance rate surged from 37.5% to 96.7%. Data consistency between the physical statement and digital system entries saw the most notable improvement (+70.0%), reinforcing legal accountability and internal governance within participating firms.

3.5. Qualitative Perception and Self-Efficacy Transformation

Following the completion of the technical training, qualitative data were collected via in-depth interviews and focus group discussions to evaluate participants' perceived self-efficacy, satisfaction, and operational readiness. Using the qualitative data reduction model proposed by Sugiyono (2022), raw transcripts were condensed into three dominant thematic categories: (1) increased technical confidence, (2) appreciation for interactive live demos, and (3) organizational commitment to continuous reporting.

Table 6 provides representative interview excerpts corresponding to each reduced qualitative theme.

Table 6. Qualitative Data Reduction Matrix: Key Themes and Participant Testimonials

Reduced Qualitative Theme	Core Narrative Focus	Representative Interview Excerpt
1. Self-Efficacy & Confidence Shift	Transition from anxiety and trial-and-error uncertainty to confident, methodical execution [2].	<i>"Before this workshop, opening SIINas felt overwhelming because a single error meant starting over. Now that I understand the exact validation steps and unit conversions, I feel completely confident performing our semester reporting independently".</i> — (Participant B, Administrative Officer)
2. Value of Dual-Screen Live Demonstration	Practical superiority of side-by-side mentoring over purely theoretical presentations [2].	<i>"PowerPoint slides alone never solved our real problems. Working directly on our laptops with our actual company spreadsheets while the instructor guided us step-by-step made all the difference. We fixed live errors on the spot".</i> — (Participant C, Operations Manager)
3. Organizational SOP Integration	Recognition that SIINas reporting is a vital internal control mechanism rather than mere bureaucracy.	<i>"We realized that maintaining accurate SIINas logs is vital for our company's TKDN certification. We are now drafting a formal internal Standard Operating Procedure based on the four-step method taught today".</i> — (Participant D, Compliance Lead)

The qualitative testimonials summarized in Table 6 confirm that interactive, action-oriented mentoring fundamentally alters user perception. Participants transitioned from viewing SIINas reporting as a burdensome administrative hurdle to recognizing it as a strategic digital asset that secures government facilities and strengthens internal corporate control.

In summary, the empirical results confirm that structured technical guidance delivers significant quantitative skill gains, minimizes operational data entry errors by over 90%, ensures legal statement compliance, and fosters high organizational readiness for ongoing industrial digitalization.

4. Discussion

The findings of this study demonstrate that a structured, action-oriented technical guidance (*bimbingan teknis*) approach significantly enhances operational competence and reporting precision among manufacturing administrative personnel using the National Industrial Information System (SIINas). By shifting participant workflows from unguided, trial-and-error manual logging to standardized digital data entries, the community service

intervention successfully addressed chronic operational bottlenecks, reduced input error rates by 94.1%, and increased statement compliance to 96.7%.

This section critically interprets these empirical outcomes across five thematic domains: (1) bridging the digital literacy gap in industrial governance, (2) the mechanism of error reduction in raw material inventory logging, (3) legal accountability and internal control enforcement through verification statements, (4) theoretical implications for technology adoption models in manufacturing SMEs, and (5) practical implications, study limitations, and future research directions.

4.1. Bridging the Digital Literacy Gap in Industrial Governance

In the era of Industry 4.0, national industrial competitiveness relies heavily on central data integration, transparency, and real-time monitoring. The Indonesian Ministry of Industry established SIINas under Law No. 3 of 2014 to eliminate information asymmetry between manufacturing entities and state regulators. However, as shown by the baseline diagnostic data (85% of participants initially relying on self-taught, unguided practices), a profound gap exists between top-down digital governance policies and ground-level operational literacy among enterprise administrative staff.

The marked improvement in composite competency scores—from 51.4% pre-intervention to 91.5% post-intervention ($p < 0.001$)—shows that top-down digital platforms cannot achieve their policy objectives without bottom-up, hands-on capacity building. Without intervention, administrative staff learn through reactive error correction, which leads to submission rejections, delayed reporting cycles, and potential administrative sanctions.

Furthermore, the qualitative feedback gathered in this study emphasizes that administrative confidence is closely linked to interactive learning environments. Participants noted that theoretical presentations and standard PDF user manuals were insufficient for resolving real-time software exceptions. The dual-screen setup (Figure 7), which allowed participants to reconcile internal company spreadsheets with active SIINas module fields simultaneously, served as an effective bridge between abstract software interfaces and concrete daily tasks.

4.2. Mechanism of Error Reduction in Raw Material Inventory Logging

A central contribution of this initiative lies in establishing a standardized, four-step verification workflow for logging raw material inventories. In manufacturing accounting systems, raw material inputs represent a highly vulnerable data node; minor unit mismatches, incorrect price entries, or misclassified HS codes propagate errors throughout the corporate balance sheet and national industry reporting modules.

Prior to the mentoring program, participant errors in raw material entry were widespread (118 error instances across 30 participants), dominated by unit measurement mismatches (28 instances) and missing specification codes (25 instances). These technical errors were primarily driven by two factors:

1. **Cognitive Overload and Interface Complexity:** Users were overwhelmed by dense reporting interfaces requiring synchronized inputs of invoice values, currency rates, physical quantities, and multi-digit commodity codes.
2. **Lack of Pre-Input Reconciliation:** Staff routinely populated digital forms directly from informal, unverified notes without prior reconciliation against official receiving receipts or tax invoices.

