

Boosting Student Work Readiness: A Meta-Analysis of Soft Skills and Teaching Factory

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ABSTRACT

This study aims to systematically synthesize and evaluate empirical evidence concerning how soft skills and teaching factory (TEFA) programs jointly influence students' work readiness across diverse educational settings. Employing a comprehensive meta-analysis design, this research integrates quantitative results from prior empirical studies to produce a more robust and generalizable estimation of the combined effect. The data used in this study were derived from 31 independent studies published between 2020 and 2025. The dataset consists of 23 studies focusing on soft skills and 8 studies on teaching factory programs. All data were analyzed using JASP version 0.19.3, employing both classic meta-analysis and random-effects models to account for heterogeneity across samples. The findings reveal a significant positive correlation between soft skills ($r = 0.519$) and teaching factory ($r = 0.693$) with work readiness ($p < 0.01$). The results confirm that both factors strongly enhance employability and readiness to work in industrial contexts. Statistical confidence intervals and forest plots generated in JASP strengthen the empirical robustness of these conclusions. This meta-analysis makes a novel contribution by being the first to quantitatively evaluate the combined impact of soft skills and teaching factory programs on graduates' employability in Indonesia. The evidence highlights the strategic importance of embedding these two elements into vocational and higher education curricula to strengthen graduates' employability profiles and ensure their alignment with industry expectations.

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INTRODUCTION

Work readiness represents a pivotal dimension in the discourse of education and employability within the Industrial Revolution 4.0 era. The evolving demands of the global labor market require graduates not only to possess technical expertise but also to demonstrate strong interpersonal and adaptive capabilities, collectively known as *soft skills*. These competencies, communication, teamwork, problem solving, self-management, and adaptability, have become indispensable attributes for individuals seeking to integrate effectively into the professional world (Aprilita & Pritasari, 2024; Rahmadani & Mardalis, 2022). The development of soft skills, therefore, constitutes a central pillar of employability enhancement and global workforce competitiveness.

While extensive research underscores the significance of soft skills in shaping graduates' employability, empirical findings remain fragmented, often differing across educational levels, sectors, and cultural contexts. This inconsistency highlights the need for a meta-analytic synthesis that can integrate prior results and provide a comprehensive understanding of how soft skills impact work readiness across diverse learning environments. In parallel, the *Teaching Factory* (TEFA) learning model has emerged as an innovative educational approach that bridges the gap between school and

industry. TEFA immerses students in authentic production processes—spanning from design and planning to manufacturing and quality assurance—thereby cultivating both technical and non-technical competencies (Efendi et al., 2024; Imran et al., 2024). Through this model, students acquire firsthand industrial experience, enabling them to internalize operational standards, discipline, teamwork, and professional responsibility.

Prior research has demonstrated that TEFA-based instruction not only enhances hard skills but also fosters a range of essential soft skills, including communication, collaboration, problem-solving, and adaptability—key determinants of work readiness in the digitalized industrial landscape (Aprilita & Pritasari, 2024). This dual function underscores TEFA's strategic relevance as a pedagogical innovation for preparing graduates to meet the complex demands of Industry 4.0. Nonetheless, a persistent mismatch remains between educational outcomes and labor market expectations. Graduates often lack the readiness and flexibility demanded by employers, signaling a disjunction between institutional training and workplace realities (Efendi et al., 2024; Imran et al., 2024; Tanjung et al., 2025). Although various studies have independently examined soft skills and TEFA, only a few have explored how these two factors interact or complement each other in shaping employability outcomes.

This gap in the literature forms the theoretical and empirical foundation for conducting a meta-analysis. Previous findings have shown inconsistent magnitudes of correlation between soft skills, TEFA, and work readiness, likely due to contextual differences in educational systems, participant characteristics, and measurement instruments (Chaudhary & Singh, 2022). Therefore, a systematic synthesis is essential to derive a more accurate, generalizable effect estimate that informs both policy and pedagogical design. The implementation of teaching factories has yielded positive results in enhancing students' work readiness, independence, and confidence in facing workplace challenges. Previous studies have shown that student involvement in teaching factory programs can significantly improve their technical skills, soft skills, and readiness for the industrial world (Efendi et al., 2024; Imran et al., 2024; Tanjung et al., 2025). Therefore, integrating soft skills and the teaching factory model into the education curriculum can be a solution to address educational needs and industry requirements, while also helping to reduce unemployment among new graduates.

