

THE INTEGRATION OF ISLAM AND SCIENCE IN VOCATIONAL EDUCATION: AN ECONOMIC PERSPECTIVE ON HUMAN RESOURCE EMPOWERMENT

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Vocational education is designed to prepare students to become professional workers equipped with specific applied skills. This paper discusses issues related to vocational education from the perspectives of psychology, sociology, and economics. Through a literature review, the paper identifies challenges and opportunities in the development of vocational education in Indonesia, including certification programs, internship collaborations with international companies, and internationally standardized training. The analysis shows that vocational education plays a crucial role in enhancing the competitiveness of the workforce and meeting labor market demands. In conclusion, vocational education must continue to be developed through collaboration between educational institutions and industry.

Keywords: *Vocational Education, Empowerment, Economy*

A. Introduction

The term *vocational* is now often associated with education, giving rise to the phrase *vocational education*. However, a large portion of the Indonesian public is still unfamiliar with the term. This is understandable, as the word *vocational* is not yet widely recognized in everyday discourse. In the current edition of the *Kamus Besar Bahasa Indonesia* (the Great Dictionary of the Indonesian Language), which serves as a primary reference for vocabulary and terminology, *vokasi* is defined as something related to vocational schools or vocational guidance.

Djohar states that vocational education is an educational program that prepares individuals to become professional workers. According to Merriam-Webster, *vocational* refers to “relating to, or undergoing training in a skill or trade to be pursued as a career,” meaning training in a specific skill or trade intended as a future profession.

In this context, parents are encouraged not only to leave material inheritance, but also to equip their children with knowledge and skills, so that they

are able to survive and contribute positively to others. As the Prophet Muhammad (peace be upon him) said

عن جابر قال : قال رسول الله صلى الله عليه وسلم : المؤمن يألف ويؤلف ، ولا خير فيمن لا يألف ، ولا يؤلف ، وخير الناس أنفعهم للناس

It was narrated from Jabir that he said, “The Messenger of Allah (peace be upon him) said: *‘The believer is friendly and sociable, and there is no good in the one who is neither friendly nor sociable. The best of people are those who are most beneficial to others.’*” (Reported by al-Ṭabarānī and al-Dāraqutnī)

In the book *Jāmi‘ al-Aḥādīth* by Imam al-Suyūṭī, it is narrated that Sayyiduna ‘Umar (may Allah be pleased with him) said:

أَنَّ عُمَرَ بْنَ الْخَطَّابِ كَتَبَ إِلَى أَهْلِ الشَّامِ أَنْ عَلِّمُوا أَوْلَادَكُمْ السِّبَاحَةَ وَالرَّمْيَ وَالْفُرُوسِيَّةَ

It is reported that ‘Umar ibn al-Khaṭṭāb (may Allah be pleased with him) instructed the people of Greater Syria (Shām), saying: *“Teach your children swimming, archery, and horseback riding.”*

Skills-based education is essential in everyday life. Even the Prophet Muhammad (peace be upon him) personally exemplified this by working as a shepherd and as a trader (both exporter and importer). According to a narration from Abu Hurairah (may Allah be pleased with him), the Messenger of Allah (peace be upon him) said:

مَا بَعَثَ اللَّهُ نَبِيًّا إِلَّا رَعَى الْغَنَمَ . فَقَالَ أَصْحَابُهُ وَأَنْتَ فَقَالَ نَعَمْ كُنْتُ أَرْعَاهَا عَلَى قَرَارِيطَ لِأَهْلِ مَكَّةَ

Tidak ada Nabi kecuali pernah menjadi penggembala kambing. Mereka para sahabat bertanya, Apakah engkau juga wahai Rasulullah? Beliau berkata, Iya, saya telah menggembala dengan imbalan beberapa qirath (mata uang dinar, pen.) dari penduduk Mekah. (HR. Bukhari, no. 2262)

In the book *Revitalisasi Pendidikan Vokasi Kementerian Pendidikan dan Kebudayaan, 2016*. the Ministry equates vocational (kejuruan) education with vocational (vokasi) education, particularly as stated by the Minister of Education in

the foreword. “Pendidikan vokasi diarahkan pada penerapan sistem ganda (dual-system), yakni belajar teori di SMK dan praktik di industry”¹.

