

Evaluation of the Implementation of the Merdeka Curriculum in Vocational High Schools (SMKs) in West Sumatra: A Systematic Literature Review

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ABSTRACT

Implementation of the Merdeka Curriculum in Vocational High Schools (SMKs) in West Sumatra faces various challenges influenced by geographic conditions, human resource readiness, and the characteristics of the business and industrial sectors (DUDI). This study aims to analyze the implementation of the Merdeka Curriculum in SMKs through a *Systematic Literature Review* (SLR) approach to identify patterns of success, challenges, and strategic recommendations for the development of vocational education. The study employed an SLR method referring to the *Preferred Reporting Items for Systematic Reviews and Meta-Analyses* (PRISMA) guidelines. The selection process was conducted on articles published between 2023 and 2026 through Google Scholar, Garuda, and university repositories in West Sumatra. Of the 115 articles identified, 20 articles met the inclusion criteria and were analyzed thematically. The results of the review revealed four main findings, namely: (1) the successful implementation of the Merdeka Curriculum is strongly influenced by school principal leadership, teacher competence, and learning communities; (2) partnerships with the business and industrial sectors (DUDI) through Teaching Factory (TEFA) and Field Work Practice (PKL) improve students' work readiness, but remain uneven due to limitations in local industries; (3) the implementation of the Pancasila Student Profile Strengthening Project (P5) based on Minangkabau local wisdom can strengthen character development, although its assessment remains subjective; and (4) disparities in infrastructure, technology access, and implementation quality between urban areas and remote regions persist. This study concludes that the successful implementation of the Merdeka Curriculum in SMKs is determined not only by the internal readiness of schools but is also influenced by infrastructure support, industry partnerships, and government policies that are adaptive to regional characteristics. Therefore, more targeted policies are needed to reduce implementation disparities and improve the quality of vocational education in West Sumatra.

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1. INTRODUCTION

Vocational education plays a strategic role in human resource development because it is required to produce graduates with competencies that are aligned with the needs of the world of work. Vocational High Schools (SMKs) need to adapt to technological developments and the increasingly dynamic needs of the Business and Industrial World (DUDI). In this context, the Merdeka Curriculum was introduced as an educational transformation policy that emphasizes curriculum flexibility, the strengthening of essential competencies, teacher autonomy, student-centered learning, and project-based learning. However, its implementation in SMKs entails more specific requirements than in general education because its success is also determined by the relevance of competencies to workplace needs, practical experience, and partnerships with DUDI. Therefore, successful implementation of the Merdeka Curriculum in this study is understood as the school's capacity to translate the policy into curriculum planning, learning implementation, teacher readiness, assessment, student outcomes, P5 implementation, institutional readiness, and alignment with DUDI.

In vocational education, DUDI holds an important conceptual position because it is not only the recipient of graduates but also a partner in ensuring competency relevance, providing practical experience, and offering input regarding workplace skill requirements. Thus, the successful implementation of the Merdeka Curriculum in SMKs is reflected not only in classroom learning processes but also in the school's ability to establish *links and match* with DUDI. Conceptually, such implementation constitutes an interconnected sequence, namely policy → school leadership → teacher readiness → learning implementation → industry partnership → student/vocational outcomes. School leadership plays a role in translating policies and providing institutional support, teacher readiness influences the quality of learning implementation and assessment, while industry partnerships strengthen the relevance of learning experiences to workplace needs, which is ultimately expected to improve students' competencies and work readiness.

The implementation of the Merdeka Curriculum does not occur uniformly because it is influenced by school capacity and the characteristics of the educational environment. Differences in teacher competence, school leadership, infrastructure, digital infrastructure, institutional readiness, DUDI partnerships, as well as socioeconomic and geographical conditions may result in variations in implementation across educational institutions. This condition is particularly relevant in West Sumatra Province, which has heterogeneous regional characteristics. Urban areas such as Padang, Bukittinggi, and Padang Panjang have different economic characteristics and access to services compared with several regencies such as Sijunjung, West Pasaman, and the Mentawai Islands. These differences may affect SMKs' access to educational resources, technology, learning facilities, and industry partners.

