



Innovation of Training Needs Analysis Model for Human Resource Training and Development at PT Bpfilters Industri Mandiri

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Abstract. This study analyzes organizational conditions, job requirements, employee competencies, and competency-development support systems at PT Bpfilters Industri Mandiri through Organizational Analysis (OA), Task Analysis (TA), and Person Analysis (PA); identifies competency gaps; and develops a Training Needs Analysis (TNA) model for a growing manufacturing company. A qualitative case-study design was used. Data were collected through interviews, observation, and document analysis involving key organizational and operational informants and analyzed through data condensation, display, verification, and triangulation. The findings indicate that the company has a clear organizational direction and division of work, while competency and training management remain largely informal and are not yet supported by complete job competency standards, competency matrices, systematic competency evaluation, or an integrated training-needs mechanism. Competency Gap Analysis identified position-specific development needs in engineering, production, and administration. The resulting model integrates OA, TA, PA, and Competency Gap Analysis into an operational sequence that connects organizational needs, job standards, actual competencies, competency gaps, and prioritized training recommendations. Expert judgement indicated that the model is appropriate, understandable, realistic, and useful for systematic competency mapping.

Keywords: Competency Gap Analysis; Human Resource Development; Organizational Analysis; Task Analysis; Training Needs Analysis.

1. INTRODUCTION

Manufacturing firms increasingly compete through quality, cost efficiency, delivery speed, technology adoption, and the ability of employees to adapt to changing production requirements. Under these conditions, training is useful only when it addresses real organizational, job, and individual competency needs. Training Needs Analysis (TNA) therefore functions as a systematic mechanism for connecting development programs with performance requirements rather than as an administrative step. Alzahmi and Alshamsi (2024) associate the application of human-resource TNA with employee performance, while Robert & Mori (2024) show that training-needs assessment can strengthen employee skills and firm performance. Odhiambo et al. (2025) likewise report a close relationship between needs assessment and employee performance.

The need for structured TNA is especially important in technical and manufacturing environments, where competence must be aligned with work standards, safety, process control, and technological change. Sunyoto et al. (2020) emphasize the importance of needs assessment for competency-based technical training in the cement industry. Yoven et al. (2024) identify competency and procedural gaps in a manufacturing setting, Harahap and Aisyah (2024) stress

systematic TNA for effective human-resource development, and Ardiansah et al. (2026) demonstrate the relevance of planned TNA for improving operational employee competence.

PT Bpfilters Industri Mandiri is a national manufacturing company established in 2021 and engaged in the development and production of biodiesel filtration systems. The company produces spin-on filters, filter elements, station filtration, and onboard filtration for mining, heavy equipment, transportation, shipping, and power-generation applications. The growing complexity of biodiesel filtration and the company's expansion require both technical and non-technical competence to be developed systematically.

Field evidence in the source research shows that the company has not yet formalized a comprehensive competency-management system. Some job descriptions and work instructions are available, but job competency standards, competency matrices, periodic competency assessments, and a documented TNA mechanism are incomplete. Much operational knowledge is transferred through experience and direct supervision. This creates risks of inconsistent work practices, dependence on individual experience, and training decisions based on immediate perceptions rather than verified competency gaps.

Recent studies provide practical support for gap-based approaches. Cahyaningrum et al. (2025) use a performance-gap approach to identify retail employees' training needs. Raj (2024) finds that TNA supports more accurate identification of competency gaps and contributes to motivation, involvement, satisfaction, and performance. Zahra and Ihsan (2026) similarly position TNA as a means of competency improvement to support employee performance. These studies reinforce the importance of comparing required and actual competencies before training priorities are established.

Nevertheless, prior TNA studies often stop at identifying training needs, examining training effectiveness, or applying an existing framework. Contextual model development remains more limited. Dauri et al. (2024), Hartono et al. (2025), and Ganji and Rao (2024) demonstrate the applicability of TNA in different organizational settings, while Rahmana and Suyono (2024) propose a conceptual TNA model for a regional public company. The present research extends this line of work by integrating Organizational Analysis, Task Analysis, Person Analysis, and Competency Gap Analysis into an operational model specifically adapted to a growing biodiesel-filter manufacturing company.

