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Stakeholders' Perspectives on Vocational Education Commercialization in Malaysia

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ABSTRACT

Seven studies examining technical and vocational education in Malaysia present a multifaceted picture of commercialization from the perspective of industry stakeholders. Industry participants stress that aligning TVET curricula with market demands through collaborative curriculum design, work-based learning, and strategic partnerships address skill gaps and supports workforce development. We searched across over 562 academic papers from the Semantic Scholar corpus, Web of Science, Taylor & Francis Online, Science Direct, Scopus (A&I), ERIC, ProQuest Dissertation & Google Scholar. We retrieved the 50 papers most relevant to the query. Papers were screened based on specific inclusion criteria, including geographic scope, commercialization focus, stakeholder perspective, study design, development outcomes, evidence base, commercialization content, and data source. Purposive sampling was used to ensure diverse representation of stakeholders by experience. Data were coded thematically using software such as NVivo, interpreted by identifying patterns across stakeholder groups, and validated through triangulation, member checking, and expert review to ensure credibility and reliability. In several accounts, such partnerships yielded practical training, knowledge transfer, and long-term economic benefits, while government initiatives—such as incentive schemes and formal corporatist models, aim to boost industry engagement. At the same time, stakeholders highlight a range of challenges. Reports noted limited participation by certain corporate actors, difficulties arising from cultural differences, geographical mismatches, and divergent expectations between industry and TVET providers, as well as high-cost barriers that complicate resource allocation. Taken together, these findings portray TVET commercialization as a promising yet complex strategy for national development, one that depends

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on improved stakeholder engagement and robust collaboration frameworks.
Keywords: Commercialization; Stakeholder Perspectives; Vocational Education

1. Introduction

Vocational Education and Training (VET) has been central to Malaysia's economic and workforce development model. While the nation is on a trajectory toward high-income status, vocational education serves as a linchpin between the demand for skilled labor and its supply [1, 2]. However, the government traditionally heavily subsidized and controlled VET to ensure accessibility and quality in Malaysia. Yet the sector has seen an increasing trend of commercialization in recent years, where private institutions, industry collaborations, and cost-sharing models have gained prominence. This transition has brought both opportunities and challenges, shaping diverse perspectives among stakeholders, including policymakers, educators, students, industry leaders, and the public [3].

Commercialization in education primarily relates to adapting market principles to manage and deliver educational services [4, 5]. Examples of commercialization in Malaysian vocational education include the establishment of private vocational training institutions, partnerships with various industries, and the introduction of profit-oriented models within public vocational colleges. Supporters claim that commercialization improves vocational training in terms of efficiency, quality, and industrial relevance, thereby increasing its responsiveness to labor market needs [6, 7]. Conversely, critics highlight issues relating to the potential commodification of education, the challenge to its ultimate aim of delivering skills for the country's advancement, and concerns about equity and affordability [8, 9]. The Malaysian government plays a significant role in promoting and implementing vocational education through the process of commercialization and related policies. To improve the quality of the Malaysian workforce, the Technical and Vocational Education and Training (TVET) Master Plan was developed to reinforce private industry linkages and promote private sector involvement [10, 11]. This shows that the commercialization of vocational education has been strongly promoted by government policy initiatives in the field of education (training), especially in Peninsular Malaysia. The Technical and Vocational Education and Training (TVET) Master Plan emphasizes strengthening collaborations and encouraging the private sector to enhance the competency of the Malaysian workforce [12–14]. This is consistent with what is happening worldwide, where vocational education models driven by industry have been successfully adopted by Germany, Australia, and South Korea, among others, resulting in positive employment paths [15, 16]. However, adjusting such models to Malaysia's particular landscape presents challenges, ranging from the regulatory environment and socio-economic gaps to various stakeholders' expectations.

Policymakers view commercialization as a way to reduce government costs and consequently increase the efficiency of the vocational education system. This also means involving private sector players that can offer vocational institutions better opportunities in terms of infrastructure, technology, and expertise, thus leading to enhanced training programs [17]. Moreover, policies have supported public-private partnerships (PPPs) in vocational education and training, with incentives like tax concessions and grants to reconcile education providers and industries [18]. As with any other trend, the interests of commercial players must be balanced to keep vocational education accessible and affordable across the socio-economic divide. Responses from educators and academic institutions to the commercialization trend are mixed. Some educators hail the expansion as a way for community colleges to offer better resources that meet industry needs, while others worry that the model prioritizes the bottom line over pedagogy. This sometimes pushes industry demands to be embedded into the curriculum at the expense of overall educational growth and development. Additionally, when educational institutions are dependent on private funding, this can lead to inequalities in quality, where wealthier schools provide better infrastructure, training, and opportunities than poorer public ones.

Another important stakeholder group is students and their families, who also hold diverse perspectives regarding the commercialization of vocational education. Commercialization has advantages as it has created a wider space for students to choose vocational training institutions, with some

institutions focusing more on particular industries to provide specialized training [19, 20]. In addition, industry-affiliated vocational programs can offer better job opportunities because businesses value students who possess practical, job-ready skills. However, there has been a disproportionate rise in financial costs imposed on students, especially in private colleges or universities, where fees can be several times more expensive than tuition in public institutions [21]. Such emphasis on vocational training may not be equitably accessible, as students from lower-income households may find it difficult to afford good-quality vocational training, which can lead them to lower-paying jobs, thus reinforcing socio-economic inequalities.

