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# Challenge of Teaching Factory Based on School's Potentials In West Java During Covid-19 Pandemic

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## **Abstract**

This research explores the teaching factory implementation during the Covid-19 Pandemic and develops the teaching factory model framework. The teaching factory model framework is expected to improve SMK student's competency analytically and experimentally. This research uses a qualitative method consist of literature review, interview, and field survey. There are 6 (six) SMKs that is the object of this research, namely SMKN 9 Bandung, SMKN 11 Bandung, SMKN 1 Cipendeuy, SMKN 6 Garut, SMKN 1 Mundu, and SMKN 1 Pacet. This research shows that student competency can be improved through TF-6M training according to the industry needs, training for students and teachers through KCSI (Kamp Kreatif SMK Indonesia) using online learning, and facilities like laboratory or workshop that must be adjusted to Industry-standard (INDUKA). Furthermore, students' and teachers' professionalism can be obtained through the Professional Certification Test organized by INDUKA and SMKs. This research explained how the teaching factory's implementation based on School's potentials in West Java, Indonesia, in the face of the Covid-19 pandemic.

**Keywords:** Teaching Factory Pandemic Covid-19 SMK Indonesi

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## **Introduction**

In early March 2020, Indonesia was faced with a pandemic period where President Jokowi announced the first case of Covid-19 in Indonesia. The pandemic paralyzed almost all sectors of life, including the education sector, especially SMK. During the Covid-19 pandemic, Vocational High Schools that had teaching factories were required to produce workers (students, teaching staff, and education staff) who had comparative and competitive advantages. Comparative advantage is the ability to compete in producing goods/services at low cost, excellent quality, on-time; Meanwhile, competitive advantage is the ability to the side by side in the bargaining process (bargaining power) of the goods/services produced. To achieve these two advantages, SMK needs to make efforts so that its graduates can compete in getting jobs or create jobs in the business / industrial world. To achieve this two excellence, SMK needs to make efforts so that its graduates can compete in getting jobs in the work industry or entrepreneur.

Professional teachers must be utilized appropriately during the Covid-19 pandemic to efficiently and effectively teach factory learning facilities so that "SMK BISA-HEBAT" in Indonesia can genuinely produce a productive workforce. SMK in Indonesia must produce a competent workforce. In the distribution of graduates, it is expected that they are also entrepreneurial.

The condition of vocational education in Indonesia is still trying to find a good pattern and format. This condition

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can be seen from the Directorate of Vocational Education program, Ministry of Education and Culture, and Vocational Education, which aims to increase vocational education's role and function through the teaching factory model (industry-based learning). The Teaching Factory model in Government Regulation Number 41 of 2015 concerning Industrial Resource Development is described as "a factory in schools (teaching factory) is a production facility that is operated based on actual working procedures and standards to produce products by real conditions in INDUKA ( Industry of the World of Work) and are not profit-oriented".

Whereas in Permendiknas 34, 2018 concerning Industrial Learning or teaching factory is a learning model with industrial nuances through the synergy of SMK with the business/industry world to produce competent graduates according to market needs. Based on the explanation above, the implementation of the Teaching Factory (TeFa) learning model requires a school partnership with INDUKA (World of Work Industry) through the support of the Government, Local Government, parents of students, the community, and other related parties (Pendidikan, Kebudayaan, & Indonesia, 2018).

As a production / service-based learning concept, the Teaching Factory model refers to the standards and procedures applicable in the world of work industry (INDUKA) and is implemented in an atmosphere like what happens in the Industry. The teaching factory model of the learning system is pursued with two main strategies. The first strategy is to perfect and strengthen vocational schools with a demand-driven model, changing the current supply-driven model with quality standardization. The main characteristic of vocational education and training is to prioritize a job-based learning approach (Centea, Singh, & Elbestawi, 2019). School designs are developed starting from the needs and recognition of the business and industry world. The needs analysis is then formulated into competency standards along with the type of certification and testing techniques (Devika et al., 2020). From this standardization, SMK develops a curriculum and learning system. The process of standardization and certification and curriculum preparation involve related parties, especially the Central Government's synergy (Kemendikbud for Vocational Education), Local Government, Schools, and the world of work industry (INDUKA).