Recent studies have significantly expanded our understanding of how these factors interact with one another. The findings revealed that TEFA implementation had a substantial impact on work readiness levels, accounting for up to 57% of the influence. Meanwhile, when examining the combined impact of teaching quality and work readiness, these elements contributed a remarkable 80.7% to determining how quickly graduates found employment (Imran et al., 2024). Furthermore, the findings showed notable improvements across multiple areas: students developed stronger technical abilities, became more prepared for the workforce, and enhanced their people skills, including problem-solving, working with others, and maintaining discipline. When schools partnered with industry professionals, the coursework became more relevant to real job demands, thereby improving the overall quality of training programs. This collaboration ultimately made graduates much more attractive to potential employers (Tanjung et al., 2025). The partnership between educational institutions and businesses created a win-win situation where students learned skills that actually matched what companies needed, making their transition from classroom to career much smoother and more successful.

Understanding the influence of soft skills and teaching factories on work readiness, this study will conduct a meta-analysis of several empirical studies published in recent years. The meta-analysis method was chosen because it enables the synthesis of diverse research results and provides more accurate and reliable estimates of combined effects for decision-making related to education policy (Chaudhary & Singh, 2022). A systematic meta-analysis could help close this knowledge gap by

evaluating the actual impact of soft skills and teaching factories on work readiness across different teaching environments and methods. Anchored in *Human Capital Theory* and the *Employability Framework*, this study employs meta-analysis to integrate quantitative evidence on the relationship between soft skills, systematic teaching factory implementation, and work readiness. By doing so, it aims to provide a theoretically grounded and empirically validated synthesis that contributes to both educational research and workforce development policy.

Accordingly, the present study aims to offer both theoretical and practical implications. Theoretically, it clarifies the extent to which human capital enhancement through soft skills and experiential learning predicts employability. Practically, it provides policy-oriented insights for embedding TEFA and soft skills training into curricula to strengthen graduates' readiness for the labor market.

METHOD

This study employed a systematic meta-analytic design aimed at integrating quantitative findings from previous empirical investigations examining the relationship between soft skills, teaching factory programs, and students' work readiness. The meta-analytic approach was chosen for its capacity to statistically synthesize multiple primary studies statistically, thereby generating a more precise and generalizable estimate of the actual effect size relevant to educational and policy contexts (Mohajan, 2020). The literature search followed the PRISMA 2020 protocol to ensure transparency and reproducibility. Initially, 174 research articles were identified through four primary databases: Google Scholar, ScienceDirect, ResearchGate, and Taylor & Francis. After screening titles and abstracts, 91 articles were excluded because they did not meet the inclusion criteria (e.g., lacking empirical data or correlation coefficients). A further 52 were removed due to duplication or methodological inconsistency, leaving 31 eligible studies for quantitative synthesis. The process is illustrated in the PRISMA-based flow: 1) Identification (174 records retrieved from the databases); Screening (83 studies removed for irrelevance or duplication); 2) Eligibility (60 articles reviewed in full text; 29 excluded for missing effect-size data); 3) Inclusion: 31 studies retained for final meta-analysis. All included studies were published between 2020 and 2025 and met quality appraisal standards based on inclusion and exclusion criteria summarized in Table 1.