Vocational education, on the other hand, is an area in which the commercialization process is generally supported by the private sector and industry leaders, as it produces skilled labor that directly matches market demand. This contributes to companies receiving a steady stream of skilled workers in industry-specific methodologies and technologies. Industries invest in vocational education via apprenticeship programs, sponsoring training, and partnering directly with vocational schools. However, inconsistencies in training quality across different institutions have been a concern expressed by some industry players, particularly regarding the competencies of the graduates entering the workforce [22]. As a result, the standardization of vocational training and quality assurance mechanisms is crucial to guarantee the effectiveness of commercialization in vocational education. The commercialization of vocational education has also attracted ethical and social criticism from the public and from civil society organizations. Critics of neoliberal education argue that excessive market mechanisms may contribute to the commodification of education as a development service; in such cases, profit-maximization outweighs the fundamental goals of education, such as providing skill development and social mobility. Moreover, concerns have been raised that private VET providers may focus more on profit generation than on the delivery of a quality educational experience, resulting in an increased incidence of poor-quality programs that do not adequately equip students for the labor market. It is, therefore, important for regulatory frameworks to exist to ensure commercialization does not adversely affect the accessibility, affordability, and equity of vocational education (which is also a priority for governments).

Given these varied perspectives, the commercialization of vocational education in Malaysia has provided both opportunities and challenges. If well regulated, it can add relevance, quality, and efficiency to vocational education and training. However, it also necessitates cautious governance to prevent adverse developments such as inflation, inequality, and discrepancies in quality. Working with all stakeholders will go a long way toward ensuring policy and strategy formulation that supports the sustainability of the economic model without compromising the primary objective of vocational education: that of creating a pool of suitably qualified candidates to drive national development. Future considerations of this topic must balance both the public and private sectors and examine how commercialization can provide a positive outcomes in Malaysia's vocational education talent pipeline. This study is anchored in the stakeholder theory propounded by Freeman in 1984, which emphasizes the need to consider the diverse interests and influences of key actors such as educators, industry partners, and policymakers in the commercialization of vocational education in Malaysia. It provides a lens to analyze how these stakeholders perceive, shape, and are impacted by commercialization, ensuring balanced, inclusive, and informed policy and practice recommendations.

2. Literature Review

2.1. Conceptual Clarification of Commercialization

To get into the literature on commercialization, it is important to give further clarification on what the word commercialization means. Commercialization is an important process in business, technology transfer, and market economics, but the specific meaning can differ based on context. Commercialization is ultimately about creating economic value through converting ideas or innovations into commercially viable enterprises [23, 24]. This paper conceptualizes commercialization through the defining aspects and theories of contemporary academic discourse. Commercialization refers to the process of bringing a new product or service to the market to generate profit and bring societal value [25]. This consists of several phases, including research and development (R&D), product development, market testing, and full-scale market launch. The seventh stage in the process of

introducing a new product to the market is commercialization, which is the last stage of developing a new product [26]. Commercialization refers to the process of bringing new products or services to market and is closely linked to innovation and entrepreneurship from an economic viewpoint. According to [27], commercialization is a critical piece of creative destruction; the aesthetic of innovation supplants more antiquated goods and services that promote capitalistic growth. The technology transfer literature conceptualizes commercialization as the movement of knowledge and innovations out of research institutions and into the market [28, 29], and is guided by five essential components: innovation and development [30], market preparedness [31], business strategy [32], marketing and distribution [26], and financial and external investment [33]. Commercialization serves as the nexus between innovative academic research and market needs [34]. The innovation diffusion theory of Rogers, 2003, the resource-based view (RBV) by Barney, 1991, business model innovation by Chesbrough, 2006 [32], and the triple helix model of Etzkowitz & Leydesdorff, 2000 were well-cited theories that give credibility and deeper understanding of commercialization. Commercialization plays a crucial role within the networks of economic growth, industrial competitiveness, and the global economy in technological advancement, and has promoted job creation, raised productivity, and increased the benefits from innovations by disseminating them to consumers [35]. Following this consideration and with the nature of the studies covered in the current research synthesis, we concluded that commercialization is a dynamic and multi-dimensional process charged with transforming innovations into commercially viable products or services.