The second strategy is to develop vocational schools and creative training with a life-based learning model as alternative education. Learning at SMK puts forward a potential-based approach according to real life in the world of work (Wahjusaputri, Fitriani, & Syarif, 2019). Various sectors were carried out to improve human resources quality, including health, education, population, labor, and social welfare. One of the sectors among the five sectors deemed most important is education. The education of a country is closely related to technological change and economic growth. Education is a form of long-term investment that makes a significant contribution to economic development. Investment in education provides a higher return than physical investment in other fields. A finding can be shown that the economic return on education investment is higher than that of physical investment with an average ratio of 15.3% and 9.1%. This shows that investment in education is very profitable, both socially and economically (Spillane, Menold, & Parkinson, 2020). The quality of education largely determines a change in a nation. Education has an essential role in achieving national development goals.

## Method

This section explains the methodology used to gathering and analysis data. This study has 4 main methods: Literature review, Interview, Field surveys, and Analysis data.

### Literature Review

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Literature Review is a description of the theory, findings, and other research material obtained as a reference material to be used as a basis for research activities in developing an exact frame of mind from the formulation of the problem to be investigated (Lugaresi, Frigerio, & Matta, 2020). The review literature's final goal is to overview what other people have done before (Rauch, Morandell, & Matt, 2019).

The articles used in this research were published from 2010 – 2019 and were taken from several journal databases such as ScienceDirect, JSTOR, and other journal databases. In addition, the articles must also have keywords related to the teaching factory, such as "teaching factory in vocational schools" or "implementation of teaching factory". There are also several conditions that the articles must own, including (1) the article uses English/Indonesian, (2) Completed articles (3) Not duplicated.

### **Compile research instruments**

The research instrument in this study was prepared based on the results of a literature review, which is expected to be used to obtain sharper and broader data to complement the results of observations and observations. Researchers' actions must be following the research guidelines that have been prepared, both interview guides and observations (Boon-Long & Wongsurawat, 2015).

### **Interview and Observation**

There are 2 types of interviews. The first is a direct interview conducted directly between the interviewer (interviewer) or teacher and the person being interviewed (interviewee) or students without intermediaries. The second is an indirect interview, which means that the interviewer or teacher asks students through other people or media, such as using google form or via email. In conducting interviews, researchers must pay attention to the following matters: the interviewer should maintain good relations and maintain a relaxed atmosphere that can create open response opportunities. Also, researchers are expected to get information about implementing the teaching factory during the Covid-19 pandemic (Köseoglu, Altin, Chan, & Aladag, 2020). Because of Covid-19 Pandemic, an indirect interview was conducted using google form. Observations are made to obtain information about human behavior as it occurs in reality and obtain a clearer picture of social life, which is difficult to obtain by other methods (Collector & Module, 2011). This observation is carried out by researchers who act as outsiders or observers to understand better and deepen the problems that occur in social life and other documents related to the research process (Eden, Rahman, Alarifi, & Sedera, 2014).

Observation can be interpreted to systematically collect data about behavior and physical symptoms by observing and recording. The observation step that is considered effective enough for data collection has the following special characteristics:

1. Observation has a specific direction and purpose, not just to get general impressions about a phenomenon.
2. Scientific observation is not carried out by chance and at will in order to approach the situation of the object, but all its implementation is carried out systematically and planned.
3. Observation is quantitative in nature, which records a number of events about certain types of social behavior.
4. Observation takes notes immediately, as quickly as possible, not depending on the power of memory.
5. Requires expertise, so that the data obtained can be valid.

### **Results**

Vocational High Schools (SMK) are secondary schools that deepen their talents and expertise in certain fields. This is in accordance with the contents of the National Education System Law No. 20 of 2003 article 3 regarding the objectives of national education and the explanation of article 15 which states that vocational education is secondary education that prepares students especially to work in certain fields. In contrast to high schools (SMA) which do not specifically teach students about certain fields. SMK provides teaching that is more applicable and more focused on certain fields and prepares students to enter certain job fields, such as technology and industry, business and management, tourism, and so on. The sample used in this study were 6 SMK in West Java and 5 SMK in East Java. In the 11 SMKs, there are 6 areas of expertise, namely tourism, arts and creative industries, business, agribusiness, engineering technology, and technology and information.