Table 1. Criteria for Inclusion and Exclusion of Studies for Selection of Meta-Analysis Studies

Criteria	Inclusion	Exclusion
Database Access	Papers found on Google Scholar, Science Direct, Research Gate, or Taylor & Francis	Studies not available through these major databases
Publication Location	Research from multiple countries worldwide	Studies published only within a single country or local region
Publication Language	English-language publications	Publications in non-English languages
Database Indexing	Articles indexed in Google Scholar, SINTA, or Scopus	Research not indexed in these recognized databases
Publication Timeline	Studies published between 2020 and 2025	Studies outside the 2020–2025 range
Statistical Data	Studies reporting correlation (r) or t-test results	Studies lacking r or t values
Sample size	≥ 20 participants	< 20 participants

Following [Ahn and Kang \(2018\)](#), clear inclusion criteria were established to ensure methodological rigor and consistency across selected studies. Each article was coded based on publication year, country, sample size (n), correlation coefficient (r), t -value, z -score, and standard error (SE). The use of a standardized coding sheet enabled systematic extraction and verification of study characteristics ([Kaufmann & Reips, 2024](#)). Additionally, notes containing information on journal data from international sources are also included. To provide a clearer picture of the distribution of publications, the information is presented in Table 2.

Table 2. Comparison of 31 studies based on n , r , and t values, 2020–2025

Study ID	Country	n	R	t	Z	SE
Mulyono et al. (2023)	Australia	128	0.176	2.054	0.177	0.089
Lusyiana and Wolor (2023)	Indonesia	100	0.214	3.013	0.217	0.101
Alfadri (2023)	Indonesia	74	0.766	15.007	1.01	0.118
Susanti et al. (2024)	Indonesia	377	0.228	4.959	0.232	0.051
Azizah et al. (2021)	Indonesia	72	0.504	4.881	0.554	0.12
Nasrullah et al. (2023)	Indonesia	371	0.33	2.3	0.342	0.052
Manullang et al. (2023)	Indonesia	70	0.554		0.624	0.122
Ukata and Okpokwasili (2024)	India	255	0.88		1.375	0.062
Harjono et al. (2024)	Indonesia	63	0.115	0.906	0.115	0.129
Kholifah et al. (2024)	Indonesia	145	0.504	4.863	0.554	0.083
Winatha et al. (2024)	Indonesia	20	0.024	-4.813	0.024	0.242
Ariyanto et al. (2020)	Indonesia	131	0.211		0.214	0.088
Fransiska and Aida (2021)	Indonesia	95	0.235	2.333	0.239	0.104
Rosidah et al. (2022)	Indonesia	148	0.449	6.087	0.484	0.083
Nihlatin et al. (2021)	Indonesia	372	0.47	2.17	0.51	0.052
Tentama and Riskiyana (2020)	Indonesia	111	0.49		0.536	0.096
Hidayatulloh and Ashoumi (2022)	Cyprus	350	0.526	4.53	0.584	0.053
Maulidina and Wijanarka (2023)	United Kingdom	187	0.35	6.927	0.365	0.073
Abdullah et al. (2025)	India	307	0.476	9.457	0.518	0.057
Ingsih and Suhana (2023)	Spanish	185	0.63		0.741	0.074
Ananda et al. (2023)	Indonesia	100	0.543	6.406	0.608	0.101
Setiarini et al. (2022)	Indonesia	167	0.141	2.35	0.141	0.078
Fenech et al. (2020)	English	302	0.92		1.589	0.057
Ridwan et al. (2025)	Indonesia	51	0.415		0.441	0.144
Amaliah and Irfan (2022)	Indonesia	70	0.817		1.147	0.122
Prianto et al. (2020)	Switzerland	163	0.629	10.29	0.741	0.079
Hidayatulloh et al. (2021)	Indonesia	60	0.365	2.718	0.382	0.132
Yusri and Sulistyowati (2020)	Indonesia	69	0.668	7.34	0.807	0.123
Setyadi et al. (2021)	Indonesia	101	0.739	6.617	0.948	0.101
Imran et al. (2024)	Indonesia	456	0.57		0.647	0.046
Anggitan and Gunadi (2025)	Indonesia	553	0.415	10.698	0.441	0.042

*Information: Soft Skills on Work Readiness (1-23), Teaching Factory on Work Readiness (24-31)