2.2. Research Synthesis on the Commercialization of Vocational Education Globally

A scrutiny of previous research uncovers some noteworthy reviews on the commercialization of vocational education. One of the most comprehensive research syntheses on the need for the commercialization of vocational education was carried out by [36]. The author looked at the market approach of higher vocational colleges' commercialization of research results under the background of an innovation-driven strategy and highlighted the urgency for higher vocational institutions to commercialize scientific and technological outcomes, also emphasizing the need for strategies to effectively market research results within innovation-driven frameworks. A study focusing on Australian vocational education and training (VET) practitioners reveals that marketization and commercialization have led to expanded roles beyond traditional teaching. Practitioners now engage in activities such as administrative tasks and industry collaborations, reflecting a shift towards a more business-oriented educational environment [37]. Recent research conducted by [38] introduces a life-skills-based teaching factory model in vocational secondary education, aiming to enhance creativity, production innovation, and commercialization. This model combines project-based learning with industry collaboration, equipping students for real-world challenges and fostering entrepreneurial skills. Looking at commercialization challenges, an analysis of the Indian education system carried out by [39] discusses how commercialization prioritizes financial gains over educational quality, leading to issues like diminished academic autonomy and increased social inequality. The authors call for a balance between profit motives and the core educational mission. Cai and Kosaka [40] conceptualize Technical and Vocational Education and Training (TVET) from a service perspective, viewing it as a co-creation process involving students and enterprises. This approach emphasizes collaboration and aligns educational outcomes with industry needs, facilitating the commercialization of vocational training. However, research focusing on Malaysia's TVET system identified challenges in TVET commercialization such as fragmented accreditation and limited stakeholder coordination. Proposed solutions include establishing a unified accreditation system, enhancing stakeholder coordination, increasing funding, and improving public perception of TVET. These measures aim to align vocational education more closely with market demands and improve its commercial viability. Effective management of partnerships between TVET colleges and industry is crucial for aligning educational outcomes with labor market needs. Research suggests that successful collaborations require clear communication, shared goals, and active involvement of industry in curriculum development and student assessment. Such partnerships enhance the commercialization potential of vocational education by ensuring it meets industry standards. Okoye [41] examined the impact of PPPs on revitalizing Technical and Vocational Education and Training (TVET). The author recommended PPP involvement in the TVET system to enhance

its economic potential. In Kenya, the partnership between the Kenya Association of Manufacturers (KAM) and the Gesellschaft für Internationale Zusammenarbeit (GIZ) has been analyzed for its effectiveness in aligning TVET outcomes with industry needs, thereby enhancing the employability of graduates. These studies collectively illustrate the multifaceted impacts of commercialization on vocational education, highlighting both opportunities for innovation and challenges related to educational equity and quality.

Taking the above considerations into account, the present research tries to address the following questions:

1. To examine how different stakeholders (policymakers, educators, and industry representatives) perceive the commercialization of vocational education in Malaysia.
2. To investigate how commercialization aligns vocational education with industry needs and labor market demands.
3. To find out whether commercialization improves or diminishes the quality of vocational education and training in Malaysia.

3. Materials and Methods

3.1. Methodology

The purpose of this study was to ascertain the opinions of stakeholders on the commercialization of vocational education in Malaysia. By comparing the application's results with the literature reviews, it was intended to assess commercialization from both quantitative and qualitative standpoints, analyze the results of the current experimental application, and conduct in-depth analyses to interpret the literature's intersecting and non-intersecting aspects. Additionally, a broader analytical approach was required to give a holistic perspective. In this context, we choose to follow the McA when conducting the research[42]. The McA method is based on integrating the results gathered from multiple analysis programs, diverse data sources, and comprehensive knowledge. This adaptable methodological approach operates in a methodical and orderly manner, which allows data to be coded thematically using software like NVivo, interpreted by identifying patterns across stakeholder groups, and validated through triangulation, member-checking, and expert review to ensure credibility and reliability.

3.2. Paper Search and Inclusion Criteria

Using the research question "How do industry stakeholders perceive the commercialization of technical and vocational education as a strategy for national development in Malaysia?", we searched across over 562 academic papers from the Semantic Scholar corpus, Web of Science, Taylor & Francis Online, Science Direct, Scopus (A&I), ERIC, ProQuest Dissertation & Google Scholar. We retrieved the 50 papers most relevant to the query. We screened papers that met specific inclusion criteria, including geographic scope, commercialization focus, stakeholders' perspective, study design, development outcomes, evidence base, commercialization content, and data source, while considering the following questions: Does the study specifically examine TVET institutions or programs within Malaysia? Does the study address commercialization aspects of TVET (such as funding mechanisms, industry partnerships, or market-driven programs)? Does the study include perspectives from industry stakeholders (employers, business leaders, or industry associations)? Is the study either a primary research study (qualitative, quantitative, or mixed methods) OR a systematic review/meta-analysis? Does the study examine relationships between TVET commercialization and national development outcomes? Is the study an empirical research article (not an opinion piece, editorial, or commentary)? Does the study include an analysis of commercialization aspects beyond purely technical TVET elements? Does the study use data exclusively from Malaysian TVET institutions or programs? We considered all the screening questions together and made a holistic judgment about whether to include in the paper. Studies that are outside the scope of the research, are unavailable, involve qualitative data, or have insufficient data for analysis are not included in the meta-analysis. It was found that some of the data came from only one database, and that some of the studies retrieved through the scanning procedure were registered in multiple databases.Experiments with only one group or without an experimental component were also included as causes for exclusion. The PRISMA flow diagram[43] showing the process of obtaining the studies included in the meta-analysis during the literature review stage is given in **Figure 1**.

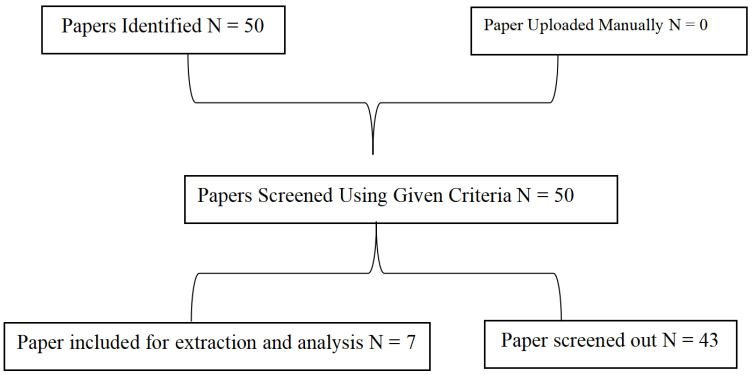


Figure 1. Studies included in the meta-analysis during the literature review stage.