Previous studies in West Sumatra have shown that the implementation of the Merdeka Curriculum is associated with various aspects, ranging from teacher competence and school leadership [1], the strengthening of *Teaching Factory* (TEFA) and industrial work practices [2], to limitations in digital infrastructure and access to DUDI in certain areas [3]. These findings indicate that implementation is influenced by pedagogical, institutional,

industry partnership, and structural factors. However, the available evidence remains fragmented across schools, study programs, and regions, and therefore has not yet provided a comprehensive picture of how these various dimensions interact in determining the successful implementation of the Merdeka Curriculum in SMKs.

This condition indicates empirical, contextual, and methodological gaps. Empirically, various findings concerning curriculum planning, learning, teachers, assessment, student outcomes, P5, institutional readiness, and DUDI have not yet been systematically synthesized. Contextually, there is no synthesis that compares variations in implementation based on urban and rural characteristics in West Sumatra. Methodologically, previous studies have tended to focus on specific cases or educational institutions and therefore have not produced a broader integration of evidence. Consequently, a *Systematic Literature Review* (SLR) is needed to integrate the dispersed evidence and map the relationships among internal school factors, learning processes, DUDI partnerships, and student/vocational outcomes.

This study aims to systematically synthesize evidence on the implementation of the Merdeka Curriculum in SMKs in West Sumatra, identify the dimensions and supporting and inhibiting factors, analyze the relationships among implementation components, and map variations in findings based on urban and rural contexts. The novelty of this study lies in integrating previously fragmented findings into an implementation framework that specifically considers the characteristics of vocational education, the strategic position of DUDI, and regional variations in West Sumatra. The findings are expected to contribute to the field of vocational education management while also providing a practical basis for schools and policymakers to strengthen institutional readiness, teacher competence, learning quality, P5, and link and match partnerships between SMKs and DUDI.

2. METHOD

This study employed a *Systematic Literature Review* (SLR), with reporting following the *Preferred Reporting Items for Systematic Reviews and Meta-Analyses* (PRISMA 2020) guidelines [4]. This review aimed to synthesize evidence regarding the implementation of the Merdeka Curriculum in Vocational High Schools (SMKs) in West Sumatra, focusing on implementation patterns, supporting and inhibiting factors, variations based on urban-rural contexts, and their implications for strengthening the link and match between SMKs and the Business and Industrial Sectors (DUDI). The literature search was conducted from January to April 2026 through Google Scholar, GARUDA, and the repositories of Universitas Negeri Padang and Universitas Andalas using a combination of the keywords “Merdeka Curriculum,” “SMK,” “Vocational High School,” “implementation,” “evaluation,” “link and match,” “Teaching Factory,” “Field Work Practice,” and “West Sumatra/Sumatera Barat” with the Boolean operators AND/OR.

The studies considered were research studies or documents published between 2023 and 2026, available in full text, verifiable, conducted in West Sumatra, and focused on SMKs and the implementation or evaluation of the Merdeka Curriculum, including aspects of educators, leadership, learning, P5, DUDI, infrastructure, and financing. Studies at levels other than SMK, conducted outside West Sumatra, in the form of opinions or popular

articles, lacking adequate methodological information, or not relevant to the focus of the review were excluded. The selection followed the PRISMA stages, namely identification, duplicate removal, screening, eligibility, and inclusion. The search yielded 115 records, of which 15 duplicates were removed, 100 records were screened, 60 were excluded, 40 full-text records were assessed, and 20 studies or documents met the inclusion criteria. Study quality was assessed based on the appropriateness of the research design, clarity of objectives, data sources, data collection and analysis procedures, as well as the consistency between methods and findings.