Each study was assigned a unique identifier, known as the Study ID, to facilitate cross-referencing between variables. Data conversion followed the recommended statistical procedures: t -values were converted into correlation coefficients (r), which were then transformed using Fisher's Z for aggregation. The study employed both fixed-effect and random-effects models, with the latter

chosen as the primary estimator to address heterogeneity among studies. Data analysis was performed using JASP version 0.19.3, which supports computation of effect sizes, heterogeneity indices (Q , I^2 , τ^2), and publication bias diagnostics (Egger's test and funnel plots). Effect size interpretation followed the guidelines of Cohen (2013), Glass et al. (1981), and Thompson (2009). The random-effects model was selected, given the expected contextual variability among studies across countries, institutions, and sample groups. Several methodological limitations should be noted. First, this meta-analysis relied on secondary data published between 2020 and 2025, which may limit temporal generalizability. Second, potential reporting bias could not be eliminated despite the application of Egger's test and funnel plot diagnostics. Third, differences in operational definitions of "work readiness" and "soft skills" across studies might introduce measurement heterogeneity. Future research could address these limitations through longitudinal designs and meta-regression analysis to identify moderator effects.

RESULTS AND DISCUSSION

The meta-analysis included 23 eligible studies examining the correlation between soft skills and work readiness. For studies that reported t -values instead of r -values, conversion was performed prior to the heterogeneity test. The results of the residual heterogeneity and pooled effect size are displayed in Tables 3–5.

Table 3. Residual Heterogeneity Test

Q_e	Df	P
671.415	22	< .001

Table 4. Meta-Analytic Estimates

	Estimate	95% CI		95% PI	
		Lower	Upper	Lower	Upper
Effect Size	0.519	0.352	0.686	-0.277	1.314
τ	0.375	0.283	0.536		
τ^2	0.141	0.080	0.288		
I^2	96.061	93.303	98.035		
H^2	25.388	14.931	50.885		

The heterogeneity analysis revealed a Q value of 671.415 ($p < .001$), confirming significant variability across the 23 effect sizes. The high I^2 value (96.06%) and $\tau^2 > 0$ further indicate substantial heterogeneity among the included studies. Such variability likely arises from contextual differences—such as educational level (vocational vs. higher education), national culture, sample size disparities, and measurement instruments of soft skills. Therefore, a random-effects model was employed to ensure robust estimation of the overall effect size.

Table 5. Pooled Effect Size Test

Estimate	Standard Error	z	P
0.519	0.081	6.427	< .001

The overall effect size ($\bar{r} = 0.519$, $z = 6.427$, $p < .001$) demonstrates a strong and significant positive correlation between soft skills and work readiness. This finding implies that students possessing higher levels of soft skills—such as communication, problem-solving, and teamwork—are substantially more prepared to transition into the workforce. According to Cohen's criteria, this relationship is classified as strong, indicating that soft skills are a consistent predictor of employability.

across educational settings. Figure 1 shows the forest plot of 23 analyzed studies, showing effect sizes ranging from 0.00 to 1.59. To assess publication bias, a funnel plot (Figure 2) was generated using Begg's method for 10 studies. While this plot offers a visual check for symmetry in sample distribution, the interpretation remains limited. Therefore, Egger's test was conducted to complement the analysis shown in Table 6.