3.3. Data Extraction

The standardized data extraction tool from JBI-MAStARI was used to extract data from the papers that were part of the review. Specific information regarding the interventions, participant demographics, the number and causes of withdrawals and dropouts, study procedures, and any results that were important to the review's goal were all included in the extracted data. All results were subject to double data entry to minimize errors. Attempts were made to contact authors for any missing data from studies.

3.4. Quality Assessment

Study quality was assessed using the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) standards to evaluate the execution of methods, reporting of results, and the likelihood that additional research would affect confidence levels in the estimate of effect[44]. Limitations in study quality and potential risk of bias were evaluated using the CONSORT checklist for RCTs18. Outcome bias about methods of performance assessment was evaluated using accepted standards for evidence of validity[45]. GRADE was used to evaluate the quality of stakeholder opinions by assessing evidence from stakeholder data, while CONSORT ensures transparent, standardized reporting by presenting structured intervention findings. Applying both enhances credibility and consistency in analyzing how different stakeholders perceive the commercialization of vocational education in Malaysia, supporting evidence-based interpretations and informed policy decisions.

3.5. Data Analysis

MetaWin 2.0 statistical software was used to analyze the data acquired in the meta-analysis. Additionally, while interpreting the effect sizes, classification was taken into account. The reliability formula [consensus/(consensus + dissensus) × 100] proposed by Miles and Huberman 1994 cited by[46] was applied to the inter-rater reliability calculation in the meta-analytical dimension, and the analyses were interpreted using the random effects model. Upon computation, the study's dependability was determined to be 98%. The studies completed within the meta-thematic scope based on document analysis were analyzed using the MAXQDA tool. The data were analyzed using the content analysis method. The inclusion criteria for the studies to be used for meta-analysis within the scope of our research are presented in **Table 1**.

Table 1. Characteristics of included studies.

Study	Study Focus	Methodology	Stakeholder Type	Geographic Region
Che' Rus et al., 2023	Technical and Vocational Education and Training (TVET) sustainability framework and graduate marketability	Qualitative (systematic literature review)	No mention found (literature-based)	Malaysia
Hussain et al., 2021	Industrial engagement in TVET system	Qualitative (textual narrative synthesis)	Government, Industry	Malaysia

Table 1. *Cont.*

Study	Study Focus	Methodology	Stakeholder Type	Geographic Region
Kamin, 2010	Work-based learning in community colleges	Mixed-methods (questionnaires, focus groups, interviews)	Students, Lecturers, Training Partners, Employers	Malaysia
Mustapha, 1999	Role of Vocational and Technical Education (VTE) in industrialization	Quantitative (surveys)	VTE Educators, Employers	Peninsular Malaysia
Rahim et al., 2021	Strategic collaboration between vocational colleges and the automotive industry	Mixed-methods (Sequential Exploratory)	Vocational Colleges, Automotive Industry	Peninsular Malaysia
Sappar et al., 2024	Implementation of collaborative industry practices in vocational colleges	Qualitative (multiple embedded case study)	No mention found	Malaysia
Vinayan et al., 2020	Upskilling and reskilling workforce via industry-driven TVET	Mixed-methods (Sequential exploratory)	Industry, Academia, Government	Malaysia

The report identified 7 studies, each with a unique focus related to TVET or vocational education in Malaysia. The stakeholder types varied widely across studies, with Industry and Government each involved in 2 studies, and Employers included in 2 studies. Other stakeholders (e.g., Students, Lecturers, VTE Educators) were each included in 1 study. One study did not specify stakeholder types. Regarding geographic focus, 5 studies focused on Malaysia as a whole, while 2 studies specifically focused on Peninsular Malaysia. The report didn't identify any studies focusing on regions outside of Malaysia. **Table 2** present the themes and characteristics of commercialization in TVET and the thematic analysis of the industry-TVET Partnership Models in **Table 3**.

Table 2. Themes and characteristics of commercialization in TVET.

Theme	Theme Definition	No of Respondents (n = 82)
Entrepreneurial development	Vocational colleges aim to cultivate entrepreneurial skills among students, aligning with the Vocational Education Transformation Plan's goal of producing 10% entrepreneurs from vocational graduates	14 (3)
Industry collaboration	Strengthening partnerships between vocational institutions and industries is crucial	17 (4)
Accreditation and standardization	Addressing fragmentation and decentralization within the Technical and Vocational Education and Training (TVET) sector is essential	11 (3)
Perception and branding	Improving societal perceptions of vocational education is vital. Rebranding efforts and highlighting the value of vocational skills can attract more students and elevate the status of TVET pathways	7 (2)
Curriculum relevance	Regular curriculum updates are necessary to match industry demands.	20 (5)
Government policy and support	Government initiatives, as outlined in the Malaysia Plans, focus on enhancing TVET through strategic policies and investments	13 (6)

Values in parentheses are the number of studies.

