

Improving Effectivity of Certified Work Training Programs: A Case Study of Dinas Tenaga Kerja Kota Bandung

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ABSTRACT

The Certified Work Training Program (CWTP) by Dinas Tenaga Kerja Kota Bandung aims to address unemployment challenges in Bandung. Key gaps include limited post-training support and poor alignment with labor market needs. The study evaluates CWTP using the Kirkpatrick Model, SWOT analysis, TOWS matrix, and Analytical Hierarchy Process (AHP), benchmarking it against global programs like Singapore's SkillsFuture. Findings show moderate success in skill improvement but limited employability outcomes. Recommendations include mentoring, employer partnerships, and robust evaluation systems to enhance workforce sustainability and ensure alignment with market demands, contributing to long-term employment solutions tailored to Bandung's unique economic context.

ABSTRAK

Program Pelatihan Kerja Bersertifikat (CWTP) oleh Dinas Tenaga Kerja Kota Bandung bertujuan mengatasi tantangan pengangguran di Bandung. Kesenjangan utama mencakup minimnya dukungan pasca-pelatihan dan kurangnya kesesuaian dengan kebutuhan pasar kerja. Studi ini mengevaluasi CWTP menggunakan Model Kirkpatrick, analisis SWOT, matriks TOWS, dan Proses Hierarki Analitik (AHP), serta membandingkannya dengan program global seperti SkillsFuture Singapura. Hasil menunjukkan keberhasilan moderat dalam peningkatan keterampilan namun hasil keberkerjaan yang terbatas. Rekomendasi meliputi mentoring, kemitraan dengan pengusaha, dan sistem evaluasi yang kokoh untuk meningkatkan keberlanjutan tenaga kerja dan memastikan keselarasan dengan kebutuhan pasar.

INTRODUCTION

As Southeast Asia's largest economy and the world's fourth most populous nation, Indonesia has demonstrated robust economic growth in recent years. This expansion has been fueled by solid domestic demand, stable fiscal policies, and significant infrastructure investments such as developing highways, ports, airports, and railways (Siahay et al., 2023). These projects aim to enhance inter-regional connectivity, reduce logistic costs, and strengthen the country's competitiveness in the global market.

Table 1. Indonesia's Real GDP Growth (2019-2024)

Year	Real GDP Growth
2019	5.0
2020	-2.1
2021	3.7
2022	5.3
2023	5.0 (est.)
2024	5.1 (proj.)

Source: International Monetary Fund (IMF), World Economic Outlook (WEO) Database, October 2023

While Indonesia's economy has shown resilience and renewed momentum, these gains have yet to translate into significant job creation. Despite consistent national economic growth,

the expansion has struggled to absorb the rapidly growing labor force efficiently. According to the International Monetary Fund (IMF), Indonesia's unemployment rate will reach 5.2% in 2024. This highlights structural challenges within the labor market, including the limited capacity of the formal sector to generate sustainable employment opportunities. The imbalance between economic growth and job creation underscores the need for targeted strategies to align workforce skills with market demands.

Globally, sustainability has become a critical component of workforce development. The United Nations' Sustainable Development Goals (SDGs), particularly SDG 8 (Decent Work and Economic Growth), emphasize the importance of fostering sustained, inclusive economic growth and creating productive employment opportunities. Workforce programs that incorporate sustainability principles address immediate labor market needs and enhance long-term adaptability to evolving economic and technological trends. By integrating sustainability into workforce development strategies, countries can promote financial stability, prepare workers for future challenges, and ensure more inclusive participation in the global labor market (United Nations, 2015).

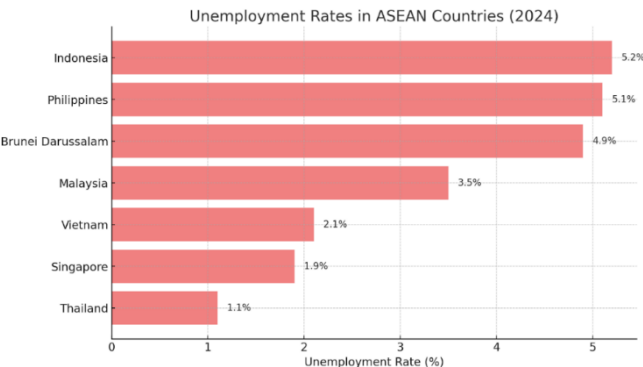


Figure 1. Unemployment Rate in Asean Countries

Figure 1 shows Indonesia as having the highest unemployment rate in Southeast Asia. This concerning trend persists despite stable economic growth, as domestic investment and the labor force have not effectively contributed to reducing unemployment levels (Ikhsan, 2005). The structural challenges within the labor market and insufficient absorption of the growing workforce continue to hinder meaningful job creation (Malik, 2018). Another significant factor contributing to Indonesia's high unemployment rate is the uneven economic growth across regions. While some areas experience rapid development, others face economic stagnation, exacerbating regional disparities (Rapanna & Sukarno, 2017). This imbalance limits job opportunities in underdeveloped regions, pushing a growing number of workers toward urban centers that struggle with limited formal employment opportunities. Consequently, cities face increased reliance on informal labor markets, which offer limited career advancement and job security.

