Technopark: Between Academician, Entrepreneurs and the Industry World in a Culture of Innovation

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Abstract

The Science Technology Park or well known as Technopark is a priority program of the Indonesian government in revitalizing and reforming Vocational High Schools. The Science Technology Park or Technopark is an integrated area that combines industry, schools, research and training centers, banking, entrepreneurship, central and local government in one site that allows the information and technology flow more effectively, more efficiently and more rapidly. The Technopark program cannot be separated from the Teaching Factory learning model because both of them intertwine and depend on each other. Technopark is an integrator or means of selling products produced by the Teaching Factory to consumers or industries. In addition, Technopark is also a liaison between vocational high schools, which have executed the Teaching Factory program and the industrial world. It was found that vocational high schools, which have implemented teaching factory, able to produce innovative products and improve the students' entrepreneurship skills. Since Technopark aims to stimulate and manage the flow of knowledge and technology among Vocational Schools implementing the program, the quality of Vocational School students and graduates increases; entrepreneurial spirit develops, and they can adapt or survive with environmental change, which is getting faster in this century.

Keywords: Science Technology Park, Technopark, innovation culture, teaching factory, entrepreneurship, Vocational High School.

1. Introduction

To meet the needs and demands for a qualified and skilled workforce in today's business and industry, the education sector must be able to answer these challenges by preparing professional class education that is tailored to the needs of the business and industry world and technological developments, especially in the era of disruption and the current industrial revolution 4.0. Alpysbay, Adieva, Zhamuldinov, Komarov, & Karimova argued that the problem of assessing the quality of technical and vocational standard education by costumers, employers (in the labor market), and experts is of great importance today [1]. It should be noted that due to social, political, science and technical changes in society and the country, the requirements of employers for specialist skills are continually shifting. As the case in Kazakhstan which is rich in mineral resources, and the amount of funding for education is large but the progress of innovation is slow [2]. In South Korea, vocational high schools were criticized for not being able to properly cultivate people against changing environments, expanding information, and accelerating technology [3]. Besides, the problem of 'mismatch skills' undermined South Korea's competitiveness between trained people in vocational high schools and those needed in companies, and because of that, it required the industry to train people, at a significant cost and time [4].

A somewhat similar case also occurs in Indonesia for vocational high school issues. Although the trend is decreasing from year to year, in terms of education level, Central Bureau of Statistics data records that the Open Unemployment Rate (OUR) for Vocational High Schools is still the highest among other education levels, amounting to 8.49 percent in the February 2020 period [5]. In the August 2018 period, the unemployment rate was 11.24 percent and in the August 2019 period, it was 10.42 percent. Conceptually, OUR is the percentage of the total unemployed to the total workforce. OUR is an indicator that can be used to measure the level of labor supply that is not absorbed by the market [6]. The Director of Vocational Education at the Ministry of Education and Culture, Bakhrun, emphasized that the current government has designed a curriculum in accordance with the wishes of the industry. Not only that, his party also continues to collaborate with industry to increase job opportunities for vocational high school graduates to advance the vocational education quality. The government also continues to synchronize the curriculum with the needs of the business world and establish cooperation with industry to increase job opportunities for vocational high school graduates. Bakhrun also highlighted that the current vocational high school curriculum has adopted a more modern curriculum than other educational levels [7].

In other words, school learning must be well integrated with workplace learning, which can be applied especially in vocational education and training (VET) or what is known as vocational high schools. In general, vocational education means "education to develop the knowledge, skills, and attitudes required for a particular or permanent career" [8]. Vocational high schools are at secondary school level that represent vocational education at the secondary school level, which provide chances for ongoing education through training for a changing industrial workforce or through primary vocational education [3]. Thus, the vocational school must be able to answer this challenge by developing a curriculum that is synchronized with the requests of the business world and the industrial world as well as changes in the current era of unavoidable disruption.