Table 3. Thematic analysis of the industry-TVET Partnership Models.

Study	Partnership Type	Implementation Strategy	Perceived Benefits	Challenges
Rus Che et al., 2023	Curriculum revision partnerships	Collaborative curriculum development	Closing skill gaps, meeting industry needs	Poor stakeholder engagement

Table 3. *Cont.*

Study	Partnership Type	Implementation Strategy	Perceived Benefits	Challenges
Hussain et al., 2021	Government industry partnerships	Corporatist model, incentives for industry participation	Improved industry involvement in TVET	Limited participation from uninterested corporations
Kamin, 2010	Work-based learning partnerships	Collaboration between community colleges and the automotive industry	Enhanced student skills and knowledge	Logistical issues, single industry focus
Ramlee, 1999	Private sector input and technical exchanges	No mention found	Mutual benefits for VTE and industry	Differing views on the government's role
Rahim et al., 2021	Strategic collaboration	Formal meetings, consulting services, technology sharing, joint research	Long-term collaboration, knowledge transfer	Differences in interests, expectations, work culture
Sappar et al., 2024	On-the-job training partnerships	Flexible Notes of Understanding (NoU)	Practical training for students, industry engagement	Cultural conflicts, geographical mismatches
Vinayan et al., 2020	Industry-driven curriculum design	Industry participation in TVET program development	Alignment of TVET with industry needs	High costs, supply-demand gap

4. Results

The report identified 7 different partnership types, each mentioned in one study. Implementation strategies varied widely across studies, 3 studies mentioned collaborative approaches (curriculum development, industry-specific collaboration, and industry participation in program development), and 2 studies mentioned formal structures (corporatist model, formal meetings), other strategies included incentives, consulting services, technology sharing, joint research, and flexible agreements while the report didn't find implementation strategy information for 1 study. Concerning the perceived benefits of partnerships, there are 3 studies that mentioned benefits related to industry needs (meeting needs, alignment, and engagement), 2 studies talked about skill-related benefits (closing skill gaps, enhancing student skills/knowledge), and others uncovered the benefits including improved industry involvement such as mutual benefits, long-term collaboration, knowledge transfer, and practical training. Regarding challenges in partnerships, 3 studies mentioned engagement-related challenges such as poor stakeholder engagement, limited participation, and cultural conflicts, 2 of the studies mentioned alignment issues like the differences in interests/expectations and the differing views on government roles, while the other challenges highlighted by other studies included logistical issues, single industry focus, work culture differences, geographical mismatches, high costs, and supply-demand gap. However, the report found unique challenges for each study, suggesting a range of potential issues in TVET industry partnerships.

In terms of commercialization perspectives, industry representatives, consistently emphasize the need for TVET programs to align closely with market demands. The research work of[47] highlights the importance of addressing skill gaps and aligning curriculum with industry needs, Vinayan et al.[48] emphasized industry participation in curriculum design as crucial for ensuring TVET relevance while[49] underscores the need for vocational colleges to understand and adapt to rapid technological developments in the automotive industry. Market alignment emerges as a critical factor in the commercialization of TVET as reported by[50], urging both educators and employers to recognize the major role of VTE in economic development. The same study reveals uncertainties about the employability skills of VT graduates, suggesting potential misalignment. Hussain et al.[51] describe government efforts to encourage industry participation through various incentives. Although government incentives, as described in[51], represent an approach to resource allocation, their effectiveness in ensuring equitable and efficient outcomes remains a question for further research. Several studies address resource allocation in TVET commercialization. Vinayan et al.[48] highlight high costs as a potential barrier to effective implementation. Rahim et al.[49] emphasized the importance of robust resources and commitment to effective collaboration.

Development impact perceptions, the perception of TVET's impact on workforce development is generally positive. Ramlee[50] reports that both educators and employers believe that VTE plays a major role in economic development. Kamin et al.[52] provides insights into the perceived benefits of work-based learning programs, including increased knowledge of technology changes and enhanced skills, whereas it identifies skill gaps as a persistent issue, indicating mismatches between developed and required skills. Regarding Economic benefits, TVET commercialization is recognized across multiple studies: Ramlee[50] reports a shared belief that VTE justifies substantial financial investment. Vinayan et al.[48] frame TVET as a beneficial investment, but also note the high associated costs. However, emphasis on industry-academia collaboration suggests a perception that closer alignment will yield economic benefits.

Despite positive perceptions of TVET's potential impact, several implementation barriers are identified, 1. Skill Mismatches (persistent issue of skill gaps between TVET graduates and industry requirements); 2. Stakeholder Engagement (poor engagement and differences in interests/expectations between vocational colleges and industry); 3. Cultural and Geographical Factors (cultural conflicts and geographical mismatches as barriers to effective collaboration); 4. Resource Constraints (high costs associated with TVET), and 5. Societal Perceptions (societal stigma labeling TVET as 'low class'. These barriers persist across studies spanning from 1999 to 2024, indicating deeply rooted issues requiring sustained attention and innovative solutions.