As illustrated in Figure 1.1, Indonesia's high unemployment rate underscores significant regional disparities and challenges in aligning the labor market with workforce demands. This issue is particularly pronounced in urban centers like Bandung, where overreliance on the informal labor sector and limited formal job opportunities exacerbate unemployment concerns. Despite Bandung's strong economic and educational foundations, its labor market struggles to

absorb the rapidly growing workforce, contributing to persistent unemployment. Addressing these challenges requires targeted interventions to improve workforce development. One such initiative is the Certified Work Training Program (CWTP), designed to equip job seekers with industry-relevant skills and certifications to enhance their employability. However, Bandung’s unemployment rate – currently the highest among major Indonesian cities – highlights critical program effectiveness gaps. These gaps include a lack of post-training support, insufficient collaboration with local industries, and limited mechanisms to evaluate long-term employment outcomes.

Bandung continues to face a persistent challenge of high unemployment, with rates reaching 8.52% in August 2022, significantly surpassing the national average. This issue persists despite the city’s strong economic base and reputable educational institutions, highlighting deeper structural problems within the labor market. A primary factor is the persistent skills mismatch, where the workforce’s abilities fail to align with the demands of growing industries. Additionally, Bandung remains heavily reliant on the informal labor sector, which, while providing short-term employment, offers limited opportunities for career progression, job stability, and income growth. The Dinas Tenaga Kerja Kota Bandung introduced the Certified Work Training Program (CWTP) in response to these challenges. This program addresses workforce shortcomings by equipping job seekers with industry-relevant skills and certifications. Participants receive training tailored to high-demand sectors and earn recognized certifications to enhance their employability. However, while CWTP represents a promising step, persistent unemployment suggests ongoing gaps in its implementation. Ensuring the program’s success requires addressing skill gaps more effectively, fostering stronger partnerships with local industries, and providing post-training support mechanisms like job placement services.

Table 1 starkly highlights the unemployment crisis in Bandung. It compares unemployment rates across major cities in Indonesia. Bandung’s rate is the highest, emphasizing the urgent need for effective workforce development initiatives.

Table 2. Unemployment Rates in Major Indonesian Cities (August 2022)

City	Unemployment Rate%
Bandung	8.52
Surabaya	6.34
Medan	5.89
Jakarta	5.67

Source: Statistics Indonesia, 2022

In addition, 40% of unemployed individuals in Bandung cite a lack of relevant skills as the primary barrier to employment. These figures point to systemic issues in aligning workforce capabilities with market demands, particularly in rapidly growing sectors such as digital marketing, creative industries, and services. The CWTP was designed to bridge the gap between workforce skills and market needs by offering certified training in high-demand fields. Participants gain recognized certifications from the National Professional Certification Board (BNSP). However, the program faces critical challenges:

Post-Training Support Deficiency: The program lacks structured job placement or career counseling mechanisms.

Weak Industry Collaboration: Minimal partnerships with local businesses reduce the program's relevance to specific job market demands.

Limited Impact Assessment: There is no robust system to evaluate the long-term employability outcomes of participants.

This research evaluates the CWTP's effectiveness and proposes strategic improvements.

The research employs a combination of the Kirkpatrick & Kirkpatrick (2006) Model, SWOT analysis, TOWS matrix, and Analytical Hierarchy Process (AHP) to assess and enhance the program. Benchmarking against international best practices, such as Singapore's SkillsFuture and Germany's Dual System, provides insights into building a more sustainable model. The research addresses gaps in workforce development by introducing post-training mechanisms such as mentoring, stronger employer partnerships, and comprehensive evaluation systems. Studies such as Pulakos et al. (2006) emphasize the importance of adaptive workforce strategies. Viterouli et al. (2024) highlight the need for continuous collaboration with industries to align training programs with dynamic market needs. By proposing actionable strategies, this research aims to enhance the CWTP's effectiveness and scalability, providing a framework that can be replicated in other regions facing similar workforce challenges.