Undang-Undang Republik Indonesia Nomor 20 Tahun 2003 Tentang Sistem Pendidikan Nasional Pasal 15 berbunyi “Jenis pendidikan mencakup pendidikan umum, kejuruan, akademik, profesi, vokasi, keagamaan, dan khusus”². This implies that vocational (kejuruan) education refers to secondary-level education designed to prepare students primarily for employment in specific fields, whereas vocational (vokasi) education refers to higher education that prepares students to enter the workforce with specialized applied skills, up to a level equivalent to a bachelor's degree. The main objective of vocational education is to enable students to work with specific applied competencies.

Vocational education is a form of education that provides learners with foundational knowledge and appropriate training in everyday life values, so that they become capable, willing, and skilled in managing their lives—ensuring both survival and personal development. Through this approach, education becomes more realistic and contextual, without detaching learners from their roots, thereby making the learning process more meaningful and allowing it to flourish. A person is considered to possess life skills when they are capable, willing, and proficient in leading a fulfilling and meaningful life. This encompasses personal life, family life, neighborhood life, community life, professional life, national life, and other dimensions of human existence.

B. Literature Review

1. The History of Vocational Education

During the period of Dutch East India Company (VOC) rule, the first vocational school was established in 1737, namely a maritime academy. However, this school was closed in 1755. After more than two centuries of colonial control, in 1853 the Dutch reopened vocational education in Indonesia. This institution was

¹ Kementerian Pendidikan dan Kebudayaan, *Revitalisasi Pendidikan Vokasi*, Jakarta: 2016

² Undang-Undang Republik Indonesia Nomor 20 Tahun 2003 Tentang Sistem Pendidikan Nasional Pasal 15

named *Ambachts School van Soerabaja* (the Surabaya Vocational School), intended for both Indonesian and Dutch children.

During the Japanese occupation, Indonesia had to rebuild its education system from scratch, as all aspects related to Dutch influence were eliminated. Vocational schools were reestablished during this time, including the *Sekolah Teknik Menengah* (STM or Secondary Technical School) in the Ciroyom area of Bandung. This school, founded during the Japanese era, offered a three-year program and had up to 360 students enrolled. However, it was forced to close after Indonesia's independence in August 1945. At that point, teachers and students dispersed and joined spontaneous resistance units such as the *Tentara Pelajar Republik Indonesia* (TPRI or Student Army of the Republic of Indonesia), *Badan Keamanan Rakyat* (BKR or People's Security Agency), and *Tentara Keamanan Rakyat* (TKR or People's Security Army).

Since the implementation of the Five-Year Development Plan (REPELITA) launched in 1969, vocational education in Indonesia began to adopt models from other countries. Gradually, vocational education gained recognition within the national education system. A milestone in the integrated development of vocational education occurred during the Fifth REPELITA through the enactment of Law No. 2 of 1989 on the National Education System. This was followed by the issuance of Government Regulation No. 29 of 1990 on Secondary Education, which included several provisions for the advancement of vocational education.

During this period, Ministerial Decree No. 490/1992 on Vocational High Schools (SMK) was issued, initiating the development of production units as part of the teaching and learning process in vocational schools. These production units involved activities related to the production of goods and services by utilizing all available resources within the school and its surrounding environment³.

The government further advanced vocational education development through the implementation of the Dual-Based Education System (*Pendidikan Sistem Ganda*, PSG) using the "Link and Match" concept, starting in 1997

³Kementerian Pendidikan dan Kebudayaan, *Revitalisasi Pendidikan Vokasi*. Jakarta. hlm.15

(Ministerial Decree No. 323/U/1997). This initiative marked the beginning of efforts to involve the business and industrial sectors in vocational education. The system was adapted from the German *Dual System* model, with several adjustments made to suit the Indonesian context. Theoretically, PSG is considered an ideal educational system to enhance both the relevance and efficiency of vocational high schools (SMK). One of the core components of this system is the student internship or practice within industry settings.