Stakeholder engagement mechanisms (Collaboration frameworks), the studies reveal various collaboration frameworks, such as 1. Work-based learning, a collaboration between community colleges and the automotive industry[52], 2. Strategic collaboration, a framework including formal meetings, consulting services, technology sharing, and joint research[49], 3. On-the-job training partnerships, the use of flexible notes of understanding[53], and 4. The corporatist model, a government-employed model to encourage industry participation through incentives[51]. These diverse frameworks reflect the complex nature of stakeholder engagement in TVET commercialization and the need for flexible approaches. Industry participation was consistently emphasized as crucial for successful TVET commercialization in many ways. 1. Curriculum design, to ensure alignment with industry needs[48], 2. Work-based learning provides practical training opportunities for students[52, 53], 3. Knowledge and technology transfer which is the industry sharing technology and expertise with TVET institutions[49], and 4. Quality assurance, industry involvement in quality assurance processes for TVET programs[53]. Challenges in industry participation include limited participation from uninterested corporations[51] and differences in interests and expectations[49].

Finally, government policy plays a significant role in shaping stakeholder engagement such as encouraging industry participation through various incentives[51], 2. Potential need for legislative changes to require more industry contribution[51], 3. The implementation of major policies like the 10th MDP, 11th MDP, and PENJANA demonstrates government commitment[51], and 4. The need for uniformity in quality assurance standards[47]. The studies indicate that while policy support is crucial for facilitating stakeholder engagement, there is still room for improvement in creating a comprehensive and effective policy framework for TVET commercialization in Malaysia.

5. Discussion

5.1. How Different Stakeholders Perceive the Commercialization of Vocational Education in Malaysia

5.1.1. Policymakers' Perspectives

Policymakers, including government officials from agencies such as the Ministry of Education and the MTVET Council, shape TVET commercialization through governance reform, funding strategies, systemic coordination, and collaboration with industry stakeholders. Stakeholders in Malaysia have exhibited a nuanced stance on the commercialization of Technical and Vocational Education and Training (TVET), balancing the need for industry collaboration with concerns about equitable access and quality assurance. In some of the reviews, policymakers recognized the critical role of industry engagement in enhancing the relevance and responsiveness of TVET programs. Some policymakers saw collaboration as essential for aligning educational outcomes with labor market demands, thereby improving graduate employability. Most of the policymakers' perspectives were

found to be consistent with the Malaysian government initiatives, such as the National Dual Training System (NDTS), which made efforts to integrate formal education with practical workplace training, ensuring that students acquire both theoretical knowledge and hands-on experience[54]. We observed that despite the support for commercialization, policymakers are cautious about speaking on potential challenges relating to the issues of governance and quality assurance. Some agreed with the assertion in[55] that the fragmentation and decentralization of the TVET system, involving multiple accrediting bodies like the Department of Skills Development (DSD) and the Malaysian Qualifications Agency (MQA), have led to overlaps and inconsistencies in accreditation processes. This duality can create confusion and inefficiencies, making it difficult to maintain uniform standards across TVET institutions[56, 57]. In light of our findings, we called on the government to be very attentive to the social implications of commercialization, particularly concerning equitable access to TVET programs. Further findings show that some policymakers wish concerted efforts to be made to ensure that commercialization does not exacerbate existing inequalities or create new barriers for marginalized communities. However, this fear seems to have been alleviated by the Malaysian government in its initiatives aimed at improving public perception of TVET, such as the 1Youth 1Skill (1B1K) program, which has been implemented to encourage broader participation and to position TVET as a viable and valuable educational pathway[58, 59]. These efforts reflect a policy perspective that seeks to balance commercial interests with social equity, ensuring that the benefits of TVET commercialization are broadly shared.

In light of these considerations and for the commercialization of TVET to hold, we gathered that policymakers advocated strategic reforms that will enhance the effectiveness of TVET commercialization by making recommendations that include the establishment of a centralized accreditation body to reduce redundancies and inconsistencies in quality assurance processes, thereby maintaining the credibility of TVET qualifications. Additionally, for commercialization to work there is a need to foster more structured and formalized industry collaborations to ensure that TVET programs are closely aligned with current industry needs, enhancing the employability of graduates[60]. By so doing, the government would harness the benefits of industry engagement while safeguarding the integrity and inclusivity of the TVET system. However, there is a need to examine the balance between profit motives and educational integrity in vocational education commercialization. Emphasis should be placed on quality assurance, equitable access, and aligning programs with industry needs. Encouraging ethical investment and stakeholder engagement can ensure commercialization supports national workforce goals without compromising TVET's core mission of skills development.

5.1.2. Educators' Perspectives

The educators referred to are vocational and technical educators, teachers and instructors in Malaysian TVET institutions, whose perceptions and priorities shape views on commercialization, curriculum relevance, and government-industry partnerships. Our investigation revealed an array of opinions among educators regarding the commercialization of vocational education in Malaysia, where some see it as a natural progression, whereas others perceive it as an existential danger to the fundamentals of teaching and learning. Some claim that commercialization would contribute to improved quality and relevance of vocational training through industry-oriented curricula and the growth of public-private partnerships[61]. Aligning vocational training with industry expectations enables institutions to equip graduates with the skills and knowledge to be productive immediately after graduation, thus helping to reduce unemployment in the country and addressing the workforce needs of the nation[62]. In addition, valuable funds channeled from the commercial sector can enrich infrastructure, technology, and pedagogical design, resulting in a more energetic learning setting. However, few educators expressed worry that commercialization would jeopardize the original intention of vocational education from a skills-based strategy to a profit-making business[63, 64], a trend that may lead to increased tuition, making vocational programs less accessible to disadvantaged communities. Some outstanding research reports seem to satisfy the demands of privately held companies for financially rewarding work and thus overlook crucial players who are receiving low remuneration[65, 66]. We realize that some scholars believe that the quality of vocational education may be jeopardized through commercialization, due to the choices made when institutions decide to favor cost-saving initiatives instead of holistic training. Even if schools had the time to spend on these programs, what becomes obvious is that they