Research on unemployment and skills mismatches in the labor market has emerged as a significant focus in economic and workforce development literature. Shan & Wang (2024) highlight the necessity for sustained collaboration between training institutions and industries to align training programs with the dynamic demands of the labor market. Similarly, Handayani (2024) emphasizes the importance of adaptive and sustainability-based workforce strategies to address global economic challenges. These studies identify certification-based workforce training programs as critical solutions for bridging the skills gap, particularly in emerging sectors such as digital technology and creative industries. In the context of Indonesia, several studies have examined regional economic disparities and their impact on unemployment. Komariyah et al. (2019) found that low domestic investment and an ineffective labor structure contribute significantly to Indonesia's high unemployment rate. Meanwhile, Bhagaskara (2023) underscores that uneven economic growth across regions exacerbates disparities in job opportunities. At the urban level, particularly in cities like Bandung, heavy reliance on the informal labor sector is a primary factor limiting access to formal employment and professional career advancement. These findings highlight systemic challenges that require targeted workforce interventions to align labor market demands with regional economic development strategies.

While various studies have identified the factors contributing to unemployment in Indonesia, such as regional economic disparities and low domestic investment, empirical research evaluating the effectiveness of workforce training programs remains limited. Most prior studies focus primarily on describing skills mismatches without offering a comprehensive evaluation framework to measure the impact of training programs on reducing unemployment. Furthermore, recent studies need to give more attention to the need for industry collaboration, post-training support, and long-term evaluation mechanisms essential for ensuring such programs' success. Theoretical gaps also persist, particularly in the absence of a comprehensive approach combining qualitative and quantitative analyses to evaluate training program effectiveness. Benchmarking against international best practices, such as Singapore's SkillsFuture and Germany's Dual System, is rarely implemented in Indonesia. This shortfall

presents an opportunity to enrich existing research with more systematic and adaptive methodologies, providing a more substantial basis for developing effective and sustainable workforce training strategies tailored to Indonesia's unique labor market challenges.

The novelty of this research lies in its systematic and integrative approach to evaluating and improving the Certified Work Training Program (CWTP) in Bandung. Unlike previous studies focusing solely on describing unemployment and skills mismatches, this research applies a comprehensive framework combining the Kirkpatrick Model, SWOT analysis, TOWS Matrix, and Analytical Hierarchy Process (AHP) to evaluate CWTP's effectiveness and propose targeted strategies for its enhancement. Furthermore, benchmarking against global best practices—SkillsFuture in Singapore and Germany's Dual System—provides innovative insights into after-training support, industry integration, and long-term impact assessment, areas often neglected in Indonesia's workforce training programs. This multidimensional approach ensures a deeper understanding of internal program dynamics and external labor market demands. The primary objective of this research is to evaluate the effectiveness of CWTP in equipping participants with industry-relevant skills and improving employability outcomes. It also aims to identify and address gaps, such as weak post-training support, minimal industry collaboration, and limited impact assessment mechanisms. This study seeks to enhance CWTP's alignment with workforce needs by proposing evidence-based strategies, ensuring greater program sustainability and contributing to SDG 8 (Decent Work and Economic Growth).

RESEARCH METHODS

The conceptual framework provides a comprehensive approach to evaluating and improving the Certified Work Training Program (CWTP) at Dinas Tenaga Kerja Kota Bandung. By integrating both qualitative and quantitative methodologies, this framework enables a structured analysis of the program's strengths, weaknesses, and opportunities for development. It aligns with the research objectives of identifying effective strategies for enhancing the program's long-term impact and sustainability, ensuring alignment with market needs and global standards for workforce training.

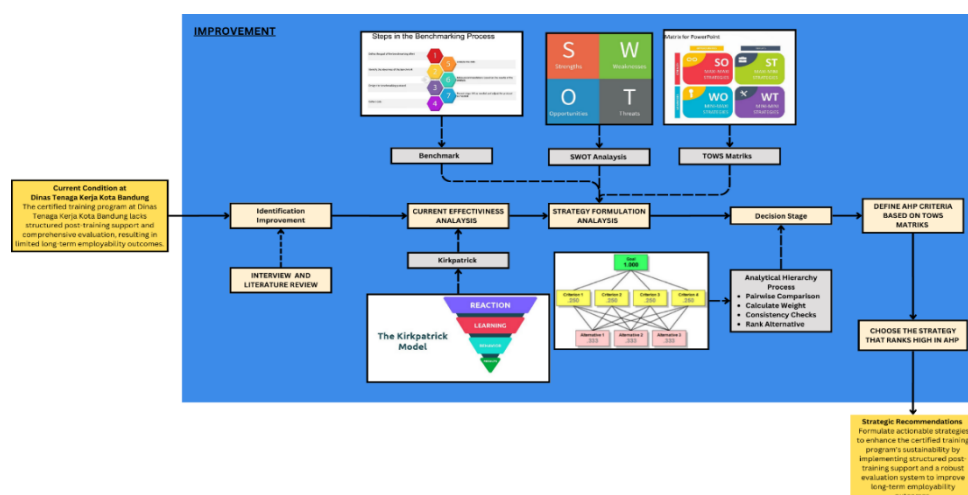


Figure 2. Conceptual Farmework

As illustrated in the conceptual framework, the evaluation process employs a combination of the Kirkpatrick Model, SWOT analysis, TOWS Matrix, and Analytical Hierarchy Process (AHP) to assess and prioritize strategies for program improvement systematically. Each method serves a distinct purpose, from evaluating the program's effectiveness in achieving learning and employability outcomes to formulating actionable strategies based on internal and external factors. This structured approach addresses the immediate training needs and ensures the program's sustainability and alignment with strategic development goals, including the United Nations Sustainable Development Goals (SDGs), particularly SDG 8, on decent work and economic growth. The methodologies are detailed as follows:

1. **Kirkpatrick Model:** This four-stage evaluation model evaluates training programs by examining participant responses, learning, behavior, and outcomes (Kirkpatrick & Kirkpatrick, 2006). Not only immediate feedback but also long-term application of acquired skills is measured. For CWTP, this model helps determine the overall impact on participant satisfaction, learning outcomes, behavioral change, and employability.
2. **SWOT Analysis:** This method identifies a program's internal strengths and weaknesses as well as external opportunities and risks (Vlados, 2021). For CWTP, a SWOT analysis provides a comprehensive understanding of the current position and highlights areas that require intervention or optimization.
3. **TOWS-Matrix:** This strategy tool builds on the SWOT analysis by developing strategies that can be implemented to capitalize on strengths and opportunities and address weaknesses and threats at the same time. This matrix helps develop targeted recommendations for CWTP improvement.
4. **Analytical Hierarchy Method (AHP):** AHP is used to prioritize strategies by assigning weights to several criteria (Nguyen & Truong, 2022). This method ranks factors such as cost, feasibility, and impact based on their importance so that the most effective strategies can be implemented first.
5. **Benchmarking:** CWTP is benchmarked against global best practices such as SkillsFuture in Singapore and Dual System in Germany. These programs are recognized for their comprehensive after-training support and strong industry integration, and serve as models for improving the structure and outcomes of CWTP (SkillsFuture Singapore, 2022).

Primary data were collected through structured interviews with program stakeholders and participant surveys, while secondary data included program reports and labor market statistics. Quantitative data analysis was conducted using descriptive statistics, and qualitative insights were processed through thematic coding.

RESULTS AND DISCUSSION

The findings are systematically organized to address the research objectives, starting with assessing the program's outcomes using the Kirkpatrick Model, followed by insights derived from the SWOT and TOWS analyses, and concluding with prioritizing strategies through the Analytical Hierarchy Process (AHP). By integrating these methods, this chapter aims to offer a holistic understanding of the program's current strengths and weaknesses while presenting actionable recommendations for its improvement and alignment with long-term sustainability goals, including the United Nations' Sustainable Development Goals (SDGs), particularly SDG 8 on decent work and economic growth. The CWTP's effectiveness was assessed across the four levels of the Kirkpatrick Model. Table 1 summarizes the results:

Table 3. Unemployment Rates in Major Indonesian Cities (August 2022)

Kirkpatrick	Metric%	Result
Level 1 (Reaction)	71,1	Moderately Effective
Level 2 (Learning)	60,1	Moderately Effective
Level 3 (Behaviour)	49,98	Less Effective
Level 4 (Result)	40,07	Less Effective

Tabel 3 presents an evaluation of the Certified Work Training Program (CWTP) based on the Kirkpatrick Model, assessing its effectiveness across four levels. At Level 1 (Reaction), the program scored 71.1%, categorized as "Moderately Effective." This indicates that participants were generally satisfied with the training delivery, content, and overall experience, suggesting the program successfully engaged its audience. However, as emphasized by Kirkpatrick and Kirkpatrick (2006), while satisfaction is crucial for fostering motivation, it does not ensure the transfer or application of knowledge.

At Level 2 (Learning), the program scored 60.1%, also categorized as "Moderately Effective." This demonstrates that participants acquired moderate knowledge and skills through the training. Despite this, the relatively low score points to more interactive and practical training approaches, such as real-world simulations, which are proven to improve knowledge retention and understanding (Sitzmann & Weinhardt, 2018). However, effectiveness declined significantly at Level 3 (Behavior), where the program scored 49.98%, and at Level 4 (Results), with a score of 40.07%, both categorized as "Less Effective." These results suggest that participants faced challenges in applying their skills in workplace scenarios and that the training had a limited impact on employability outcomes. This gap underscores the importance of incorporating post-training support, such as mentoring and employer partnerships, to reinforce skill application and align training content with labor market demands. While the CWTP demonstrates some effectiveness in engaging participants and delivering knowledge, addressing these critical gaps is essential for ensuring long-term employability outcomes.

To address these gaps in post-training support and ensure the CWTP aligns with labor market needs, examining proven approaches from other work training programs worldwide is essential. Benchmarking successful models allows for a comparative analysis, highlighting best practices that can be adopted and adapted to improve the CWTP's outcomes. By studying how these programs address challenges such as participant satisfaction, program relevance, and job placement rates, valuable insights can be gained to enhance the program's sustainability and impact.