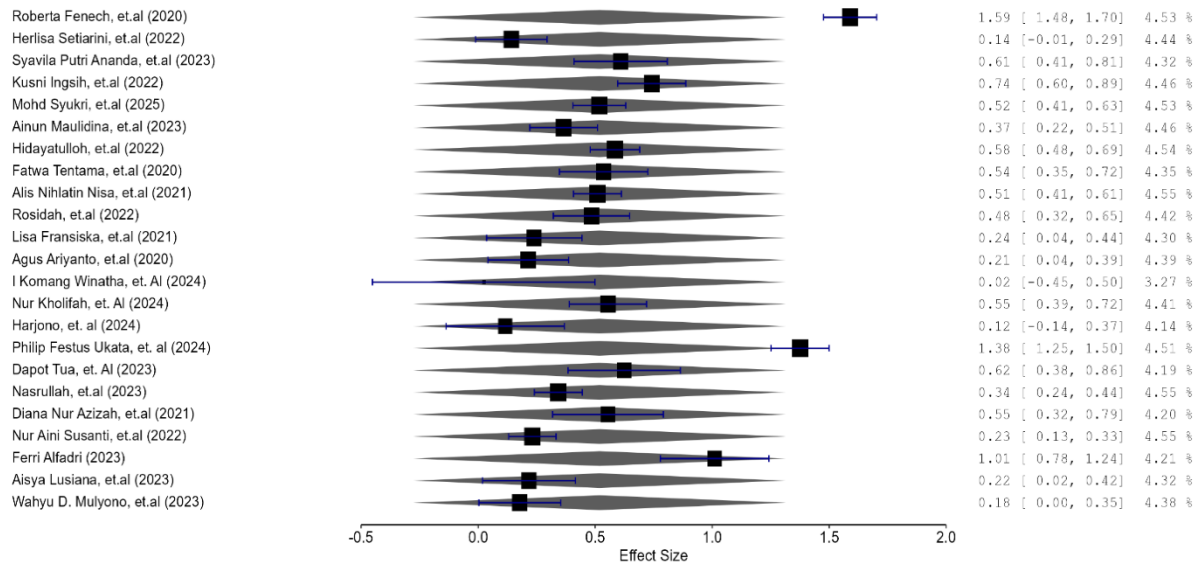


Figure 1. Forest Plot Meta-Analysis Figure

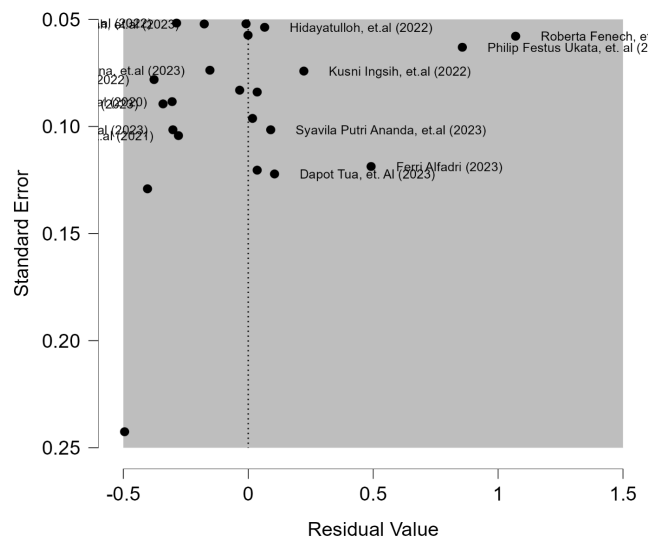


Figure 2. Funnel Plot After Trimfill Diagnosis

Table 6. Regression to Test Asymmetry in Funnel Plot (Egger Test)

	z	p
sei	-1,467	0.142

Table 6 shows a Z-value of -1.467, with a p-value greater than 0.05, indicating significance at the 0.05 level. This confirms the symmetry of the funnel diagram. Therefore, this meta-analysis is not affected by publication bias. Table 7 presents the heterogeneity, and Table 8 displays the residual heterogeneity.

Table 7. Heterogeneity Test

Q_e	df	p
56.413	7	< .001

Table 8. Meta-Analytic Estimates

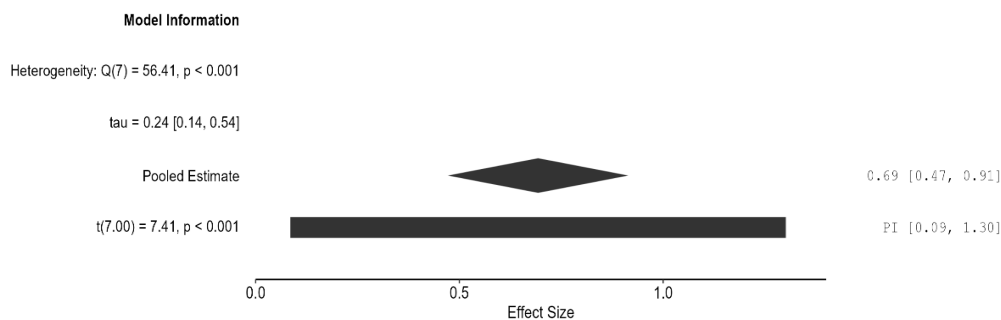
		95% CI		95% PI	
	Estimate	Lower	Upper	Lower	Upper
Effect Size	0.693	0.472	0.915	0.085	1.301
τ	0.239	0.139	0.538		
τ^2	0.057	0.019	0.289		
I²	90.226	75.605	97.898		
H²	10.231	4.099	47.582		