Several initiatives have been undertaken by SMKs to engage the business and industrial sectors, including organizing vocational education expos, signing cooperation agreements with industries, forming internal school organizations, and conducting regular teacher visits to industries. These efforts have been followed by the establishment of the National Vocational Education Council (*Majelis Pendidikan Kejuruan Nasional*, MPKN) and Provincial Vocational Education Councils.

In accordance with Law No. 20 of 2003 on the National Education System, Article 15, vocational high schools (SMKs) are designed to prepare graduates for employment in specific fields. This indicates that vocational secondary education aims to produce job-ready graduates, whether for self-employment or for employment in particular industries.

The Directorate General of Vocational High School Development, under the Ministry of Education and Culture (Kemdikbud), has stated that the current ratio of instruction at SMKs is approximately 50 percent theoretical and 50 percent practical. This is expected to be increased to 70 percent practical learning⁴.

Vocational education (dual training) in Germany is designed to provide students with both theoretical knowledge and practical skills. In vocational schools, approximately 75% of students' time is spent working in industry, while the remaining time is dedicated to theoretical learning in school. Upon completing their vocational education and industry-based training, students receive certification

⁴<https://www.republika.co.id/berita/nasional/umum/16/09/15/odicmp359-kemendikbud-akan-tambah-persentase-praktik-smk>, diakses 9 Desember 2018

from the relevant industrial association (chamber), which can be used as a credential when applying for jobs.

The vocational education curriculum in Germany is oriented toward integrating *instruction* and *construction*. Therefore, the primary approach in designing the stages of learning is based on both classroom instruction and industrial practice, with an emphasis on achieving desired learning outcomes. Moreover, competency orientation at various levels must be considered in alignment with the instructional design process.

Indonesia currently faces two major challenges. The first challenge is the onset of the Fourth Industrial Revolution, which is already underway. No force has driven such significant civilizational change as the industrial revolution, which brings with it rapid technological advancement. Unlike the Third Industrial Revolution, where machines operated independently, the Fourth Industrial Revolution connects all machines through cyber-physical systems, fundamentally transforming how humans live, work, and communicate. The innovations it produces to enhance quality of life are limitless, yet the challenges are increasingly complex. Manual labor is gradually being replaced by automation and information technology. As a result, many current types of jobs are projected to disappear over the next decade. It is estimated that 35% of core skills will change by 2020, and nearly 2 billion workers are at risk of job displacement.

For Indonesia, this challenge must be transformed into an opportunity. By harnessing its abundant youth population and advancements in technology, Indonesia must prepare a generation of innovators capable of transforming its diverse natural resources into high-value goods and services, thereby creating millions of new jobs. Consequently, vocational high schools (SMKs) must develop 21st-century skills to produce graduates who are *"innovative, inventive, self-motivated and self-directed, creative problem solvers to confront increasingly complex global problems"* (Trilling & Fadel, 2010).

The second challenge is globalization, particularly with the implementation of the ASEAN Economic Community (AEC) at the end of 2015, which facilitates

increased labor mobility and open competition among the workforce across ASEAN member countries⁵.

2. Issues in Vocational Education

Education in Indonesia is often burdened by stigmas that can affect the quality of education an individual receives. Despite the abundant potential of Indonesia's human resources, many individuals are not properly or systematically educated.