Table 4 summarizes benchmarking results from four notable work training programs: These programs represent diverse approaches to workforce development, offering practical lessons in improving training satisfaction, aligning with market needs, and achieving higher job placement rates.

Table 4. Benchmarking Result form Other Work Training Program

Aspect	New Orleans Career Pathways Program (RAND, 2019)	SkillsFuture Singapore	City of London Employment Support Program	Germany's Dual System Training
Participant Satisfaction	80-85% satisfied – focus on job placement and post-training support	85% satisfied – mentoring system and ongoing learning opportunities	75-80% satisfied – continuous support from industry partners	85% satisfied – emphasis on practical experience
Program Relevance	Highly relevant – collaboration with local industries and market demands	Highly relevant to global labor market, focuses on 21st-century skills	Relevant, but needs adjustment to local market needs	Highly relevant to the German and European labor market
Job Placement Rate	70-80% – with post-training support and industry partnerships	80-90% – high job placement through partnerships with large companies	70-80% – high placement through connections with large companies	90% – high placement due to the dual system and company partner
Post-Training Support Quality	Long-term support including mentors and partnerships with companies	Extensive support with industry networks, mentors, and follow-up courses	Ongoing support with access to further training programs	Strong post-training support with internships and long-term job placement programs
Sustainability	Sustainable model based on industry and government partnerships	Highly sustainable, supported by government with large funds and private sector collaboration	Sustainable with strong government and industry collaboration	Highly sustainable, supported by industry and government educational policies
Industry Partnerships	Strong partnerships with local and international companies	Extensive partnerships with major companies across various sectors	Strong partnerships with large companies	Strong partnerships with over 200 companies across various industries

The benchmarking table comprehensively analyzes various certified work training programs worldwide, focusing on critical aspects such as participant satisfaction, program relevance, job placement rates, post-training support quality, sustainability, and industry partnerships. The programs, including the New Orleans Career Pathways Program, SkillsFuture Singapore, City of London Employment Support Program, and Germany's Dual System Training, illustrate varying levels of success in aligning training content with market demands, ensuring robust post-training support, and fostering industry partnerships. The Germany Dual System exemplifies a sustainable and highly effective model with strong government and industry collaboration. At the same time, SkillsFuture Singapore demonstrates the benefits of extensive mentoring systems and partnerships with global industries. These findings underscore the importance of integrating these elements into Dinas Tenaga Kerja Kota Bandung's Certified Work Training Program to enhance its effectiveness and sustainability.

The analysis progresses from benchmarking insights to an internal assessment of the Certified Work Training Program's current condition. Through interviews with key

stakeholders such as the Head of Dinas Tenaga Kerja Kota Bandung, the Head of the Certification and Training Division, and affiliated training providers, critical data on the program's internal strengths and weaknesses and its external opportunities and threats were gathered. These interviews provided valuable qualitative inputs, forming the foundation of the SWOT analysis.

Table 5. TOWS Matrix

<p>IFAS</p> <p>EFAS</p>	<p>Strenght (S)</p> <ol style="list-style-type: none"> 1. Focus on creative economy and digital marketing 2. ndependent IT training facilities. 3. BNSP certification enhances participant credibility. 4. NEWBIMA application to simplify participant training registration. 	<p>Weaknesses (W)</p> <ol style="list-style-type: none"> 1. Limited budget restricts training programs 2. Lack of local workforce demand data. 3. Some training providers struggle to adjust to budget constraints 4. o follow-up programs or support after training completion. 5. Lack of tracking system to monitor participant outcomes post-training. 6. No comprehensive program evaluation after training; only focuses on certification results. 7. No sustainable partnerships with industries or institutions. 	
<p>Opportunities (O)</p> <ol style="list-style-type: none"> 1. Demographic bonus provides opportunities for young workforce training. 2. High potential in creative and digital economy. 3. Collaboration with LSP and government expands access 4. Partnerships with industries and institutions enhance training relevance to market demands 	<p>SO Strategy</p> <ol style="list-style-type: none"> 1. Leverage Certification Credibility to Build Industry Partnerships (S3 + O4) 2. Expand Creative Economy and IT Training for Emerging Opportunities (S1 + O2) 3. Developing Collaborative Training with Local Startups (S4 + O2) 	<p>WO Strategy</p> <ol style="list-style-type: none"> 1. Develop Comprehensive Post-Training Support to Ensure Long-Term Employability (W5 + O3) 2. Collaborate with Industries to Provide Free On-the-Job Training (W7 + O2) 3. Enhance Evaluation Mechanisms to Improve Training Relevance (W6 + O4) 	
<p>Threats (T)</p>	<p>ST Strategy</p> <ol style="list-style-type: none"> 1. Simplify Training Registration to 	<p>WT Strategy</p> <ol style="list-style-type: none"> 1. Introduce Modular Training Programs to 	