The innovation of the proposed model does not lie in replacing the established Organizational, Task, and Person Analysis framework, but in explicitly positioning Competency Gap Analysis as a synthesis stage that connects required job competencies with

employees' actual competencies and translates the identified gaps into prioritized training needs.

The study therefore has three objectives: first, to analyze organizational conditions, jobs, actual employee competencies, and the support system for competency development through OA, TA, and PA; second, to identify competency gaps by comparing job competency requirements with actual employee competencies; and third, to develop and validate a TNA model that can guide the formulation of training and human-resource development programs at PT Bpfilters Industri Mandiri.

2. LITERATURE REVIEW

Training Needs Analysis and Competency Development

TNA is a structured process used to determine whether training is needed, who needs it, and what competencies should be developed. Kusmiati and Sundari (2022) apply the Irwin Goldstein approach to industry-based TNA and show the value of structured analysis in defining training priorities. Mohammad & Mamun (2021) demonstrate that TNA is important for training effectiveness in manufacturing firms, while Pradita et al. (2025) conclude from a literature review that systematic needs analysis is essential for effective human-resource development.

A competency-based perspective strengthens the connection between TNA and longer-term HR development. Bahri and Salsiati (2025) discuss competency-based human-resource development as a strategic approach. Maulana et al. (2025) emphasize strategic factors in human-resource career development, and Nugraha et al. (2024) underline the role of strategic HR planning in organizational motivation and retention. Together, these studies support the view that training priorities should be aligned with organizational direction rather than treated as isolated learning events.

Organizational, Task, Person, and Competency-Gap Analysis

The primary theoretical framework underlying this study is the Three-Level Analysis approach to Training Needs Analysis, consisting of Organizational Analysis (OA), Task Analysis (TA), and Person Analysis (PA), as discussed in recent TNA research by Suhendra et al. (2025) and Zahra and Ihsan (2026). The approach originates from the framework introduced by McGehee and Thayer. Organizational Analysis examines organizational conditions and strategic requirements. Task Analysis identifies job duties, work standards, and the competencies required for each position, while Person Analysis assesses employees' actual competencies and development needs. In this study, the McGehee and Thayer framework

serves as the foundation for identifying training needs, while Competency Gap Analysis is incorporated as a synthesis stage to compare required and actual competencies.

The research framework examines training needs at three interconnected levels. Organizational Analysis identifies strategic direction, work systems, HR-development support, and organizational readiness. Task Analysis identifies duties, responsibilities, work standards, and the competencies required for each position, while Person Analysis identifies employees' actual competence, work experience, obstacles, and individual development needs. The comparison between Task Analysis and Person Analysis forms the Competency Gap Analysis, which is subsequently used to identify and prioritize competency development needs.

Recent TNA studies indicate that training priorities can be established by considering both competency gaps and the importance or relevance of competencies to job performance. Fadli (2024), for example, used gap analysis and importance-performance analysis to identify competencies requiring priority improvement, while Chang and Lu (2025) demonstrated that comparing required competency importance with actual competency performance can be used to identify and prioritize training needs. Based on this perspective, the present study determines training priorities qualitatively by considering the extent of the competency gap, the relevance of the competency to daily operational activities, and its potential implications for work quality, safety, and process continuity.

The value of discrepancy-based assessment is also supported outside conventional corporate settings. Flanagan et al. (2023) use a ranked discrepancy model to evaluate technical and human-relation competencies, demonstrating how differences between expected and actual competency levels can guide development priorities. Suhendra et al. (2025) apply TNA to nurses and show that structured needs identification can support position-specific development, while Hamdi (2025) and Nor (2025) emphasize the strategic role of TNA in public-sector employee development and training effectiveness.