A clear example of this is the distinction made between science (natural sciences) and other academic tracks starting from senior high school. There is a prevailing perception among parents and students that entering the science track (*IPA*) is mandatory, even if it does not align with the student's interests. As a result, students who pursue social sciences at the university level are often not considered among the top-tier candidates⁶. This has long-term implications for human resources entering professional sectors related to the social sciences, such as law. One prevailing stigma in society concerning education is the perceived distinction between university education and vocational education. After graduating from secondary school, most students prefer to pursue university education rather than vocational pathways. Even when students enroll in vocational programs, it is often viewed merely as a stepping stone to eventually enter a university. This perception arises due to various disparities between university and vocational graduates, ranging from differences in social status to income levels. Moreover, students who choose to attend vocational high schools (SMKs) are often excluded from opportunities to enter government service academies (*sekolah kedinasan*).

Despite these stigmas, the Minister of Education and Culture, Muhadjir Effendy, highlighted three key issues concerning the future direction of vocational education in Indonesia. These points were presented during the closing of the World Culture Forum 2016, held in Nusa Dua, Bali, on Thursday, October 13, 2016. In this context, the Minister gathered the Education and Cultural Attachés (*Atdikbud*)

⁵Kementerian Pendidikan dan Kebudayaan....hlm 2

⁶Hikmahanto Juwana (Guru Besar Fakultas Hukum Universitas Indonesia.), *Problem dan Upaya Membenahi Sistem Pendidikan di Indonesia* . Jakarta hlm.1

from Indonesian embassies to discuss the strategic handling of vocational education development.

The three key issues raised include: the plan to grant certification for vocational high school (SMK) students, opportunities for international internship partnerships, and the design of internationally standardized training programs for vocational students.

Muhadjir emphasized that vocational education has become a central focus of Indonesia's educational policy, aiming to produce vocational graduates who meet the actual needs of the labor market. He explained that the pressing demand for vocational schools involves preparing students with competencies aligned with specific employment sectors. This effort requires cooperation from all stakeholders. Notably, four emerging areas of vocational competence that are currently in high demand include marine and maritime industries, tourism, and agriculture⁷.

a. Certification for Students Sekolah Menengah Kejuruan (SMK)

The quality of vocational education graduates is ideally determined based on their mastery of a defined occupational competency standard, namely the Indonesian National Work Competency Standards (*Standar Kompetensi Kerja Nasional Indonesia* or SKKNI). Based on these competency standards, a system of assessment and certification is formulated. However, not all vocational programs currently have established SKKNI, and several existing SKKNI have not yet been integrated into the curriculum. At present, inter-ministerial and institutional coordination is underway to develop SKKNI for each vocational specialization.

Several efforts have been made to minimize the gap between the competencies of vocational education graduates and the needs of the business/industrial sectors. These include the development of certification schemes involving professional associations and industry representatives (DUDI) in both the design and implementation of competency assessments.

Graduates who receive certification are those who meet the established work competency requirements. These requirements include: (1) A well-structured

⁷Suara Pembaruan, <https://acdipindonesia.wordpress.com/2016/10/17/mendikbud-ada-tiga-isu-penting-di-pendidikan-vokasi/> diakses 9 Desember 2018

learning process at school, where students are treated as active learners and are nurtured to develop character, competence, independence, responsibility, creativity, innovation, and entrepreneurial skills; (2) Availability of testing equipment in schools that meets the competency standards; and (3) Certified assessors to conduct the evaluation.

The Work Competency Certification is issued by the National Agency for Professional Certification (*Badan Nasional Sertifikasi Profesi*, BNSP) and relevant professional associations⁸.

To equip vocational high school (SMK) graduates with competency certificates recognized by the business and industrial sectors (DUDI), thereby increasing their competitiveness, since 2015 the Directorate of Vocational High School Development (Dit. Pembinaan SMK), Ministry of Education and Culture (Kemendikbud), in collaboration with the National Agency for Professional Certification (BNSP), has implemented the development of SMKs into First-Party Certification Institutions (LSP-P1).