1. Unstable economic conditions hinder investment. 2. Declining funding limits programs 3. Rising operational costs impact program sustainability.	Support Vulnerable Participants in Economic Downturns (S4 + T1) 2. Implement Cost-Effective Digital Solutions to Counter Operational Costs (S2 + T3)	Mitigate Budget Constraints (W3 + T2) 2. Create Alumni Networks for Long-Term Sustainability (W5 + T3)	
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The TOWS matrix in Table 3 translates the SWOT analysis into actionable strategies to enhance the Certified Work Training Program (CWTP) at Dinas Tenaga Kerja Kota Bandung. Combining internal strengths and weaknesses with external opportunities and threats, the matrix identifies four strategic approaches: SO strategies leverage certification credibility (S3) to build industry partnerships and expand training opportunities in the creative and IT sectors (O2). WO strategies address gaps such as the lack of post-training support (W5) by collaborating with industries to provide on-the-job training and developing comprehensive evaluation mechanisms? ST strategies focus on simplifying processes (S4) to counter external challenges, such as economic downturns (T1) and operational cost increases (T3), ensuring program sustainability. Meanwhile, WT strategies aim to introduce modular training programs to mitigate funding constraints (W3) and establish alum networks to foster long-term sustainability (T3).

These strategies form the foundation for the Analytical Hierarchy Process (AHP), which is used to prioritize and rank them systematically. AHP incorporates criteria and sub-criteria from the TOWS matrix – SO, WO, ST, and WT strategies – allowing for a quantitative evaluation of each option. This process ensures that the selected strategies align with program objectives, particularly addressing gaps in employability outcomes and operational efficiency. By combining the insights of TOWS with the structured decision-making of AHP, the CWTP can focus on strategies that deliver the most significant and sustainable impact, aligning with long-term development goals.

AHP

1. Criteria

Cat		Priority	Rank	(+)	(-)
1	SO Strategies (Strengths + Opportunities)	59.1%	1	17.0%	17.0%
2	WO Strategies (Weaknesses + Opportunities)	23.4%	2	3.4%	3.4%
3	ST Strategies (Strengths + Threats)	12.8%	3	3.6%	3.6%
4	WT Strategies (Weaknesses + Threats)	4.6%	4	1.8%	1.8%

Number of comparisons = 6
Consistency Ratio CR = 4.5%

Figure 3. Parwise Comparison Result for Criteria

The Analytical Hierarchy Process (AHP) results in Figure 4 illustrate the prioritization of strategies for the Certified Work Training Program (CWTP), derived from the TOWS matrix. SO (Strengths-Opportunities) strategies hold the highest priority with a weight of 59.1%, reflecting their critical role in leveraging internal strengths, such as certification credibility and creative economy focus, to capitalize on external opportunities like partnerships with industries and the growing demand for IT training. This prioritization highlights the importance of aligning internal capacities with market opportunities to maximize the program's effectiveness and relevance. Following this, WO (Weaknesses-Opportunities) strategies, weighted at 23.4%, underscore the necessity of addressing key gaps, such as limited post-training support, by utilizing external collaborations, such as on-the-job training initiatives with industry partners. ST (Strengths-Threats) strategies, with a weight of 12.8%, focus on mitigating external threats, including economic instability, by streamlining processes and enhancing cost efficiency. Meanwhile, WT (Weaknesses-Threats) strategies, at 4.6%, have the lowest priority due to their limited potential impact. The consistency ratio of 4.5% confirms the reliability of the prioritization, ensuring that the strategy selection aligns with program objectives and effectively addresses stakeholder concerns.

2. Sub-criteria

Cat	Priority	Rank	(+)	(-)	Cat	Priority	Rank	(+)	(-)
1 SO 1	64.9%	1	16.4%	16.4%	1 WO 1	70.8%	1	18.7%	18.7%
2 SO 2	7.2%	3	1.8%	1.8%	2 WO 2	23.1%	2	6.1%	6.1%
3 SO 3	27.9%	2	7.0%	7.0%	3 WO 3	6.0%	3	1.6%	1.6%
Number of comparisons = 3 Consistency Ratio CR = 6.8%					Number of comparisons = 3 Consistency Ratio CR = 7.4%				
Cat	Priority	Rank	(+)	(-)	Cat	Priority	Rank	(+)	(-)
1 ST 1	87.5%	1	0.0%	0.0%	1 WT 1	12.5%	2	0.0%	0.0%
2 ST 2	12.5%	2	0.0%	0.0%	2 WT 2	87.5%	1	0.0%	0.0%
Number of comparisons = 1 Consistency Ratio CR = 0.0%					Number of comparisons = 1 Consistency Ratio CR = 0.0%				