In responding to problems and criticisms regarding the quality of the vocational schools, since 2010 the Government of South Korean has been working to increase student interest in VET and better align VET programs and the needs of the labor market with a series of reforms to the system structure. Vocational high school restructuring is focused on specific industries such as banking, shipbuilding, or semiconductor manufacturing, and encourages greater collaboration with industrial partners. In addition, the South Korean government is also developing its curriculum with industrial partners [9]. With the existence of this new policy package, there have been new changes; especially the absorption of the workforce of vocational high school graduates, and the Korean people's interest in vocational schools has increased [10].

To develop and reform Vocational High Schools, the Indonesian government has also implemented various policies to improve the quality of vocational high school graduates, namely through Presidential Regulation Number 41 of 2015 concerning Industrial Resource Development by launching the Teaching Factory and Technopark Programs at vocational high school. The Teaching Factory Program is a production / service-based learning concept in vocational high school which refers to the standards and procedures applicable in the industry. The Teaching Factory model of the learning process is carried out in schools in an atmosphere like what happens in the industry. According to the Directorate of Vocational High School Development, the Technopark Program was proclaimed as the center of several Teaching Factories in vocational high school ("hubs") that connected the world of education (vocational high school) with the industry and relevant agencies to cooperate with the Teaching Factory at vocational high school. Technopark will become a "Think-Tank" vocational high school in developing a Teaching Factory, which must be able to adjust to the rapid industrial development. Technopark will also promote the regional potential that is relevant for regional economic development and at the same time facilitate communication with the industrial world [11].

Innovation is considered as an important key to surviving in a changing environment [12]. Innovations in technical and vocational education and training (TVET) can also refer to a substantial change in the way TVET is practiced, making it more relevant to economic, societal, and environmental needs [13]. Therefore, the Technopark program, which can stimulate innovation with the flow of knowledge and technology between several sectors is an important program as the main driver for a successful transition. Technopark or also known as the science technology park is not a new thing, this is the first old project initiated by Prof. Dr. Sumitro Djojohadikusumo when he served as Minister of Research in 1976 [14], but his declaration in Indonesia was only developed in the era of President Joko Widodo since 2014. In this case, the author will discuss the Technopark concept in detail, several cases in other countries, obstacles faced and its impact on the economic growth of a country, and its implementation in vocational high school.

2. Techno Park and Its Role in the Culture of Innovation

The expression Technopark has many synonyms, namely "Technology Park", "Technopole", "Research Park" and "Science Park" which include broad and interchangeable concepts in this definition (IASP). Based on official definitions from the International Association of Science Parks (IASP) in February 2002, a science park has the main objective of fostering a culture of creativity and competitiveness in science and technology in the fields of economic growth, which is driven by specialist professionals. To achieve these objectives, the research park promotes the transfer of information and technology between universities, R&D institutes, businesses and markets, encourages the creation and growth through incubation and spin-off processes of corporations based on innovation, and provides other value-added services along with high-quality space and installations [15].

UNESCO adds that the term "science and technology park" includes all types of high-tech clusters such as technopolis, science city, science park, hi-tech (industrial) park, cyber park, innovation center, R&D park, university research park, research and technology park, science and technology park, science town, science city, technology incubator, technopark, technopole, technology park, and technology business incubator. However, it should be noted that some of these terminologies have slightly differences. For instance, experience shows that there are several differences between a technology business incubator, Science Park or Research Park, technopolis, science city, and a regional innovation system.

Silicon Valley (USA) is a pioneer in the world science park development. Initially known as Stanford University Science Park, Silicon Valley goes back to the early 1950s. Then in the 1960s, it was followed by Sophia Antipolis (France) in Europe and in the early 1970s Tsukuba Science City (Japan) in Asia. This trio science park represents the oldest and most famous science parks in the world. Currently, thousands of science parks are established around the world and the number continues to grow. The US, with over 150 scientific parks, and Japan, with 111 science parks, is at the top of the list. China began developing science parks in the mid-1980s and now has about 100, 52 of which have been approved by the national government and the rest by local governments. Other countries that also have science parks are Africa (11), Western Europe (222), Eastern Europe (12), Middle East (36), East Asia (142), Southeast Asia (12), South Asia (4), America North (85), South America (6), Australia (9) and New Zealand (1) [15]. This number identifies that the concept of science park is not a new term in the world and the need for its existence is very important to develop technological innovation and the development of the country's economy.