Data were extracted based on the author, year, source type, research design, location, characteristics of the subjects or educational units, implementation focus, supporting and inhibiting factors, DUDI partnerships, infrastructure, and main findings. The data were then analyzed through narrative synthesis and thematic analysis to identify patterns, similarities, differences, and gaps in the findings. The synthesis results were grouped into four domains: (1) school and educator readiness; (2) industry partnerships and link and match; (3) learning and P5 implementation; and (4) infrastructure, financing, and regional disparities. The classification of urban and rural areas was determined based on the geographical and administrative characteristics reported in the studies.

3. RESULTS AND DISCUSSION

Based on the literature search and selection process using the PRISMA 2020 protocol, 20 studies met all inclusion criteria and were used as the basis for the synthesis. The series of identification, screening, eligibility assessment, and study inclusion processes is presented in Figure 1.

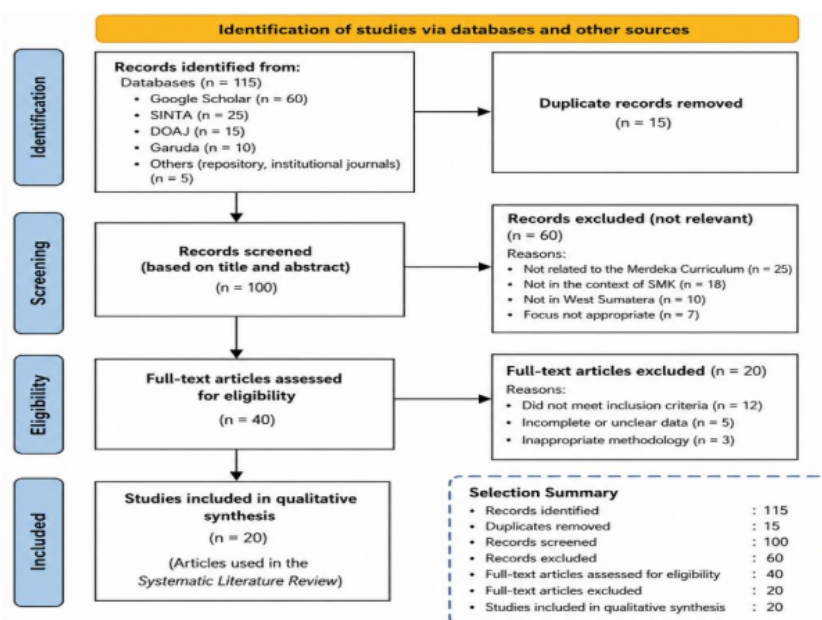


Figure 1. PRISMA Diagram

Table 1. Characteristics of the Analyzed Studies

No	Authors & Year	Research Focus	Research Location	Main Findings
1	Zahrah & Gistituati (2025) [5]	Implementation of the Merdeka Curriculum	SMK Negeri 2 Bukittinggi	Supported by leadership, teacher competence, and infrastructure, but constrained by teacher understanding, time for differentiated learning, and student readiness.
2	Rahmah et al. (2024) [6]	Teachers' difficulties in implementing the Merdeka Curriculum	SMK Negeri in Padang Barat District	Implementation was relatively difficult, particularly in assessment, followed by lesson planning and implementation.
3	Lukman & Gistituati. (2024) [1]	Transformational leadership of school principals	SMKs throughout Padang City	Transformational school leadership was categorized as good, but intellectual stimulation and individualized consideration still needed to be strengthened.
4	Wulandari et al. (2024) [7]	Management of the Merdeka Curriculum	SMK Negeri 1 Kota Solok	Management included KOSP-based planning, learning, and P5 implementation, and formative-summative evaluation; teacher understanding still needed to be strengthened.
5	Zalukhu et al. (2025) [8]	The effect of the Merdeka Curriculum on learning outcomes	SMK Negeri 9 Padang	The implementation of the Merdeka Curriculum was relatively good and had an effect on learning outcomes in Pastry Bakery.
6	Putri et al. (2024) [9]	Implementation of the Merdeka Curriculum	SMK Negeri 9 Padang	Implementation was categorized as very good (4.79), but challenges remained in teaching modules, learning variation, and formative assessment.
7	Sulastri et al. (2023) [10]	Evaluation of the Merdeka Curriculum using the CIPP model	SMKN 1 Dua Koto, Pasaman	Implementation had a positive impact but was still constrained by teaching materials, teacher training, operational curriculum, and learning facilities.
8	Artha et al. (2024) [2]	Implementation of the Merdeka Curriculum, Teaching Factory, and Prakerin	SMK Negeri 3 Kota Solok	The Merdeka Curriculum, TEFA, and Prakerin had been implemented according to guidelines with support from DUDI collaboration.
9	Meyindra & Kadri (2024) [11]	Implementation of the Pancasila Student Profile Strengthening Project (P5)	SMKs throughout Padang City	P5 implementation was relatively successful, but its understanding, management, documentation, and evaluation still needed to be strengthened.
10	Afriani et al. (2024) [12]	The role of teachers as facilitators in implementing the Merdeka Curriculum	SMK Negeri 1 Padang	The role of teachers as facilitators had a very strong effect on student learning outcomes ($r = 0.810$; 81%).
11	Anggraini et al. (2023) [13]	Development of the Merdeka Curriculum	SMK Negeri 1 Enam Lingsung	The Merdeka Curriculum encouraged learning flexibility, innovation, creativity, and improved teacher competence.
12	Ilham et al. (2023) [14]	Correlation between the Merdeka Curriculum and Basic Automotive learning outcomes	SMK Negeri 1 Dua Koto, Pasaman	Learning outcomes were positively correlated with learning implementation but were influenced by the availability of practical equipment.