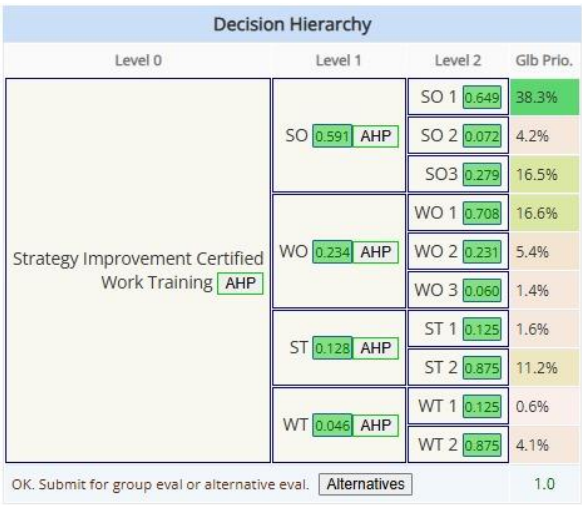
Figure 4. Parwise Comparison Result for Sub-criteria

The results for the sub-criteria reveal the most substantial priorities within each group. For the SO category, SO1, which emphasizes leveraging certification credibility, ranks highest with a priority weight of 64.9%, followed by SO2 (7.2%) and SO3 (27.9%). This underscores the critical role of certification in building partnerships and enhancing program relevance. Within the WO category, WO1 leads with 70.8%, reflecting the importance of post-training support, while WO2 (6.0%) and WO3 (23.2%) follow. The ST sub-criteria highlight ST1 as the most significant, with an overwhelming priority weight of 87.5%, emphasizing the simplification of registration processes during economic downturns. Lastly, the WT sub-criteria focus similarly on WT2 (87.5%) for developing alum networks to ensure sustainability, with WT1 (12.5%) playing a supplementary role. The consistency ratios, all below the threshold of 10%, validate the reliability of these sub-criteria rankings, ensuring their alignment with the overarching

objectives of the CWTP. By concentrating on these sub-criteria, the program can strategically allocate resources and tailor its initiatives to maximize impact and sustainability.

Global Ranking

After a detailed analysis of the criteria and sub-criteria using the Analytical Hierarchy Process (AHP), the decision hierarchy model was finalized to determine the most effective strategies for improving the Certified Work Training Program (CWTP). The results, visualized in the decision hierarchy chart, provide a clear understanding of the relative importance of each criterion and sub-criterion, ensuring alignment with the strategic goals and addressing key areas of improvement. The application of AHP in prioritizing strategies aligns with the findings of Saaty (1990), which emphasize its reliability in multi-criteria decision-making. Furthermore, it mirrors its successful use in workforce training optimization studies (Jain et al., 2021; Bhattacharya et al., 2020).



The decision hierarchy model prioritizes strategies for enhancing the Certified Work Training Program (CWTP) based on Analytical Hierarchy Process (AHP) results. SO, strategies rank highest, with a global priority of 38.3%, driven by SO1, which emphasizes leveraging certification credibility to build industry partnerships. This aligns with successful practices like Singapore's SkillsFuture program, emphasizing industry collaboration and market alignment. WO strategies, ranked second at 16.6%, prioritize comprehensive post-training support, echoing the effectiveness demonstrated in the New Orleans Career Pathways Program. ST and WT strategies, though lower in priority, address critical needs for simplification and long-term sustainability through measures such as streamlined processes and alumni networks, supported by research on modular training and workforce adaptability. The AHP analysis confirms consistency with a 6.2% ratio, ensuring reliable decision-making aligned with global benchmarks and SDG 8.

Building on the insights from the decision hierarchy, the next step involves identifying the top three strategies that align most closely with the highest-priority criteria and sub-criteria. These strategies represent actionable initiatives tailored to address the program's key challenges and opportunities, ensuring immediate improvements and long-term sustainability. The selection of these strategies is informed by the AHP results and their alignment with global

benchmarks and SDGs, ensuring their relevance and impact (UN SDG 8, 2023).

Tabel 6. Detailed Explanation of the Top 3 Prioritized Strategies for CWTP Improvement