As of 2015, the certification testing was prioritized for 13 vocational programs, 8 of which are included in the 12 priority sectors of the ASEAN Economic Community (AEC), namely: Tourism, Culinary Arts, Beauty Therapy, Fashion Design, Finance, Administration, Mechanical Engineering, Automotive Engineering, Textile Technology, Chemical Engineering, Computer and Informatics Engineering, and Telecommunication Engineering.

b. Internship Collaboration with International Companies

High-quality vocational education is education that produces graduates in accordance with the needs of the business and industrial sectors (DUDI). To achieve this, the teaching and learning process must align with industry standards and expectations. The involvement of DUDI should not be limited to providing internship placements for vocational education students. Rather, their participation must reflect the practical implementation of a dual-skills system between DUDI and schools to ensure the objectives of vocational education are fulfilled.

⁸Kementerian Pendidikan dan Kebudayaan....hlm 59

DUDI engagement may include curriculum development, ensuring that learning materials are more relevant and aligned with real-world demands. In addition, DUDI can offer training to teachers and educators to keep their knowledge up-to-date with the latest advancements in machinery or techniques relevant to their vocational programs. In some cases, DUDI may assign professionals to serve as co-teachers or mentors, allowing students to interact directly with industry experts

UU Sisdiknas Nomor 23 Tahun 2013, The business and industrial sectors (DUDI) can also be involved in financing education. In schools that maintain close cooperation with DUDI, they can participate in the development of laboratories or practical training facilities, or provide assistance with practical equipment. Schools that have strong relationships with DUDI and can implement a dual-skills practice system are assured of producing graduates who meet the needs of the industry.

The apprenticeship system is the oldest vocational education system in the history of vocational training. It is a highly effective system for educating and preparing individuals to deepen and master more complex skills that cannot be fully acquired through mass education in schools. In the apprenticeship system, novices learn directly from experts in a specific vocational field. Industrial apprenticeships provide students with hands-on experience by engaging in actual work activities, with the aim of mastering competencies that align with industry standards, as well as understanding work culture, required professional attitudes, quality culture, and customer service.

Industries serving as apprenticeship sites benefit not only the students but also themselves, as they contribute to shaping apprentices into skilled workers ready for employment. This arrangement benefits industries by providing trained labor, reducing the need for additional training after hiring. Given that the capacity of industries to accommodate apprentices is smaller than the number of students needing placements, the concept of a teaching factory has been developed. The teaching factory, which will be elaborated upon in later sections, is a factory or production site that also serves as a venue for vocational education students to practice and enhance their skills⁹.

⁹*ibid*hlm 46

c. International-Standard Training for Vocational Students

In addition to serving as a venue for internships to understand work processes and culture, industries are also utilized as places for learning about production management and organization. Vocational students sometimes observe machine operation and product quality, indirectly learning about product quality and efficiency. Moreover, students learn about industrial management and organization to gain insights into business operations and management, thereby broadening their knowledge and understanding of the business world. Through studying management and organization, students can also enhance their entrepreneurial capabilities. Vocational students sometimes use industries as “study tours” by simply observing production processes from a distance. Occasionally, they receive information from industry managers about organizational structures and management. These industrial experiences are beneficial for developing the students’ professional competencies. It is expected that upon graduation, students will be able to develop their talents and potentials, not solely relying on employment but also independently advancing their personal potential and the potential of their regions.

The design of practical training programs cannot be separated from the implementation of syllabi into learning activities, which requires appropriate methods, strategies, and evaluation of execution. The skills already possessed by students, gained through practice and training at school, need to be implemented in real contexts so that students develop awareness that their competencies are valuable for themselves and others. Consequently, students gain greater confidence as their knowledge is recognized and accepted by the industrial world. Therefore, the implementation of practice in vocational high schools generally uses a block system of learning that can be adjusted to industry needs.

In recent decades, the Teaching Factory concept has become a major attraction in various countries, including the United States. A Teaching Factory is an industrial project aimed at providing real-world experience in design, manufacturing, and product realization. It develops curricula that balance

knowledge, theory, and analysis with manufacturing, design, business activities, and professional skills to produce graduates who are experts in their fields.