Model Development and Validation

A contextual TNA model must remain theoretically coherent while also being implementable in the target organization. In this study, model development synthesizes OA, TA, PA, and Competency Gap Analysis into a sequence that ends with prioritized competency-development needs and training recommendations. The model is an adaptation for the company's current maturity rather than a replacement for the classic three-level needs-analysis logic.

Validation through expert judgement is used to assess the appropriateness, clarity, feasibility, and organizational usefulness of the model. Adillah et al. (2022) demonstrate the

role of expert judgement in content validation, providing methodological support for structured expert review. The combination of empirical field evidence and expert validation is important because the model is intended as an operational HR tool, not merely as a conceptual diagram.

3. RESEARCH METHOD

The study used a qualitative case-study design at PT Bpfilters Industri Mandiri. The unit of analysis was the company's system for identifying training and human-resource development needs, covering organizational conditions, job requirements, actual employee competencies, competency gaps, and supporting HR mechanisms.

Informants were selected purposively because of their direct knowledge of strategic direction, work processes, competency requirements, or actual job performance. The informants consisted of the Director, Production Manager, Engineering Staff, two Production Operators, and an Administrative Staff member. The six informants were not intended to represent the total employee population, but were selected to provide in-depth information relevant to the research objectives. Data were collected through interviews, direct observation, and document analysis. Source triangulation compared information across management and operational informants, while method triangulation compared interviews, observation, and documentary evidence.

Analysis was conducted iteratively through data condensation, systematic display, interpretation, and verification. Evidence was first grouped into OA, TA, and PA categories. Job competency requirements identified through TA were then compared with actual competencies identified through PA to form the Competency Gap Analysis. The results of OA, TA, PA, and Competency Gap Analysis were synthesized into a proposed TNA model, which was subsequently reviewed through expert judgement.

Table 1. Informants and Analytical Contribution.

Informant	Number	Primary Contribution
Director	1	Organizational direction, strategy, HR-development commitment, OA
Production Manager	1	Job duties, work standards, production competency requirements, TA
Engineering Staff	1	Technical duties, competency requirements, actual competence, TA and PA
Production Operator	2	Actual operational competence, work obstacles, PA
Administrative Staff	1	Administrative competence, documentation and digital-work needs, PA
Total	6	Purposively selected informants

Source: Research data, 2026.

4. RESULT AND DISCUSSION

Organizational Context and Human-Resource Management

PT Bpfilters Industri Mandiri has a relatively simple organizational structure comprising managerial, engineering, administrative, maintenance, and production functions. This structure supports rapid coordination and communication across functions. However, as a growing manufacturing company, the development of formal HR systems has not yet progressed at the same pace as production activities and market expansion. This condition highlights the need for a more systematic approach to competency development and training-needs identification.

Organizational Analysis shows that management is committed to employee development and the company has a clear strategic direction. However, the organization does not yet have a formally documented competency-management system, systematic training-needs identification, or an integrated training program. This finding is consistent with Harahap and Aisyah (2024), who argue that TNA is necessary to prevent HR development from relying on assumptions, and with Alzahmi and Alshamsi (2024), who link TNA implementation with stronger employee performance.

This condition indicates that training decisions at PT Bpfilters Industri Mandiri may still rely on supervisors' immediate perceptions rather than systematically verified competency gaps. Therefore, integrating Competency Gap Analysis into the TNA process becomes important to ensure that training priorities are based on documented discrepancies between required and actual competencies.

Task Analysis and Person Analysis

Task Analysis confirms that duties and responsibilities are generally understood, but formal job descriptions, SOPs, work instructions, and competency standards are incomplete across positions. Engineering Staff perform Product Engineering, Process Engineering, and Quality Control functions; Production Operators execute production activities by workstation; and Administrative Staff support operational documentation and reporting. The absence of complete written standards means that part of the required competence is still inferred from experience and managerial expectations.