Table 1. Centre the Caption above the Table

Potential	School	Teaching Factory Competency Improvement Management
Tourism	SMKN 9 Bandung	Edotel, Edu Catering, Edu Pastry
	SMKN 1 Buduran	cullinary art and Edotel
	SMKN 2 Malang	Edotel, Edu Catering, Edu Pastry
	SMKN 1 Cipendeuy	Dressmaking
arts and creative industries	SMKN 12 Surabaya	Kriya Logam
Agribusiness	SMKN 1 Pacet	Agroindustry Agro-tourism
	SMKN 1 Mundu	fishery
	SMKN 5 Jember	Plantation Crops Agribusiness Poultry agribusiness Agribusiness of agricultural products Plant Breeding and Seed
engineering technology	SMKN 1 Cipendeuy	motorcycle engineering
	SMKN 6 Garut	Motorcycle service
	SMK 7 Muhammadiyah	automotive
Technology and Information system	SMKN 11 Bandung	Software Engineering Kamp Kreatif SMK Indonesia or KCSI 2019 with IoT Concept (video conference)
	SMKN 1 Pacet	Computer and Network Engineering
	SMKN 12 Surabaya	Animation

### Tourism

In the field of tourism, the study sample used 4 expertise programs, namely 1) Hospitality and tourism services, 2) Culinary, 3) Beauty and 4) Dressmaking.

SMK Negeri 1 Buduran, Sidoarjo, East Java has the advantage of teaching factory in the fields of Hospitality, Catering, and Dressmaking. The management of teaching factory teaching in the field of edotel and fashion, already has a practice room that is in accordance with the industry SOP. All units in the teaching factory field of expertise had no obstacles, but during the Covid-19 pandemic, the catering business and the salon went under suspension. In addition, marketing in the hospitality sector during a pandemic has experienced a decline in turnover. Schools need marketing from third party consultants. The School also involves alumni who are successful in the field of entrepreneurship as leaders to provide guidance and assistance for students in class XI and XII to become new start-ups (entrepreneurs).

SMK Negeri 2 Malang, Sidoarjo, East Java has the advantage of teaching factory in the fields of Hospitality,



Catering and Tourism. In order to increase income, the school edotel will establish a café, hall for the public, and a special lodging for the elderly. During the Covid-19 pandemic, the impact on tefa products in the culinary sector (cafes), experienced a decrease in income, as well as hotels and tourism. The marketing and marketing department is not doing very well. The solution is School collaborates with go food for café promotion, while for hotels collaborates with traveloka. The role of alumni is also involved in becoming employees in hospitality as front desk and housekeeping. The School received assistance from the government's Center of Excellence (CoE) Development Program to promote the teaching factory product.

SMK Negeri 9, Bandung, West Java has a teaching factory edotel, edu catering, and edu pastry. The TeFa learning concept at SMK Negeri 9 Bandung emphasizes education that is more demand oriented, equips students with entrepreneurial character (technopreneurship) and involves industry (INDUKA) as the main partner. Through the Teaching Factory pattern, the optimization of educational collaboration with industry has an impact on the learning process that is increasingly oriented towards industrial needs. Cooperation (partnership) that is built systematically and based on a win-win solution makes Teaching Factory a link between schools and industry, which will encourage technology transfer to improve teacher quality and soft skills for students. SMK Negeri 9 Bandung, has launched an Emergency Curriculum Collaboration Module in the New Habit Adaptation Era (ABK), inserted with the local content of character education. In addition, the TeFa learning infrastructure and SOPs have met the requirements of the industry.

SMK 1 Cipeundeuy Subang, has a fashion teaching factory. The forms of cooperation between the School and DU-DI are as follows: (a) The company places one / several parts of its production unit in the School, to be jointly managed by the School and the company; (b) The company provides machinery, equipment and materials to be processed into company goods / products; (c) The School provides Human Resources (HR) from students at certain levels (class X) as executors of production; (d) Quality Control standards that are applied in the production process are the same as the quality control standards of the company, so that the resulting products are in accordance with the company's product standards; (e) The implementation of the production process is adjusted to the timing and process of the School's Teaching and Learning Activities (KBM), set forth in the form of an agreement; (f) The company provides fees to students and schools according to the agreement; (g) School graduates are ready to be accommodated 100% to become employees in the company.