Eight studies that met the inclusion criteria examined the relationship between the Teaching Factory (TEFA) model and work readiness. The results indicate significant heterogeneity ($Q = 56.413$, $p < .001$; $I^2 \approx 100\%$), suggesting that contextual variations exist in how TEFA is implemented across institutions and industries. The average pooled effect size obtained through the random-effects model is summarized in Table 9.

Table 9. Pooled Effect Size Test

Estimate	Standard Error	z	P
0.693	0.092	7.532	< .001

The correlation between TEFA implementation and work readiness was positive and significant ($\bar{r} = 0.693$, $p < .001$), categorized as strong based on Cohen's scale. This suggests that students exposed to teaching factory environments gain practical, experiential learning benefits that enhance not only technical proficiency but also soft skills such as adaptability, teamwork, and discipline—key indicators of employability. The forest plot for the twenty-three analysed studies is shown in Figure 3. The graph shows that the analysed studies varied between approximately effect sizes of 0.00 and 0.69. A funnel plot was also created as part of this series of analyses. In meta-analysis practice, a Begg funnel plot, which serves as a scatter diagram, is often used to assess the possibility of publication bias visually and to indicate whether the sample distribution of studies is symmetrical. A funnel plot representing ten studies is shown in Figure 4. However, determining publication bias based solely on a funnel plot is highly dependent on the symmetry or asymmetry of the funnel plot, making it hard to identify publication bias definitively.

**Figure 3.** Meta-Analysis Forest Plot Figure

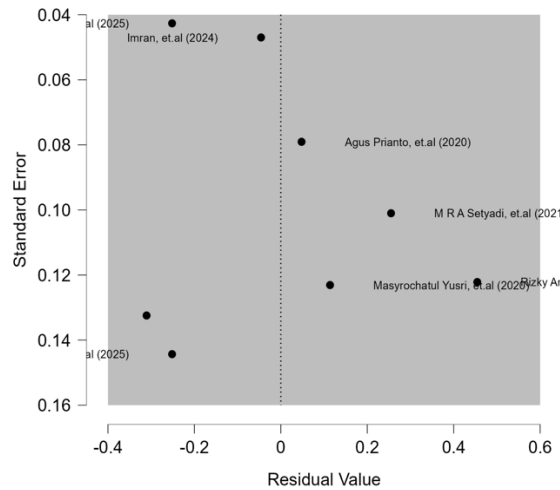


Figure 4. Funnel Plot After Trimfill Diagnosis

Table 10: Regression analysis to detect asymmetry in funnel plot (Egger test)

Regression test for Funnel plot asymmetry ("Egger's test")		
	z	p
sei	0.385	0.700

Table 10 shows a Z-value of 0.385 with a significance level of $p > 0.05$, indicating that the funnel plot is symmetrical. Therefore, the meta-analysis is not affected by publication bias. The integrated results from 31 studies affirm that both soft skills and teaching factory programs significantly enhance students' readiness for work. These findings align with prior research indicating that interpersonal and practical competencies are decisive factors influencing employment success. (Alfadri, 2023; Lusyiana & Wolor, 2023; Mulyono et al., 2023) The strong positive correlation across contexts implies that readiness for employment stems not only from mastery of technical skills but also from the cultivation of behavioral and interpersonal competencies that facilitate workplace adaptation (Fransiska & Aida, 2022; Hardiana et al., 2023; Winatha et al., 2024). The high level of heterogeneity observed in the research results can be attributed to variations in the educational contexts employed, the characteristics of the respondents involved, and the methods used to measure soft skills in each study. Several moderating factors can explain the observed heterogeneity in effect sizes. First, differences in institutional contexts (vocational vs. higher education) produce variations in the emphasis on soft skills within curricula. Second, sample size differences may affect the stability of effect sizes, as smaller samples tend to yield higher variability. Third, cultural and pedagogical differences influence how teamwork, communication, and discipline are taught or perceived. Finally, measurement instruments for work readiness vary across studies, creating additional divergence in reported correlations.