Person Analysis shows that most employees can perform their daily work, primarily because competence has developed through work experience, direct coaching, and informal knowledge transfer. However, the company does not yet have a competency matrix or formal competency-assessment records that would allow employee capability to be measured objectively and periodically. Dauri et al. (2024) and Hartono et al. (2025) similarly show the

practical importance of identifying position-specific development needs rather than assuming that existing work experience automatically represents full competence.

Competency Gap Analysis

Competency Gap Analysis compares the competency standards identified through Task Analysis with the actual competencies identified through Person Analysis. The analysis found that competency gaps were not uniform. Engineering needs centered on technical analysis, engineering-design software, quality engineering, product and process improvement, and systematic problem solving. Production-operator gaps centered on standardized machine operation, SOP compliance, quality control, and occupational safety. Administrative gaps centered on digital administration, data processing, office applications, and document control. These findings support Cahyaningrum et al. (2025) and Raj (2024), who position performance or competency gaps as a practical basis for defining training priorities, and are consistent with Zahra and Ihsan (2026), who connect competency-based TNA with employee performance.

Table 2. Synthesis of OA, TA, PA, and Competency Gap Analysis.

Stage	Main Finding	Contribution to the Developed Model
Organizational Analysis (OA)	Management supports HR development, but competency management, TNA, and training systems are not yet formally documented.	Identifies organizational-level training needs and implementation readiness.
Task Analysis (TA)	Duties and responsibilities are identifiable, but formal competency and work standards remain incomplete.	Establishes required competencies for each position.
Person Analysis (PA)	Actual competencies have developed through experience but are not systematically mapped or evaluated.	Identifies actual individual competency levels and development needs.
Competency Gap Analysis	Required and actual competencies differ across positions, with gaps identified in technical, operational, quality, safety, and administrative competencies	Identifies position-specific competency gaps and provides the basis for training prioritization.

Source: Processed research data, 2026.

Innovation of the Developed TNA Model

The central innovation is the placement of Competency Gap Analysis as an explicit synthesis stage between job requirements and actual employee competence. The model follows an operational sequence: Organizational Analysis -> Task Analysis -> Person Analysis -> Competency Gap Analysis -> identification of competency-development needs -> formulation

of training and HR-development recommendations -> periodic competency evaluation and model updating.

This design addresses the research gap identified in the thesis: much prior research focuses on applying TNA or measuring its outcomes, while fewer studies develop a contextual model that combines organizational, job, individual, and competency-gap evidence. Rahmana and Suyono (2024) demonstrate the relevance of conceptual TNA modeling, while Yoven et al. (2024) and Ardiansah et al. (2026) show the importance of competency and procedural gaps in industrial settings. The present model adds an operational path suitable for a company that is still building formal competency-management infrastructure.

Table 3. Developed TNA Model Flow.

Sequence	Analysis / Action	Core Output
1	Organizational Analysis	Strategic needs, organizational support, HR-system readiness
2	Task Analysis	Job duties, work standards, required competencies
3	Person Analysis	Actual competencies, experience, individual development needs
4	Competency Gap Analysis	Required-versus-actual competency gaps by position
5	Training-need prioritization	Priority competencies and target groups
6	Training and development formulation	Program, objectives, methods, and priority level
7	Periodic competency evaluation	Updated gaps, revised priorities, continuous improvement

Source: Developed by the authors based on research findings, 2026.

Training and Development Recommendations

The training recommendations follow the identified gaps rather than a single uniform program. This principle is consistent with Kusmiati and Sundari (2022), Mohammad and Mamun (2021), and Suhendra et al. (2025), who emphasize the need to connect training content with the actual demands of specific jobs and employee groups. It also reflects the competency-based development orientation discussed by Bahri and Salsiati (2025).

Table 4. Priority Training Recommendations.