No	Authors & Year	Research Focus	Research Location	Main Findings
13	Murdiana et al. (2024) [15]	P5 based on Minangkabau local wisdom	SMK Pembina Bangsa Bukittinggi	P5 based on the <i>makan bajamba</i> tradition received positive responses and strengthened students' understanding of local wisdom.
14	Irsyad & Fitri (2023) [16]	Implementation of P5 in the Merdeka Curriculum	SMKN 1 Batusangkar	P5 had been implemented, but teachers' understanding and skills remained the main challenges.
15	Purba & Sukardi (2026) [17]	Video-assisted PjBL on learning outcomes	SMK Negeri 1 Sumatera Barat	Video-assisted PjBL improved student learning outcomes, with an N-Gain of 0.57 and 88.23% mastery.
16	Muntatsiroh et al. (2023) [18]	Analysis of Merdeka Curriculum implementation in non-urban areas	SMKN 4 Sijunjung	Limited internet access hindered teachers' access to modules and learning resources on the Merdeka Mengajar Platform.
17	Lestari & Gistituati (2024) [19]	Teacher readiness in implementing the Merdeka Curriculum	SMKs throughout Pariaman City	Teacher readiness in implementing the Merdeka Curriculum needs to be strengthened, particularly in understanding and implementing learning according to curriculum demands.
18	Putri et al. (2024) [20]	Development of Android-based learning media	SMK Pembina Bangsa Bukittinggi	Android-based media was considered highly valid and practical for supporting Informatics learning.
19	Hasibuan et al. (2024) [21]	Digitalization of Merdeka Curriculum report management	SMK Kesehatan Genus Bukittinggi	The web-based report system was considered highly feasible for supporting the management of Merdeka Curriculum assessment results.
20	Ramadhani et al. (2025) [22]	Evaluation of Merdeka Curriculum implementation	SMK Negeri 1 Pariaman	Implementation still requires strengthening in teacher readiness, facilities, student-centered learning, and learning outcomes.

The synthesis results indicate that the implementation of the Merdeka Curriculum in SMKs in West Sumatra varies and is influenced by educator and school management readiness, partnerships with the Business and Industrial Sectors (DUDI), the implementation of P5 and project-based learning, as well as the availability of infrastructure and geographical conditions. Based on the interrelationships among the findings, the subsequent results were analyzed into four main themes: (1) managerial readiness, leadership, and educator adaptation; (2) curriculum alignment and DUDI partnerships (*link and match*); (3) internalization of character values through P5 based on local wisdom; and (4) disparities in infrastructure and implementation inequalities across regions.