may focus too much on pragmatic and short-term certificate programs and not enough on empowering students to develop those skills on their own. Notwithstanding, vocational education and its commercialism are gaining momentum in Malaysia, with the potential to adapt to industry demands, while raising challenges around access, quality, and ethics in education are being perceived. Educators should explore how commercialization impacts teaching quality, curriculum relevance, and student access. A new focus is needed on balancing market-driven demands with educational values, ensuring training remains student-centered and inclusive. Educators must adapt to industry trends while safeguarding academic standards, advocating for policies that support both innovation and the integrity of vocational education.

5.1.3. Industry Representatives' Perspectives

From our findings, we understand that industry representatives in Malaysia perceive the commercialization of Vocational Education and Training (VET) as a strategic avenue to align educational outcomes with market demands, thereby enhancing the nation's economic competitiveness. A pivotal aspect of this perspective is the emphasis it puts on strengthening collaborations between VET institutions and industries, which are essential for producing graduates equipped with relevant skills that directly address workforce requirements across various sectors. However, several studies indicate that challenges persist in these collaborative efforts. A significant issue identified is the limited placement opportunities for academic staff to undertake placements within industries, which hampers the practical exposure necessary for educators to impart industry-relevant knowledge. Industry responses also revealed a notable gap in the sharing of facilities and resources between educational institutions and industry partners. As[67] cautioned, without proper attention, this may further impede the practical training of students. These gaps highlight the need for more structured and reciprocal arrangements to facilitate seamless knowledge and resource exchange. From the industry's standpoint, the quality of VET programs is intrinsically linked to the competency of teaching staff and the effectiveness of governance structures. In light of this, industrial representatives expressed concerns regarding the adequacy of soft skills among graduates and the perceived inefficiencies in the governance of VET, which may limit the responsiveness of these programs to evolving industry needs. To mitigate these issues, industry experts advocate for strategic collaborations that include active participation in curriculum development, provision of practical training opportunities, and involvement in assessment processes to ensure that graduate competencies align with industry standards. While the commercialization of vocational education in Malaysia is viewed positively by industry representatives for its potential to produce a competent workforce tailored to market needs, it is our thinking that this may require overcoming challenges related to collaboration mechanisms, quality assurance, and societal perceptions. Addressing these issues through cohesive strategies involving both educational institutions and industry partners is essential for realizing the full potential of VET in contributing to Malaysia's economic development. However, industry workers should view commercialization as an opportunity to shape vocational education that meets real workplace needs. A new dimension involves active collaboration with educators to ensure curriculum relevance, skill alignment, and employability. Workers must advocate for training standards that enhance productivity while supporting fair access, lifelong learning, and sustainable development within Malaysia's evolving labor market.

6. Commercialization and the Alignment of Vocational Education with Industry Needs and Labor Market Demands

No studies have previously reported on industrial needs and labour market demands. Powell[68] reported that the integration of private sector investment, industry partnerships, and market-driven curricula have emerged as a crucial strategy to bridge the gap between education and employment. Stakeholders agree with Powell's belief that such alignment is essential in fostering a workforce that is prepared for the evolving needs of various industries. Some stakeholders anticipated that if companies invest in vocational institutions through sponsorships, apprenticeships, and curriculum design, it would ensure that TVET graduates possess the competencies required in the workforce[69]. We found that this partnership-driven approach enhances the employability of students by providing hands-on experience and exposure to real-world industry challenges. Undoubtedly, studies have revealed that commercialization fosters innovation within

vocational training programs. There have been reports that notable market-driven education models emphasize technological advancements, such as artificial intelligence, automation, and digital skills, aligning curricula with industry trends. By attracting investments from private enterprises, we believe that vocational education providers can access better infrastructure, resources, and technology, leading to improved training quality. Examining vocational education systems across different regions reveals a direct correlation between financial investment and program success. For instance, reported evidence indicates that Germany's dual vocational training system thrives due to substantial government and industry funding, while underfunded vocational programs in developing nations face challenges in delivering quality education.