It is generally accepted that science and technology parks / technology parks are successful platforms to attract new-technology-based businesses, promote the commercialization of scientific innovation, revitalize regional economies and provide the impetus for the development of several new technologies ([16]–[18]. Techno-parks are clustered forms that play an important role in promoting cooperation between two different environments, namely academic and business [19]. Much literature also identifies positive contributions to tenant territories and companies and the main impact of technoparks is fostering greater interaction with universities [20].

As in China, there are a total of 1637 Technoparks or known as science and technology industrial parks (STIPs) spread across the country, of which 224 are owned and built by the central government, 1344 are owned by provincial governments and 69 of them are owned by universities. The impact of the development and development of technoparks since 1990 was recorded at the end of 2009, namely 53,692 technology companies with production valued at 6,100 trillion Yuan or about 18, 23% of China's GDP. Of these companies, 2,979 were start-ups that graduated from the technopark incubator, and 9 of them entered the Chinese stock exchange. So the university technopark is a major part of China's development from “made in China to Create in China”. The impact of its existence on economic growth and development has shown an increase [21], [22]. Zhang, & Sonobe found that the national STIP has been rising at an impressive rate. The annual STIP growth rate was more than 40 per cent over the course of 14 years from 1992 to 2006, the average job output more than seven times, and the number of STIP companies also increased more than sevenfold. His research has also demonstrated the positive relationship between high-tech firms' competitiveness both within and outside STIP and foreign direct and academic investments of local universities in the same region [23]. In South Korea, an example of success is the emergence of two automotive companies, namely Daewoo and Hyundai. The two companies grew rapidly due to the closeness between companies, R&D institutions, and the intense involvement of various actors in the STP field [24].

Kanhukamwe & Chanakira affirmed that the University plays an important part in the dynamics of the growth of a Science and Technology Park (STP) and the economic development of a country. This study identifies critical success factors in establishing a successful STP, including the excellence of the university location, the skill level of research staff, expenditure on R&D, and the success of Public-Private Partnerships (PPPs). With an enabling environment, new investment, new employers, new jobs can be created as a testament to the impact and role of universities in the growth and development of STPs [25]. Guadix, Castrillo, Jesús Carrillo Onieva, & Navascues revealed that to identify successful Science and technology park strategies are as follows: STPs that have overcome early stages and deal with a high volume of income; high level of land occupation; and a large number of employees [26]. Kharabsheh in his study of four technology parks in Australia identified critical success factors including: risk-taking "entrepreneurial" culture, autonomous management of technology parks from independent university officials and government bureaucrats, a supportive environment, a large number of companies enabling synergies in technology parks, the presence of innovative companies leaving the international world, and finally a shared vision among technology park stakeholders [27].

In Indonesia, the government uses the terms Science and Technology Park (STP) and Technopark as they have been built and developed in several provinces and regions. In the 2016 Draft Government Work Plan, the Government plans to build and develop 100 Technoparks throughout Indonesia to be built in regional areas, polytechnics, and vocational high schools with infrastructure and facilities equipped with the latest technology. Technopark is a priority program and will be developed at the central, provincial, and municipal levels whose locations have been determined in the 2014 - 2019 National Medium Term Development Plan. The Technopark development program aims to create innovative things and new research-based industrial products. The project is divided into National Science Techno Park (N-STP or STP) at the national level, science park (SP) at the provincial level, and Techno Park (TP) at the district/city level and Vocational High Schools [28]. The technopark model used in Indonesia as seen in Figure 1 compiled by the National Development Planning Agency involves government, universities, R&D, vocational training, and business in joint research to produce the latest technological innovations [29]. The development of STP is considered as a strategic step for the nation in encouraging the down streaming of research and technology results from universities and research and development institutions so that they can be utilized by industry and society [30].