From a theoretical standpoint, these findings support the Human Capital Theory (Becker, 1964), which posits that investment in education and skill development enhances individual productivity and employability. Soft skills and TEFA function as complementary forms of human capital, encompassing cognitive, affective, and behavioral aspects that collectively enhance graduates' capacity to adapt and perform in complex work environments. This production-based learning model provides hands-on experience that closely approximates real-world industrial conditions, enabling students to not only master the necessary technical skills but also develop the soft skills relevant to the demands of the real-world workplace (Amaliah & Irfan, 2022; Ridwan et al., 2025). Additionally, this study extends the Employability Framework (Yorke, 2006), emphasizing the integration of

personal attributes, applied knowledge, and reflective learning. The combination of soft skills and experiential TEFA learning forms a holistic construct of employability that enables students to navigate transitions between education and the labor market successfully.

The TEFA model offers students an authentic experience by directly involving them in the production process of goods or services, from receiving orders and analysing needs, through the manufacturing process, to quality control and delivery of products to consumers. All these stages closely approximate actual industrial practices, enabling students to not only master technical skills relevant to their field of expertise but also apply applicable industry operational standards, such as the proper use of tools, machines, and work procedures. In addition to strengthening hard skills, teaching factory-based learning has proven effective in developing various critical soft skills like communication and presentation skills, teamwork, problem-solving, critical thinking, as well as responsibility, discipline, and adaptability to change. Students who participate in TEFA also demonstrate greater mental readiness to face changes and challenges in the workplace, including preparedness for digitalisation and industrial innovation ([Hidayatulloh et al., 2021](#); [Prianto et al., 2020](#); [Yusri & Sulistyowati, 2020](#)).

These observed positive effects align with findings from various countries that have adopted the teaching factory model in their vocational education systems. Differences likely influence the degree of heterogeneity among the studies analysed in the design of the teaching factories themselves, the industrial sectors involved, and the duration of the programs. The employability of graduates, from both vocational and non-vocational education, is strongly influenced by their mastery of soft skills ([Fenech et al., 2020](#)). Communication, teamwork, and problem-solving consistently emerge as key factors in increasing graduates' chances of success in the workforce ([Ingsih & Suhana, 2023](#); [Setiarini et al., 2022](#)). This finding aligns with various studies that emphasise the importance of developing soft skills from an early education stage ([Hidayatulloh & Ashoumi, 2022](#); [Maulidina & Wijanarka, 2023](#); [Tentama & Riskiyana, 2020](#)). In addition to soft skills and technical abilities, a strong foundation in hard skills remains the primary foundation for preparing competent graduates. However, mastering hard skills alone is not enough to ensure optimal work readiness. Graduates who rely solely on technical skills tend to be less adaptable to the ever-evolving dynamics and demands of the industry.

The TEFA learning model emerged as an innovative approach in vocational education, effectively bridging the needs of industry and the educational world. ([Imran et al., 2024](#); [Setyadi et al., 2021](#)). TEFA provides an authentic learning experience through the simulation of real production processes, enabling students not only to understand the theory but also to apply this knowledge in practice that closely resembles real industrial conditions ([Anggitan & Gunadi, 2025](#); [Syifa et al., 2023](#)). TEFA implementation has been proven to improve students' technical skills significantly. Students involved in the teaching factory demonstrate a better understanding of industry operational standards, the use of tools and machines, and applicable work procedures. This makes graduates better prepared to contribute directly to the industrial environment upon graduation.