3.1. Managerial Readiness, Leadership, and Educator Adaptation

The synthesis results indicate that educator readiness and school managerial capacity are key factors in the successful implementation of the Merdeka Curriculum in vocational high schools (SMKs) in West Sumatra. Of the 20 studies analyzed, the recurring issues do not primarily concern acceptance of the new curriculum, but rather the ability to translate the principles of the Merdeka Curriculum into planning, implementation, differentiated learning, and assessment. The findings of Zahrah and Gistituati [5] show that

implementation at SMK Negeri 2 Bukittinggi has encompassed lesson planning, implementation, as well as formative and summative assessment; however, teachers' understanding of the Merdeka Curriculum concepts remains incomplete, and the implementation of differentiated learning is still constrained by limited time. This condition is consistent with Rahmah et al. [6], who identified difficulties among teachers at vocational high schools in Padang Barat District, particularly in assessment, followed by lesson planning and implementation.

These findings demonstrate that curriculum implementation cannot be adequately measured merely by the completion of administrative documents, but rather by teachers' capacity to transform curriculum principles into learning practices that are responsive to students' needs. The study by Wulandari et al. [7] at SMK Negeri 1 Kota Solok indicates that the management of the Merdeka Curriculum has encompassed planning based on the School Operational Curriculum (KOSP), learning and P5 implementation, as well as learning evaluation. However, teachers' understanding of curriculum management still needs to be strengthened. This finding is consistent with Lestari and Gistituati [19], who reported that the readiness of teachers at vocational high schools across Pariaman City in planning, implementing, and evaluating learning was categorized as fairly good, with TCR scores of 72.6%, 76.4%, and 75%, respectively. Thus, the main issue is not the absence of readiness, but rather the uneven depth of teachers' implementation competencies.

School leadership is an important factor that bridges policy and learning practices. Lukman and Gistituati [1] found that the transformational leadership of principals at public vocational high schools across Padang City was categorized as good, with an average score of 4.31 and a TCR of 82.05%. However, the aspects of intellectual stimulation and individualized consideration remained in the moderate category, indicating the need for further leadership strengthening. This finding suggests that principals should not merely act as policy administrators but also serve as drivers of professional change, particularly by providing teachers with opportunities to experiment, reflect on learning practices, and develop competencies according to school needs.

In this context, teacher readiness needs to be understood as a multidimensional construct encompassing knowledge, skills, the ability to design learning and assessment, and adaptation to students' characteristics. Findings from a study at SMK Dhuafa Padang reinforce this perspective. Ahwani et al. found that teacher readiness in lesson planning reached 76.00%, while overall readiness in implementing the Merdeka Curriculum reached 75.76%, with both categorized as ready. This means that the general readiness of teachers does not automatically eliminate the need for continuous professional development, particularly when teachers are required to address the demands of more flexible and student-centered learning.

Conceptually, this need is consistent with the *Panduan Pembelajaran dan Asesmen Kurikulum Merdeka*, which positions learning and assessment as an integrated cycle. Teachers are expected to analyze learning outcomes, formulate learning objectives, design learning activities, and use assessment to obtain information about students' development. The guidelines also emphasize student-centered learning and the use of formative assessment to support competency development. Thus, the difficulties identified in studies conducted in

West Sumatra, particularly those related to assessment and differentiated learning, can be understood as a gap between policy demands and implementation capacity at the school level.

From an SLR perspective, this pattern indicates that strengthening the implementation of the Merdeka Curriculum in vocational high schools in West Sumatra needs to shift from an administrative orientation toward professional capacity development. Training that focuses only on understanding curriculum documents is insufficient if it is not followed by practical activities involving the development of teaching modules, diagnostic and formative assessments, differentiated learning, and learning reflection. This is also supported by Ropiyah et al. [23], whose study at SMK Negeri 2 Slawi specifically examined teacher readiness in implementing the Merdeka Curriculum and demonstrated that teacher readiness is an important aspect that needs to be considered in the implementation process.