Position	Competency Gap	Recommended Program	Method	Priority
Production Manager	Lacks competency in developing a competency evaluation system and identifying training needs	Leadership and Supervisory Development	In-house Training	High

Position	Competency Gap	Recommended Program	Method	Priority
Production Manager	Has not yet fully understood the systematic application of TNA	Training Needs Analysis	Workshop	High
Engineering Staff	Root Cause Analysis skills still need to be improved	Root Cause Analysis & Problem Solving	Workshop and Case Studies	High
Engineering Staff	CAD/SolidWorks proficiency is not yet optimal	Advanced SolidWorks	Practical Training	Medium
Engineering Staff	Quality engineering and technical-analysis capability need strengthening	Quality Engineering / technical problem solving	In-house training / technical workshop	Medium
Production Operator	Machine-operation standardization is uneven	Machine Operation	On-the-job training	High
Production Operator	SOP application is not yet consistent	SOP Awareness	In-house training	High
Production Operator	Quality-control competence needs improvement	Quality Control	Field practice	High
Production Operator	Occupational safety awareness needs strengthening	Occupational Safety and Health (K3)	In-house training	High
Administrative Staff	Administrative work remains partly manual	Digital Administration	Workshop	Medium
Administrative Staff	Data processing is not yet optimal	Advanced Microsoft Excel	Practical training	Medium
Administrative Staff	Document-control system is not standardized	Document Control	In-house training	Medium

Source: Developed by the authors based on research findings, 2026.

Expert Judgement and Implementation Feasibility

Expert judgement was used to assess the appropriateness, clarity, feasibility, and organizational usefulness of the proposed model. The expert review indicated that the model was appropriate to the company's training-needs context, clearly structured, realistic to

implement, and useful as a guide for systematic competency mapping and training-program formulation. Expert validation as a model-development step is consistent with the role of expert judgement described by Adillah et al. (2022).

The expert also emphasized two implementation conditions. First, OA should be applied before other stages because organizational direction determines the competencies that should be developed. Second, the main challenge is building a consistent competency-management system. The company therefore needs formal job competency standards, periodic competency evaluation, and a documentation culture. This recommendation is aligned with strategic HR-planning arguments by Nugraha et al. (2024) and Maulana et al. (2025).

Comparison with Recent TNA Studies

The findings are consistent with a broad body of recent TNA research. Ganji and Rao (2024) show that training-development analysis remains important in knowledge-intensive organizations, while Robert and Mori (2024) find that needs assessment enhances skills and firm performance. Odhiambo et al. (2025) report a relationship between training-needs assessment and employee performance in customer-service work. Across public-sector contexts, Hamdi (2025) and Nor (2025) similarly show that systematic needs analysis supports competency development and training effectiveness.

The present study differs by developing a company-specific model rather than only identifying needs or testing TNA outcomes. Pradita et al. (2025) synthesize the importance of TNA for effective HR development, while Flanagan et al. (2023) demonstrate the usefulness of discrepancy-based competency assessment. By integrating those principles with OA, TA, PA, and an explicit Competency Gap Analysis, the model provides a practical bridge from organizational direction to job-specific training priorities.

5. CONCLUSION

The study concludes that PT Bpfilters Industri Mandiri has a clear organizational direction and functional division of work, but competency and training management are not yet fully formalized. Organizational Analysis identifies the need for a documented competency and training system; Task Analysis identifies required job competencies and incomplete work standards; Person Analysis shows that actual competence is largely experience-based and not yet systematically mapped; and Competency Gap Analysis identifies position-specific gaps. The developed TNA model integrates OA, TA, PA, and Competency Gap Analysis into an operational mechanism for identifying development needs and formulating training recommendations. Expert judgement confirms that the model is suitable, understandable,

realistic, and useful for the company. Implementation should be gradual, beginning with job competency standards, a competency matrix, periodic competency assessment, documented SOPs/work instructions, and continuous updating of training priorities. Future research should test the model after implementation and evaluate its effect on competency improvement, training accuracy, and organizational performance.

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