Many educational institutions strive to bring practical education closer to industry. Thus, the Teaching Factory has become a novel approach to vocational education with the goals of: (1) modernizing the learning process by closely linking it with industrial practice; (2) enhancing industrial knowledge through new insights; (3) supporting the transition from manual to automated work methods and reducing gaps between industrial resources (labor and capital) and industrial knowledge (information); (4) increasing and maintaining industrial wealth growth; and (5) ultimately promoting graduates' capability development. The fundamental concept of the Teaching Factory is "Factory to Classroom," which aims to transfer the real industrial production environment directly into practical learning spaces.

In Indonesia, the Teaching Factory concept was introduced in vocational high schools (SMKs) in 2000 in a very simple form, namely through the development of production units already implemented in several SMKs. This concept evolved in 2005 into a model for developing industry-based SMKs. The three basic categories of industry-based SMK development are: (1) simple industry-based SMK development; (2) developing industry-based SMKs; and (3) developing industry-based SMKs in the form of factories as learning venues. Subsequently, in early 2011, the third model developing industry-based SMKs in the form of factories as learning venues became widely known as the Teaching Factory.

Here, the term "factory" is symbolic and does not necessarily refer to a physical factory building. Rather, it refers to learning conducted directly at practical sites, outside the classroom, with practice oriented towards production, similar to real industrial activities. This model fully integrates learning and working, no longer separating theory delivery and practical implementation.

In 2011, the Indonesian government, through the Directorate of Vocational High School Development, collaborated with the German government under the SED TVET program to develop the Teaching Factory concept. Initially, the Teaching Factory adapted the Dual System learning method, which has long been implemented in TVET education in Germany and Switzerland. This learning

method integrates or links two primary environments in every student activity: the school as a learning place and the company (industry). Students not only engage in learning at school but also practice (basic competencies) and work (apply their competencies) in industries over a relatively long period. Fundamentally, the Dual System aims to place students in a real workplace situation comprehensively. Through this practice, students gain not only theoretical knowledge but also the ability to apply production-based practices as routinely performed in industry. This enables students to acquire skills, processes, and attitudes that align with industry standards, ensuring education outcomes meet industrial needs¹⁰.

3. An Economic Perspective on Vocational Education

Economics can be viewed as one of the outputs of vocational education, among which is the creative economy. The creative economy encompasses various activities based on creativity, skills, and talents that possess economic potential and create new job opportunities through the creation and exploitation of intellectual property. Vocational education is education aimed at mastering knowledge and skills that have economic value, aligned with market needs and characterized by a high education labor coefficient.

The implications for vocational education are as follows: a) Programmed internships or apprenticeships must be an integral part of the vocational education system, as many technical skills, attitudes, habits, and emotional competencies can only be acquired through on-the-job training; b) On-the-job training includes learning both general and specific skills; c) Since general training has a longer economic value and forms the foundation, it must be strong; d) Specific training must always be updated according to market demands; e) Training in acquiring and exploring information skills is important for continuous updating¹¹.

¹⁰*Ibid...* hlm 57

¹¹Bambang Sugestiyadi (Dosen Pendidikan Teknik Sipil dan Perencanaan UNY) 2011, *Pendidikan Vokasional Sebagai Investasi*. Universitas Negeri Yogyakarta. hlm 4

According to Finch and Crunklton (1979), the broad objectives of education are: (a) education for living, and (b) education for earning a livelihood. The dimensions of vocational education according to Finch & McGough (1982) include: (a) The human dimension, encompassing human relations, creativity, commitment (responsibility), flexibility, and long-term orientation; (b) The task dimension, covering planning, development, management, and evaluation; (c) The environmental dimension, including schools, society, and labor supply.

Theoretically, vocational education according to Rupert Evans (1978) aims to: a) fulfill society's need for labor, b) expand educational choices for every individual, and c) encourage motivation for lifelong learning. Vocational education is a program directly linked to preparing an individual for a specific occupation or further career preparation (United States Congress, 1976).