Equally important, TEFA is significant in developing students' soft skills. Through involvement in the production process, students are trained to communicate effectively, work in teams, solve problems creatively, and hone their critical thinking skills. These soft skills are crucial for complex and dynamic challenges in the modern workplace. Students who participate in TEFA tend to have greater self-confidence, discipline, and responsibility. They are also better prepared for digitalisation and industrial innovation, enabling them to survive and thrive in the face of rapid change. The collaboration between strengthening soft skills and implementing the teaching factory model is crucial to preparing graduates who are not only technically competent but also adaptable, communicative, and highly competitive. Close collaboration between schools, teachers, and industry must be continuously optimised to ensure TEFA implementation is practical and relevant to job

market needs. Overall, the results of this meta-analysis confirm that vocational education that integrates soft skills development and the teaching factory learning model can produce more work-ready graduates.

Practically, the evidence underscores the necessity for educational institutions to design curricula that intentionally integrate soft skills and teaching factory experiences. Teachers and curriculum developers should prioritize communication, collaboration, and problem-solving as core competencies in applied learning environments. Furthermore, partnerships between schools and industries must be institutionalized to ensure that TEFA activities align with real-world professional standards. Policymakers should also view TEFA and soft skills training as strategic investments in human capital formation. Embedding these competencies into national vocational frameworks can enhance workforce competitiveness, reduce graduate unemployment, and ensure that educational outputs align with labor market needs.

CONCLUSION

This meta-analysis synthesized 31 empirical studies conducted between 2020 and 2025, revealing that the development of soft skills and the implementation of the Teaching Factory (TEFA) exert a significant and positive combined influence on students' work readiness across diverse educational settings. The integrated evidence confirms that the simultaneous enhancement of interpersonal competencies and experiential learning substantially strengthens graduates' employability in a competitive labor market. Statistically, the analysis revealed two strong correlations: between soft skills ($r = 0.519$) and work readiness, and between TEFA ($r = 0.693$) and work readiness. These findings are robust and consistent, supported by minimal publication bias and high analytical validity under random-effects modeling. Heterogeneity among studies reflects contextual diversity, reinforcing the generalizability of the results rather than undermining them. The novelty of this study lies in being the first meta-analysis in Indonesia to systematically measure the *combined effect* of soft skills and TEFA programs on graduates' employability outcomes. While previous studies have treated these constructs separately, this research presents a unified analytical model that bridges pedagogical innovation (TEFA) with behavioral competence (soft skills), thereby establishing a new empirical framework for vocational education reform. Scientifically, the study contributes to the expansion of Human Capital Theory by validating that employability-enhancing competencies are multidimensional—encompassing both technical and socio-behavioral skills. It also advances the Employability Framework by illustrating how institutionalized learning experiences (e.g., TEFA) mediate the relationship between educational investment and workforce adaptability. Theoretically, these findings highlight that human capital formation must integrate behavioral and experiential learning dimensions to remain relevant in the Industry 4.0 context. Practically, the results encourage educators and policymakers to embed structured soft skills and TEFA modules into national curricula, thereby ensuring alignment between graduate attributes and industrial expectations. Partnerships with the private sector and industries should be institutionalized as part of this reform, creating sustainable ecosystems for skill-based education. Future research should focus on meta-regression analysis to identify potential moderators that influence the strength of these relationships, such as gender, region, field of study, and duration of participation in TEFA. Longitudinal designs are also recommended to assess the sustainability of work readiness outcomes post-graduation. Exploring digital adaptations of TEFA and virtual employability training models could provide valuable insights into how hybrid learning environments enhance workforce preparedness in the era of automation and artificial intelligence. In conclusion, enhancing graduates' readiness for work requires a synergistic strategy that integrates both the development of soft skills and the teaching of factory experiences within educational systems. This meta-analysis provides

robust empirical justification for such integration, positioning it as a cornerstone for future curriculum design, educational policy, and human resource development in Indonesia and beyond.

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