Thus, managerial readiness, leadership, and educator adaptation constitute an interconnected and mutually reinforcing system. School leadership provides direction and support for change, curriculum management translates policy into operational planning, while teachers are the primary actors implementing these changes in the classroom. When one of these components is not optimal, the flexibility of the Merdeka Curriculum may potentially become merely administrative flexibility. Conversely, when all three are strengthened simultaneously through mentoring, professional collaboration, and practice-based reflection, the implementation of the Merdeka Curriculum is more likely to produce learning that is adaptive and centered on students' needs.

3.2. Curriculum Alignment and DUDI Partnerships (Link and Match)

The synthesis results indicate that aligning the Merdeka Curriculum with the needs of the Business and Industrial World (DUDI) is an important component in strengthening the relevance of vocational education. In vocational high schools (SMKs) in West Sumatra, this alignment is primarily realized through Teaching Factory (TEFA), Field Work Practice (PKL/Prakerin), and DUDI involvement in the learning process. However, its implementation has not been fully equitable because it remains influenced by school capacity, the characteristics of vocational programs, and the availability of industry partners.

The study by Artha et al. [2] at SMK Negeri 3 Kota Solok shows that the implementation of the Merdeka Curriculum has been integrated with TEFA and Prakerin and supported through cooperation with DUDI. This finding indicates that vocational learning is not only directed toward mastery of subject matter at school but also toward work experiences that approximate actual industrial conditions. A similar pattern is observed in Sulastris et al. [10] at SMKN 1 Dua Koto, Pasaman, which shows that the implementation of the Merdeka Curriculum has had a positive impact on learning quality. However, teaching materials, teacher training, and learning facilities remain challenges. Thus, the existence of industry cooperation programs does not automatically ensure optimal learning relevance when internal school capacity remains inadequate.

In terms of work experience, the integration of Prakerin is important because it provides students with opportunities to apply competencies acquired at school in real work environments. Research on the management of the Merdeka Curriculum and *link and match*

in vocational education also positions competency analysis based on industry needs and the implementation of work practices in IDUKA as important components of curriculum management. Sulistio et al. [24], for example, emphasize that the management of the Merdeka Curriculum in SMKs need³⁶ connect basic competencies with IDUKA needs and optimize industrial work practices. This reinforces the findings of Artha et al. [2] that the relationship among the curriculum, TEFA, and Prakerin constitutes an important mechanism for bringing the educational process closer to the needs of the labor² market.

However, DUDI partnerships in the implementation of the Merdeka Curriculum should not be understood merely as the placement of students in industry. More substantive relationships are needed so that industry contributes to curriculum development, competency updating, the provision of work experience, and the strengthening of teacher competencies. The study by¹² Yoto et al. [25] demonstrates that industry involvement plays an important role in realizing the potential of the Merdeka Curriculum for vocational education, particularly by strengthening school–industry relationships. The study positions school–industry collaboration as an important component of efforts to improve the work readiness of SMK graduates. Thus, effective *link and match* should move beyond administrative cooperation toward academic and professional collaboration that generates actual knowledge and technology transfer.

These findings can also be viewed from the perspective of Teaching Factory. TEFA essentially integrates the learning process with production or service processes that resemble an industrial environment. Therefore, its success depends not only on the availability of production units but also on management, facility quality, teacher competence, work standards, and industry involvement. The study by Yoto et al. [26]¹⁴ on TEFA evaluation using the CIPP model shows that TEFA evaluation needs to consider context, input, process, and product to ensure that the model genuinely improves students' skills. This provides an important perspective on the findings of Artha et al. [2]: although TEFA implementation has been carried out according to guidelines, it still needs to be evaluated based on the quality of learning experiences and competencies produced, rather than merely on the existence of the program.