Wenrich and Wenrich (1974: 6) define vocational education as “the total process of education aimed at developing the competencies needed to function effectively in an occupation or group of occupations.” The implied meaning in this definition includes: (1) development of competencies, (2) competencies needed, (3) competencies developed that enable effective functioning, and (4) competencies related to a specific job or group of jobs. Vocational education is specialized education covering all types and levels of occupations. A common misconception is to limit vocational education only to manual skills. In fact, vocational education concerns mental skills, manual skills, values, and attitudes (Wenrich and Wenrich, 1974: 8). Therefore, vocational education implicitly contains cognitive (thinking), psychomotor (doing), and affective (feeling) elements in varying proportions according to the competency needs of specific job types and levels. This concept also indicates that vocational education exists at all educational levels: basic, secondary, and higher education. This reflects the understanding that different occupations require varying qualifications/competencies. These differences refer to competency levels. The educational paradigm must shift from supply-minded (quantity-oriented) to demand-minded (needs-oriented) in relation to the labor market.

According to Hadiwaratama (2002: 3-6), vocational education implementation should follow these processes: (1) transfer or acquisition of knowledge through theoretical learning; (2) digestion of knowledge through assignments, homework, and tutorials; (3) validation of knowledge through empirical or visual experiments in laboratories (simulation or virtual reality); (4) skills development through real tasks in school workshops, training centers, or internships in industries. Among these four stages, skills development is the most essential element in vocational education.

Vocational education faces ongoing real challenges rooted in social and economic welfare issues that have increasingly been neglected procedurally over time.

C. Research Methodology

This study employs a qualitative approach with a systematic literature review design. This approach was chosen because the research focuses on an in-depth analysis of vocational education issues from a multidisciplinary perspective (psychology, sociology, economics) as well as the identification of patterns and recommendations from relevant textual sources. The systematic literature review design enables the researcher to collect, evaluate, and synthesize findings from various sources in a structured manner.

D. Results and Discussion

1. Issues in Vocational Education in Indonesia

a. Social Stigma towards Vocational Education

Although Vocational High Schools (SMK) contribute 48% of the total secondary school students in Indonesia (Ministry of Education and Culture, 2023), vocational education is still perceived as "pilihan kedua" after high school or university education.¹² The BPS survey (2022) indicates that 65% of parents prefer their children to attend senior high school (SMA) due to reasons of "social prestige" and access to university education.¹³ This stigma is exacerbated by government

¹²Kemdikbud. (2023). *Statistik Pendidikan Menengah 2023*. Jakarta.

¹³BPS. (2022). *Survei Sosial Ekonomi Nasional*.

policies that have not yet fully integrated vocational high schools (SMK) into the national education system as a primary pathway.¹⁴

This stigma reflects the social class structure in Indonesia, where blue-collar jobs (such as technicians or artisans) are considered inferior to white-collar professions. This contradicts the principles of the sociology of education, which emphasize education as a tool for social mobility.

b. Competency Gap Between Graduates and Industry Needs

A study by the Ministry of Education and Culture (Kemdikbud, 2021) found that only 40% of vocational high school (SMK) graduates possess competencies that align with industry requirements. A concrete example can be seen in the automotive sector, where 70% of industries report a lack of SMK graduates' ability to operate digital CNC machines.

This gap results in a labor mismatch, with the unemployment rate among SMK graduates reaching 9.1% (BPS, 2023), while industries face a shortage of 1.2 million skilled workers annually. According to Becker's Human Capital theory (1964), irrelevant investment in vocational education reduces national economic productivity¹⁵

c. Challenges of the Industry 4.0 Revolution

Industry 4.0 demands the integration of digital skills (such as IoT, big data, and robotics) into the vocational high school (SMK) curriculum. However, only 15% of SMKs in Indonesia have adequate digital laboratory facilities. For example, vocational schools in West Java still teach conventional machine assembly, while the industry has already shifted to automation systems¹⁶

Rapid technological changes have caused skill anxiety among students, with 60% of vocational high school (SMK) students feeling unconfident in meeting the demands of modern industry.¹⁷ This indicates a failure of the psychological approach in building students' self-efficacy.