Strategy	Explanation
Leverage Certification Credibility to Build Industry Partnerships (S3 + O4)	Building on the credibility of BNSP certifications, this strategy aims to establish strong collaborations with industries to align training outcomes with labor market demands. Benchmark: Germany's Dual System demonstrates how recognized certifications foster trust and partnerships with industries, facilitating job placements and enhancing program relevance. Alignment with SDGs: This strategy contributes to SDG 8 (Decent Work and Economic Growth) by promoting industry-relevant skills and fostering inclusive economic opportunities.
Develop Comprehensive Post-Training Support to Ensure Long-Term Employability (W5 + O3)	To improve employability outcomes, this strategy emphasizes creating structured post-training support systems, such as mentorship, career counseling, and job placement services. Benchmark: Singapore's Workforce Development Agency (WDA) has successfully integrated post-training support into its programs, significantly improving participant employment rates. Alignment with SDGs: The approach aligns with SDG 4 (Quality Education) by supporting lifelong learning and SDG 8 through sustained employability.
Developing Collaborative Training with Local Startups (S4 + O2)	Encouraging partnerships with local startups, this strategy leverages the agility and innovation of startup ecosystems to provide practical, market-driven training opportunities. Benchmark: The New Orleans Career Pathways Program showcases how collaborations with local businesses enhance training relevance and create immediate employment opportunities. Alignment with SDGs: This strategy supports SDG 9 (Industry, Innovation, and Infrastructure) and SDG 8, fostering innovation-driven growth and decent work.

Table 6 explains the top three prioritized strategies for improving the Certified Work Training Program (CWTP) at Dinas Tenaga Kerja Kota Bandung. Each strategy is carefully aligned with the research findings and supported by relevant benchmarks and sustainable development goals (SDGs).

The first strategy, leveraging certification credibility to build industry partnerships, focuses on enhancing the program's collaboration with industries to align training outcomes with labor market needs. This approach takes inspiration from Germany's Dual Education System, which highlights the importance of industry partnerships in bridging the gap between training and employment. By integrating SDG 8 (Decent Work and Economic Growth), this strategy promotes employability and fosters inclusive opportunities for a broader workforce.

The second strategy emphasizes the development of comprehensive post-training support systems, such as mentoring, job placement services, and career counseling, to ensure sustainable employability. Benchmarked against Singapore's Workforce Development Agency (WDA), this strategy incorporates advanced post-training frameworks to address the gap in job placement support. Its alignment with SDG 4 (Quality Education) ensures lifelong learning and skill development, directly supporting SDG 8 through enhanced workforce readiness.

The third strategy involves developing collaborative training programs with local startups. This strategy aims to capitalize on Bandung's creative economy and digital market potential by fostering partnerships with startups to provide innovative, market-driven training opportunities. The New Orleans Career Pathways Program serves as a benchmark, illustrating

the impact of local business collaborations on training relevance. This strategy aligns with SDG 9 (Industry, Innovation, and Infrastructure) and SDG 8 by encouraging innovation-led economic growth while providing decent employment opportunities.

These strategies collectively address the CWTP's core challenges, including alignment with market needs, long-term employability, and sustainability, while contributing to broader global objectives.

CONCLUSION

As summarized in the table, the evaluation of CWTP's effectiveness highlights its strengths in delivering technical training. At Level 1 (Reaction), 71.1% of participants expressed satisfaction with the training content and delivery quality, demonstrating the program's ability to engage participants effectively. Similarly, at Level 2 (Learning), 60.1% of participants reported gaining relevant skills, indicating moderate success in knowledge acquisition. However, these results reveal a need for curriculum updates to align training content more closely with high-demand industries.

Significant gaps were observed at Levels 3 (Behavior) and 4 (Results), with effectiveness ratings of 49.98% and 40.07%, respectively. These scores indicate challenges in translating acquired skills into workplace application and achieving employability outcomes, as only a few participants secured employment or advanced their careers post-training. Addressing these gaps through structured post-training mechanisms, such as mentorship and more substantial market alignment, is critical to enhancing the program's long-term impact on workforce development.

Three strategic recommendations have been proposed to enhance outcomes and long-term sustainability to address the challenges identified in the evaluation of CWTP's effectiveness. The first strategy leverages the credibility of BNSP certification to establish robust partnerships with industries, ensuring alignment between training programs and labor market demands. This approach draws inspiration from Germany's Dual System, which has successfully facilitated job placements and strengthened collaborations between employers and training institutions. This strategy supports SDG 8 (Decent Work and Economic Growth) by promoting inclusive economic opportunities and fostering a more sustainable workforce pipeline by bridging the gap between training providers and industries.

The second strategy focuses on developing comprehensive post-training support systems, including mentorship, career counseling, and job placement services, to improve employability outcomes. Inspired by Singapore's Workforce Development Agency, this strategy ensures that participants transition into stable employment while continuing to develop their skills. It aligns with SDG 4 (Quality Education) by supporting lifelong learning and SDG 8 by enhancing employability and reducing underemployment. Lastly, a recommendation has been made to develop collaborative training programs with the local aim of capitalizing on Bandung's creative economy and emerging industries. By fostering partnerships with innovative businesses, this strategy ensures training relevance to evolving market needs while encouraging entrepreneurship, aligning with SDG 9 (Industry, Innovation, and Infrastructure) and SDG 8. These strategic initiatives provide a targeted approach to addressing CWTP's challenges, ensuring its alignment with global sustainability objectives.

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