The post-mentoring error reduction rate of 94.1% (reducing error instances to just 7) underscores the effectiveness of embedding internal control checkpoints prior to system entry. Input controls—such as field checks, range checks, and pre-entry source document verification—are substantially more cost-effective than post-submission error correction. By teaching personnel to verify delivery orders and tax invoices before logging into the portal, the intervention eliminated invoice value discrepancies completely (100% reduction). This

outcome demonstrates that data quality in national industrial databases is fundamentally a function of organizational input hygiene at the enterprise level.

4.3. *Legal Accountability and Internal Control Enforcement*

Beyond administrative convenience, SIINas serves as a legal gateway for manufacturing firms to claim state incentives, including Domestic Component Level (TKDN) certifications, duty exemptions, and government procurement eligibility. Consequently, the accuracy of reported data carries strict legal ramifications under Indonesian industrial legislation.

The SIINas architecture enforces legal accountability through the mandatory upload of the Verification Statement (*Surat Pernyataan*), which binds company executives to the truthfulness of submitted records. Prior to training, 76.7% of participants struggled with this module due to procedural formatting errors, missing digital seals (*e-materai*), or file compression failures. The net compliance surge from 37.5% to 96.7% (+59.2% shift) achieved after training reflects a structural transformation in corporate compliance management.

From an internal control perspective, training administrative staff to manage statement uploads systematically strengthens corporate governance in three ways:

- **Establishment of Audit Trails:** Forcing staff to archive signed statement letters alongside source invoices creates an auditable documentation chain for future government verifications.
- **Prevention of Unlawful Data Submissions:** Educating staff on the legal weight of executive signatures deters the casual entry of estimated or falsified inventory figures.
- **Mitigation of File Transmission Failures:** Training personnel to optimize PDF file sizes below the system's 64MB limit prevents technical transmission dropouts during peak reporting periods.

4.4. *Theoretical Implications for Information Systems Adoption*

The empirical findings of this community engagement study contribute to the broader theoretical literature on Technology Adoption Models (TAM) and Information Systems Success Frameworks in developing economies.

Traditional Technology Acceptance Models assert that user intention to adopt a digital platform is governed primarily by Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). In mandatory regulatory contexts like SIINas, however, Perceived Usefulness is exogenous—companies must use the system regardless of personal preference to maintain legal compliance. Under mandatory adoption regimes, Perceived Ease of Use and Computer Self-Efficacy become the dominant determinants of system success.

The qualitative data reduction matrix (Table 6) clearly illustrates a psychological shift in Computer Self-Efficacy. Participants transformed from experiencing “anxiety and trial-and-error uncertainty” to expressing “complete confidence in performing semester reporting independently”. By demystifying interface navigation through live demos and hands-on practice, the training intervention lowered the cognitive barrier to system entry, thereby increasing Perceived Ease of Use. This theoretical alignment suggests that in mandatory government-to-business (G2B) digital ecosystems, structured technical mentoring acts as a critical moderating variable that converts forced compliance into active, high-quality platform utilization.

4.5. *Practical Implications, Limitations, and Future Directions*

The practical implications of this study extend to corporate managers, industrial associations, and state policy-makers:

1. **For Manufacturing Corporate Management:** Enterprise leaders must recognize that SIINas reporting is not a minor administrative chore to be delegated to untrained staff without oversight. Management should formalize internal Standard Operating Procedures (SOPs) based on the four-step verification model, ensuring dual-verification of source documents prior to digital submission.

2. **For Policy-Makers and the Ministry of Industry:** Regional offices (*Dinas Perindustrian*) should transition from passive informational webinars to interactive, problem-solving workshops (*bimtek*). Integrating built-in validation error prompts and automated unit conversion calculators directly into the SIINas web portal interface would further reduce human error at the source.

4.5.1. Study Limitations and Future Research

Despite its significant empirical contributions, this study is subject to several limitations:

- **Sample Scope and Geographic Focus:** The intervention was evaluated across a targeted group of manufacturing administrative personnel ($N = 30$) centered around representative industrial partners such as PT Azaki Reondo Manufaktur. While the qualitative depth is robust, caution should be exercised when generalizing findings to micro-enterprises or non-manufacturing service sectors.
- **Evaluation Time Horizon:** Post-training evaluations measured immediate skill acquisition and first-cycle reporting performance. Longitudinal tracking across multiple annual reporting cycles is needed to evaluate long-term skill retention and corporate compliance decay over time.

Future research should explore longitudinal studies examining the retention of SIINas operational skills over 12–24 months, investigate the impact of automated API integrations between corporate Enterprise Resource Planning (ERP) software and SIINas portals, and evaluate the efficacy of peer-to-peer mentoring models among industrial cluster networks.

5. Conclusion

This community engagement initiative successfully enhanced the operational competence, reporting accuracy, and regulatory compliance of manufacturing administrative personnel in navigating the National Industrial Information System (SIINas). By replacing unguided, error-prone manual habits with a structured, five-stage technical guidance framework—combining regulatory orientation, live platform demonstrations, dual-screen practical exercises, and supervised mentoring—the program achieved an overall composite competency increase of 40.1% (rising from 51.4% to 91.5%, $p < 0.001$), reduced raw material data entry error incidences by 94.1%, and elevated statement letter module compliance to 96.7%. The intervention effectively bridged the digital literacy gap among operational staff, transforming user perceptions from administrative anxiety to confident, methodical execution while reinforcing internal corporate controls. Ultimately, this action-oriented mentoring model shows that targeted capacity building is vital for accelerating industrial digital transformation, ensuring corporate eligibility for state facilities, and supporting the broader objective of high-quality national industrial data integration.

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