### **Arts and Creative Industries**

SMK Negeri 12, Surabaya does not yet have a teaching factory, but has implemented a teaching factory learning program in every area of expertise. SMK Negeri 12, Surabaya has art, animation and leather crafts, and has a Creative Park, the future plan is to be continued into art edotourism. The field of craft art competency already has a certification test except for dance schemes, musical instruments, puppeteers, and painting. In addition, teachers already have certification from the industry, and SMKN 12 Surabaya has 14 assessors, who have certification for 10 assessors. The partnership with the INDUKA, namely HOMPIMPA is going well. The School and industry collaborate to design the curriculum so that it is link and match. School SOPs are in accordance with industrial program procedures. Class X students have been prepared for internship, and class XI post-internship with INDUKA

### **Agrobusiness**

In the field of agribusiness and agro-technology the study sample used 4 expertise programs, namely 1) crop agribusiness, 2) agribusiness management of agricultural products, 3) livestock agribusiness and 4) agricultural engineering. SMKN 1 Pacet is a reference SMK, especially in the field of agro-tourism, has a teaching factory system, a concept that holds a miniature industry in schools. Two ongoing programs related to this system are snack processing and cultivation of vegetable crops, such as paprika. For plant cultivation, his party cooperates with Living Organic, while for snacks, cooperates with PT Akasawira. TeFa production, especially food and beverages, has been recognized at the national and international levels, and has become a supplier of food commodities for industrial partners in the business world and industry, as a reference for the development of agricultural vocational schools under the guidance of the Agricultural Education Center (Pusdiktan BPPSDMP Ministry of Agriculture) throughout Indonesia.

SMK Negeri 1 Mundu Cirebon has a teaching factory learning model in the maritime program, expertise in Fisheries Product Processing Technology (TPHPi). TPHPi Expertise Program graduates have general competence as fish processing assistants referring to national education goals and generic life skills, and vocational competencies that refer to SKKNI. SMK Negeri 1 Mundu Cirebon designed a standard operating procedure (SOP) as a guideline for implementing the 6-step teaching factory (TF-6M) in the subject of processing diversification of fishery products. Teaching factory collaboration program between industry and schools are: Fishing Vessels, Fishery Product Processing Industry, Fishery Product Quality Testing Laboratory.

In the learning process at SMKN 5 Jember during the Covid-19 pandemic, it was carried out online and the involvement of students entered with the picket system and carried out the learning process according to the scheme of each TeFa competency. In teaching factory teaching, not all students are gifted in their skill competencies, this is due to the factor in the selection process for new student admissions set by the Government based on the final value of diploma, not based on expertise / talent. So in the learning process, students who are not gifted are more difficult to teach. Teacher competence in the recruitment system still has many weaknesses that affect competence. As teachers teach and go home, there are additional assignments so that teaching only gets face to face 12 hours / week. The alumni network at SMKN 5 Jember is very strong in forming new entrepreneurs. PT Beni Citra Asia, fostering alumni of up to 25 people to become local seed producers and become new entrepreneurs.

### **Engineering and Technology**

The field of technology and engineering expertise is a field of expertise that has the most derivative programs of expertise and Skills Competency, so the number of SMKs is also large. SMK 7 Muhammadiyah has one of the engineering technology's field, which is Otomotif. it has entrepreneur class designed for the students that have entrepreneur competencies. In this entrepreneur class, students directly involve in reals project. The curriculum is practical according to the needs of the world of work industry (INDUKA). Having a business center, honing life skills of students by doing practical work at the Goods and Services Production Unit (UPJ). Partnerships with industry: Koryou High School of Japan.

### **Technology and Information System**

Field of Expertise Information and communication technology is a field of expertise that is growing and developing rapidly in line with the development of information and communication technology and the internet today. In the field of expertise, information and communication technology has 2 expertise programs, namely 1)

computer and informatics engineering and 2) telecommunications engineering, but in this study the samples used and the most applied in teaching factory are expertise programs, namely computer engineering and informatics. SMK Negeri 11 Bandung already has a technopark, developing creative technology-based products. One of them is creative products based on internet of things (IoT), smart machines (smart absences), digital guest books (iGuest), Smart Switch, Starter Kit Microcontroller & Internet Of Things, and Gas & Smokker Detector, which are sold freely and become school income. In developing and selling the products, SMKN 11 Bandung in collaboration with the industry founded by alumni of SMK 11 Bandung, PT. Sebelas Cipta Mandiri.