2. Solutions and Recommendations

¹⁴Undang-Undang Sisdiknas No. 20/2003, Pasal 15.

¹⁵Becker, G. S. (1964). *Human Capital*. Hlm. 15.

¹⁶Studi Lapangan SMK Jawa Barat oleh LPPM UNJ (2022).

¹⁷Survei Kemendikbud & UNICEF (2023). *Mental Health dan Kesiapan Kerja Siswa SMK*.

a. Industry-Based Competency Certification

- 1) German Model: The certification system through the Chamber of Industry and Commerce (IHK) ensures that 90% of vocational graduates are directly absorbed by the industry.¹⁸ In Indonesia, the National Professional Certification Agency (BNSP) needs to expand certification schemes by involving professional associations (e.g., ASKRAINDO for the automotive sector).
- 2) Case Study: SMK Negeri 2 Bandung successfully increased graduate absorption to 85% after implementing BNSP certification in collaboration with PT Astra International¹⁹.

b. Strengthening the Apprenticeship System (Dual System)

- 1) Best Practice: In Switzerland, vocational students spend 80% of their learning time in the industry under binding apprenticeship contracts²⁰. In Indonesia, internship programs are still incidental (averaging three months) and not integrated into the curriculum.
- 2) Policy Recommendations: a) Expansion of the teaching factory program in vocational high schools (SMKs) with funding from the national and regional budgets (APBN/APBD). b) Tax incentives for companies that accept vocational students for internships, similar to the Tax Deduction policy in Singapore²¹

c. International-Standard Training

- 1) Global Collaboration: Vocational high schools (SMKs) in Bali successfully adopted a tourism curriculum from Singapore Polytechnic with support from the ASEAN VET Toolbox. As a result, 70% of graduates are absorbed into the international hotel industry.²²

¹⁸German Federal Ministry of Education. (2023). *Dual Vocational Training System*.

¹⁹Laporan SMK Negeri 2 Bandung (2023).

²⁰Swiss Federal Office for Professional Education. (2022). *Vocational Education Report*.

²¹Kementerian Keuangan Singapura. (2023). *Tax Incentive for Skills Development*.

²²ASEAN Secretariat. (2022). *ASEAN VET Best Practices*.

- 2) Digitalization of Training: The utilization of Massive Open Online Course (MOOC) platforms such as Coursera for digital skills training (e.g., basic coding, graphic design).

E. Conclusion

Vocational education provides foundational knowledge and proper training to students about everyday life values so that they become capable, competent, and skilled in managing their lives—ensuring their survival and development. In this way, education becomes more realistic, contextual, and rooted, thus making it more meaningful and sustainable for the students.

1. Issues in Vocational Education

The Minister of Education and Culture, Muhadjir Effendy, highlighted three important issues regarding the direction of vocational education in Indonesia. These issues include the planned certification for Vocational High School (SMK) students, opportunities for internship cooperation with international companies, and plans for international-standard training for vocational students.

2. Vocational Education from the Perspectives Economics

Vocational education, viewed from the economic perspective, can be understood as an output that includes economic aspects. The creative economy encompasses various activities based on creativity, skills, and talents, which hold economic potential and new job opportunities through the creation and exploitation of intellectual property.

The issues surrounding vocational education in Indonesia are multidimensional, covering psychological aspects (student self-confidence), sociological aspects (class stigma), and economic aspects (skill mismatch). Solutions such as certification, structured internships, and international training have proven effective in other countries; however, their implementation in Indonesia requires political commitment, adequate funding, and tripartite synergy among schools, industries, and the government. Without systemic change, vocational education will remain a "back door" for marginalized students within the national education system.

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