7. Commercialization and the Quality of Vocational Education and Training in Malaysia

Significant to this study was whether commercialization improves or diminishes quality. Although no substantial evidence exists within the selected reviews, the Malaysian government has implemented policies to encourage industrial engagement in VET, offering incentives such as tax breaks and training grants to foster partnerships between educational institutions and industries. Stakeholders considered this alignment crucial for improving the employability of VET graduates and enhancing the overall quality of training programs. They also found that the incorporation of digital learning platforms, as part of commercialization efforts, has increased the accessibility and flexibility of VET. They noted, for instance, that Malaysia's Ministry of Higher Education Massive Open Online Courses (MOOCs) initiative, hosted by OpenLearning, offers vocational courses tailored to local industry needs as an initiative that would enable students from diverse backgrounds to engage in competency-based education, leading to improved employment outcomes and better alignment between training and industry requirements. These stakeholders concurrently understood the constraints that could affect the quality of TVET. According to them, one significant issue is the fragmentation and decentralization of governance, noting that the presence of multiple accrediting bodies operating independently would lead to overlaps and inconsistencies in accreditation and quality assurance processes. Another fear that stakeholders expressed was that market-driven approaches may result in inadequate funding for VET programs. Limited financial resources would constrain the ability of institutions to upgrade facilities, adopt new technologies, and attract qualified instructors, thereby affecting the quality of education and training provided. It is likely that, without sufficient investment, the effectiveness of commercialization efforts in enhancing VET quality may be compromised.

8. Limitations

Although this study offers useful perspectives on the commercialization of vocational education in Malaysia from a multiple-stakeholder perspective, the results are not without some drawbacks. We found some limitations that could limit the generalizability and applicability of the findings. For instance, the study's geographical scope was limited to Malaysia in particular, raising concerns regarding the generalizability of the findings to the rest of the world. Again, insights are based on qualitative data through interviews and focus groups that, while delivering richness, cannot reinvent the wheel of objectivity. It is, however, impossible to completely avoid researcher bias in data interpretation and analysis. However, future research exploring qualitative findings in quantitative surveys may strengthen data robustness.

The sampling strategy was also of concern, as the study was largely composed of policymakers, educators, and industry representatives, limiting student voices. As direct beneficiaries or victims of commercialization, students' perspectives are an essential component of understanding the ramifications of commercialization. We encourage further researchers to examine students' perspectives as well. The study examined short-term perceptions from stakeholders and did not consider the long-term effects of commercialization on vocational education deliverables. Longitudinal studies would help to capture shifts in stakeholder opinions and evaluate the ongoing impacts of commercialization. We did not delve into external influences such as the changing government policies, global economy, and global educational trends that also greatly impact the prospects of vocational education in Malaysia. Future work should combine macroe-

conomic and policy factors in an integrated analysis.

9. Conclusions

Vocational education is a vital component of national development, particularly in industrialized and labor-intensive economies. Malaysia has been experiencing a growing trend of commercialization within its vocational education and training (VET) sector, leading to significant changes in availability, quality, and job-market alignment. As a result of this trend, a range of stakeholders, including policymakers, educators, industry leaders, students, and parents, have focused their attention on this issue, each bringing different views that influence the construction and consequences of vocational education commercialization. This study explores these diverse stakeholder views on the commercialization of vocational education in Malaysia, intending to deliver a holistic overview of how commercialization could create opportunities or hurdles for VET in the Malaysian context by examining the complex interactions between government policies, industry demand, institutional strategies, and social equity considerations.

Commercialization has been driven by government initiatives that seek to decrease reliance on public funding while increasing the competitiveness of institutions. The increasing privatization of vocational education institutions and the use of public-private partnerships (PPPs) would also lead to new opportunities for investment and curriculum diversification. These changes would also prompt new concerns, especially regarding the commercialization of education and the potential marginalization of poorer students in an era of increasing tuition fees.

In general, for the government, the argument has been made that commercialization would make vocational education more responsive to the demands of the industrial sector. For instance, the adoption of the Malaysian TVET Blueprint reiterates synergetic work between educational institutions and industry players to narrow down the skills gap and increase employability. However, this might cause the industry to put pressure on educational institutions to focus on short-term profitability over long-term educational objectives, which may widen the gap between skills acquired in laboratories and those required in the actual industry. Some stakeholders are calling into question the reality of academic exchange amid market-driven models, and how institutions and instructors can strive for academic integrity within this framework. The move toward commercialism would push institutions to provide industry-oriented certifications, create strategic partnerships, and integrate technology into training programs. Although these changes can improve the relevance of vocational education, they can also compromise the quality of pedagogy when the pursuit of profit trumps learning. While commercialization would provide better facilities and skills training sessions, it would also create more inequality in terms of access to education, thereby raising the necessity for regulatory frameworks that balance market efficiency with access to education. Policymakers should strengthen regulatory frameworks to ensure that vocational education commercialization aligns with national development goals. Encourage transparent public-private partnerships, prioritize equitable access, and involve stakeholders, educators, industry, and communities in policy formulation. This inclusive approach fosters quality training, reduces skill mismatches, and enhances TVET's role in driving Malaysia's socio-economic transformation.

Author Contributions

S.A. conducted qualitative interviews with educators and policymakers, analyzed data to uncover themes related to institutional funding challenges, curriculum commodification, and policy gaps. His insight shaped the framework used to assess stakeholder alignment and provided critical recommendations for more inclusive, sustainable vocational education commercialization in Malaysia. A.M. led the literature review and theoretical grounding of the study, drawing from global commercialization models and applying them to Malaysia's TVET context. He identified key stakeholder dynamics and framed the implications of market-driven approaches on educational equity, ultimately guiding the study's policy relevance and academic contribution. All authors have read and agreed to the published version of the manuscript.

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Data Availability Statement

Raw data that support the findings of this study are available from the corresponding author, upon reasonable request.

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Conflicts of interest

The authors declare no conflict of interest.

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