The 20 studies analyzed also reveal that the relevance of DUDI partnerships is strongly influenced by regional characteristics and fields of expertise. Schools with access to relevant industry partners have greater opportunities to develop practice-based learning and work experiences. Conversely, schools with limited access to industry face challenges in providing learning experiences that genuinely correspond to technological developments and occupational demands. This condition is particularly important in West Sumatra because the economic structure and distribution of industries are not uniform across regions. Therefore, the *link and match* model cannot be implemented uniformly but needs to be adapted to regional economic potential, the characteristics of vocational competencies, and the availability of DUDI.

Another aspect that needs to be considered is the quality of relationships between schools and industry. Cooperation that is merely formalized through a memorandum of understanding does not necessarily produce changes in the learning process. Conversely, productive partnerships are characterized by industry involvement in curriculum

development or review, competency alignment, project development, the provision of PKL placements, certification, teacher competency development, and graduate recruitment. This perspective is consistent with the study by Yoto et al. [27], which demonstrates that vocational collaboration with industry can have a more comprehensive impact on work readiness when the relationship is directed toward competency development rather than merely internship activities.

Thus, the synthesis results show that the Merdeka Curriculum has created greater opportunities for SMKs to align learning with DUDI needs, but curriculum flexibility must be accompanied by the strengthening of the partnership ecosystem. TEFA and PKL can serve as primary instruments for connecting learning with the world of work, but their effectiveness depends on facility quality, teacher competence, the relevance of industry partners, and the depth of school–DUDI collaboration. These findings indicate that strengthening *link and match* in West Sumatra needs to move beyond program-based cooperation toward strategic partnerships involving DUDI throughout the competency development cycle of both students and teachers.

3.3. Internalization of Character Values through P5 Based on Local Wisdom

The synthesis results indicate that the *Projek Penguatan Profil Pelajar Pancasila* (P5) serves as an important instrument for integrating character formation, project-based learning experiences, and local cultural context¹⁴ in vocational high schools (SMKs) in West Sumatra. Meyindra and Kadri [11] found that the implementation of P5 in public vocational high schools across Padang City has been carried out well; however, understanding, management, documentation, and evaluation still need to be strengthened. This finding is consistent with Irsyad and Fitri [16] at SMKN 1 Batusangkar, which shows that P5 has been implemented since the adoption of the Merdeka Curriculum, but teachers' understanding and skills remain the main challenges.

The local context is one of the strengths of P5 in West Sumatra. Murdiana et al. [15] demonstrate that the integration of the *makan bajamba* tradition into P5 at SMK Pembina Bangsa Bukittinggi can strengthen students' understanding of Minangkabau local wisdom through community involvement and direct experience. This finding indicates that P5 does not merely function as a general character-strengthening activity but can serve as a space for contextualizing cultural values within students' learning experiences.

From the perspective of learning strategies, PjBL can strengthen students' engagement⁷ in the P5 process. Purba and Sukardi [17] demonstrate that video-assisted PjBL improves learning outcomes, with an *N-Gain* of 0.57 and a mastery level of 88.23%³¹. This finding is reinforced by Satria et al. [28], who demonstrate that PjBL integrated with the Pancasila Student Profile can be used to develop¹⁰ critical thinking character. In the SMK context, Wafi and Wailanduw [29] also found that the implementation of PjBL oriented¹⁰ toward the Pancasila Student Profile needs to be systematically evaluated across the dimensions of mutual cooperation, independence¹¹, critical thinking, and creativity.

Thus, the findings from the 20 studies indicate that the effectiveness of P5 is determined not only by the implementation of projects but also by the school's ability to connect projects with character values, local contexts, and meaningful learning experiences.

The main challenge remains teachers' capacity to design and evaluate projects consistently. Therefore, strengthening teacher competencies, documentation, and more structured evaluation instruments is necessary so that P5 does not stop at the completion of activities or products but results in character internalization that can be observed and systematically evaluated.