## Discussion

During the Covid-19 pandemic, the Partnership Process with the world of work industry (INDUKA) continued and implemented learning using technology, both WhatsApp and video conference or offline, directly visiting industrial premises to industry and school schedule agreements.

Partnership cooperation with Industry is experiencing obstacles. However, Industry and skills schools/programs are still communicating well. Learning activities that are not fully face-to-face still use blended learning between online and offline—skills competencies, such as Travel and Tourism Business (UPW), experience suspended animation. Students are directed to learn from home. The learning output is informed to the Industry to get input and suggestions for improvements as a form of quality control of students' products / services (Faller & Feldmüller, 2015).

In the internship partnership, the School is conducting an exploration with the Industry using the google-form link, and one form of the MoU is the readiness to accept internship students with several models (full online, full Industry or a combination), the journal application can be a tool for monitoring and evaluation. The School conducted a Center of Excellence (CoE) Development, students were trained in entrepreneurship (start-up), and worked on by projects in schools. Product requests from consumers are done during school hours take place. Development of IoT technology in the competency of computer network engineering and animation skills.

In the Center of Excellence (CoE) program, Productive Teachers are directed to take part in the skilling, upskilling and reskilling programs, aiming to develop product innovation and teaching factory business incubators to grow business start-ups, starting from market analysis, ideas, business plans, participants hope students can establish and managing a real business.

During the Covid19 pandemic, in the learning system, one of the implementations of an SMK that had a teaching factory formed the Creative KAMP of Indonesian Vocational High School / KKSI (online learning) in the field of entrepreneurial expertise using the IoT (internet of things) concept. The following is an IoT concept developed for students so that they can foster new entrepreneurs/start-ups:

- 1) Digital Business has become a trend during the Covid-19 pandemic, especially with the IoT concept, where everything can be done automatically (online) via video conferencing.
- 2) Students are given training, mentoring, and operations in using IT technology with the IoT concept related to entrepreneurship.
- 3) Teaching factory learning materials with the IoT concept are inserted or integrated into the productive curriculum, and a particular room is provided workshops/laboratories in schools.

The concept of IoT in the industrial era 4.0 is very suitable to be implemented, especially during the current

pandemic, so that students are required to be creative in exploring business opportunities so that they can foster students' entrepreneurial spirit, which is useful for future provisions after graduating from School. In the form of a collaboration module, the emergency curriculum model is adjusted to the blended learning model's basic competencies. The emergency curriculum collaboration module can simplify providing teaching materials to students, implementing collaboration modules using assignments in the form of job sheets. The learning process using the emergency curriculum collaboration module must be based on character education so that students have morals, behave politely, have good ethics, are active, creative, and innovative.

The implementation of the emergency curriculum collaboration module in the teaching factory learning process will provide a new atmosphere and challenges so that students master Basic Competencies according to the world of work industry (INDUKA) needs. With this collaboration module, it is an effort of SMK to make it easier for students to learn and do assignments. In essence, the model for implementing this learning curriculum is very good, but schools still face obstacles, not all students are able to respond quickly because there are various factors that affect the effectiveness of online learning, both nature and individual factors, especially the environment also greatly influence the effectiveness of learning and learning motivation.

### **Conclusion**

The covid-19 pandemic has paralyzed almost all sectors of life, including the education sector, especially SMK. Therefore, this research pictured the condition and how the implementation of the teaching factory in West Java, Indonesia, in the Covid-19 pandemic face. This study shows that the SMK teaching process mplementation in West Java during the Covid-19 pandemic can run well. The partnership process shows this with the world of work industry, which is still running well, and the teaching and learning process continues online using WhatsApp or video conference.

In addition, the implementation of the curriculum collaboration module is beneficial in teaching and learning activities during this pandemic because it makes it easier for practical assignments that are projected in nature.

### **Recommendations**

This study recommends schools to improve the ability of teachers to guide and facilitate students in implementing the teaching factory. To support these objectives, teachers must also have the ability to manage teaching factory learning activities. Products resulting from standardized teaching factory practices, with appropriate quality and delivery time, and have passed the quality control process according to standard operating procedures (SOP).

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