3.4. Disparities in Infrastructure and Unequal Implementation Across Regions

The synthesis results indicate that the implementation of the Merdeka Curriculum in vocational high schools (SMKs) in West Sumatra continues to face disparities in facilities, digital access, and school readiness across regions. Muntatsiroh et al. [18] found that limited internet access at SMKN 4 Sijunjung hindered teachers from accessing modules and learning resources through the *Platform Merdeka Mengajar* (PMM). This condition indicates that the flexibility of the Merdeka Curriculum cannot be utilized optimally when basic infrastructure support is not yet available. This finding is consistent with Sulastris et al. [10], who identified limited learning facilities as one of the challenges in implementing the Merdeka Curriculum at SMKN 1 Dua Koto, Pasaman.

These disparities are also evident in the need for technology-based learning resources. Putri et al. [20] showed that Android-based learning media can be considered highly valid and practical for supporting Informatics learning, while Hasibuan et al. [21] demonstrated that the digitalization of report-card management can support the management of assessment within the Merdeka Curriculum. However, the utilization of such technologies requires adequate availability of devices, connectivity, and user competencies. Thus, digitalization is not merely related to the provision of applications or media but also to the readiness of the school ecosystem.

These findings are reinforced by the study of Sofiana et al. [30], which found that the readiness of digital infrastructure and school resources in implementing the Merdeka Curriculum remains varied, particularly regarding internet availability, computers, digital learning devices, and teachers' digital pedagogical competencies. The study by Sianipar et al. [31] also indicates that disparities in infrastructure and educator competencies between urban areas and more remote regions can affect the equitable implementation of the Merdeka Curriculum.

In the context of vocational education, infrastructure issues become increasingly important because SMK learning requires not only digital facilities but also practical equipment that is relevant to workplace standards. The West Sumatra Education Office itself emphasizes that the development of SMKs needs to be supported by practical facilities and infrastructure that correspond to workplace demands so that graduates possess relevant competencies. This is consistent with Ilham et al. [14], who showed that basic automotive learning outcomes are positively associated with learning implementation but remain influenced by the availability of practical equipment.

Thus, disparities in the implementation of the Merdeka Curriculum in West Sumatra are not merely a matter of differences in schools' capacity to implement the policy but also reflect unequal access to resources that constitute prerequisites for implementation. Schools in areas with better internet access, digital facilities, and practical equipment have greater

opportunities to implement flexible and technology-based learning, whereas schools with limited facilities face narrower implementation opportunities. Therefore, the equitable implementation of the Merdeka Curriculum needs to be directed toward needs-based regional interventions, particularly through the provision of connectivity, digital devices, practical facilities, and support for school capacity development.

4. CONCLUSION

Based on a *Systematic Literature Review* of 20 studies published during 2023–2026, the implementation of the Merdeka Curriculum in Vocational High Schools (SMKs) in West Sumatra has shown progress but remains uneven. Four main issues were identified: managerial readiness and educator adaptation, curriculum alignment with the Business and Industrial World (DUDI), character strengthening through P5 based on local wisdom, and disparities in infrastructure and resources across regions. School leadership, learning communities, Teaching Factory (TEFA), and industrial work practices support work-based learning, but challenges remain in teachers' understanding, assessment, practical facilities, and the relevance of competencies to industry needs. These findings confirm that successful implementation requires the integration of curriculum design, school capacity, educator competence, DUDI partnerships, and equitable resource distribution. Therefore, strengthening teacher competence, substantive DUDI partnerships, infrastructure and practical facilities, and P5 based on local wisdom is necessary.

This review has several limitations, including limited geographical coverage within West Sumatra and studies that tend to be concentrated in particular cities or schools, heterogeneous research designs, reliance on Google Scholar and national indexing sources or repositories that may not capture all *grey literature*, a relatively short publication period, partial coverage of 2026, and limitations in urban–rural classification because it was not consistently reported. The heterogeneity of the evidence also prevented the use of meta-analysis, and the synthesis was therefore focused on narrative mapping. Future research should expand geographical coverage and literature sources, involve SMKs with more diverse urban and rural characteristics, and employ quantitative or longitudinal designs and more standardized indicators to examine the relationship between Merdeka Curriculum implementation and graduates' competencies and work readiness, while enabling meta-analysis in future studies.

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