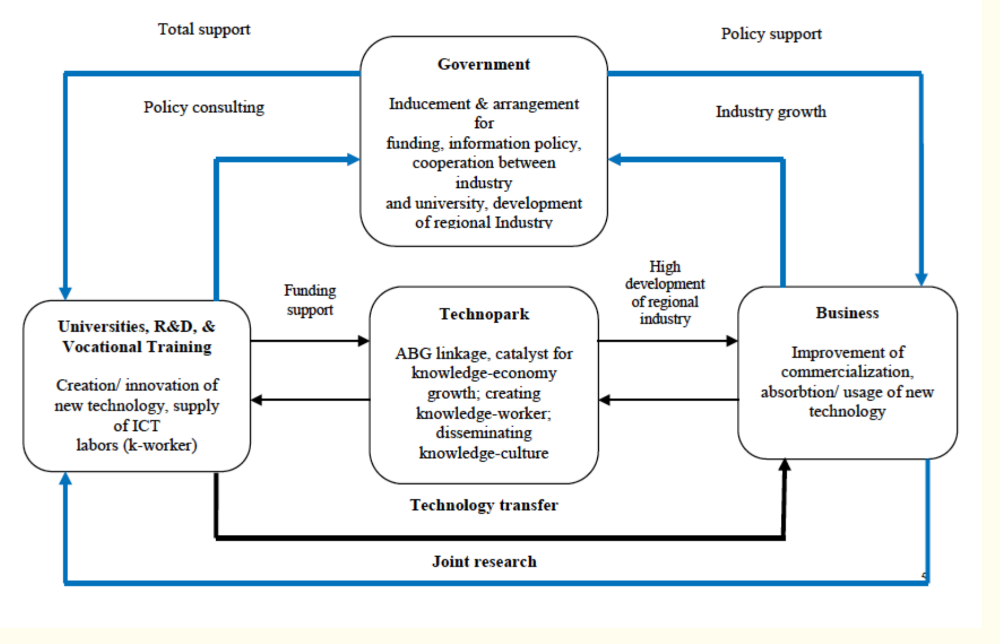

Fig. 1: Model of Technopark

3. The concept of Technopark in vocational high school.

Technopark programs developed in vocational high schools with those developed in Provinces / Regencies / Cities and universities are of course a little different and cannot be said to be pure technopark due to several limitations, such as lack of marketing, competent teacher resources, or limited productive teachers, the age gap between senior and junior teachers and sizeable facilities and costs. However, the main principles of Technopark, namely bringing together schools with the industrial world, training, as well as entrepreneurship have been fulfilled in vocational high schools. Therefore, to become a pure technopark, it requires training and coaching that is sufficiently incentive for both teachers and students, adequate facilities, and support from various parties, especially the government, universities that have run technoparks; and industries. What the Indonesian government has done is a collaborative program between the Indonesian French Institute of Education and the French Ministry of National Education for the implementation of a training program aimed at strengthening the competence of Indonesian Vocational School teachers in 2017. The training program that has been held in France is divided into two groups, namely in April - May 2017 and in November - December 2017 with the agenda of activities are training, visits to several related companies, intensively assisting the process of strengthening materials, and technical and pedagogical competencies and contributing more structured thoughts for practical activities. 44 teachers have been accepted in France at various Campus des Métiers et Qualifications (Vocational Campus and Qualifications) according to their vocational qualifications, namely aeronautics; tourism, hospitality and culinary; energy, and energy efficiency; welding; textiles and fashion [31]. The teacher sending program to France is a follow-up to Presidential Instruction No. 9 regarding the revitalization of vocational high school. According to the Director of Teachers and Education Personnel of the Ministry of Education and Culture of the Republic of Indonesia Sri Renani Pantjastuti, in addition to France, during the 2016 - 2019 period, the Ministry of Education and Culture also sent teachers to several countries in Europe, the United States, Asia such as Japan and South Korea. She emphasized "The choice of schools abroad is made based on the excellence of the country. For example, “we sent Aviation Vocational School teachers to the City of Toulouse where there is an Airbus factory and there is a good aviation vocational school to refer to. We are sending teachers to New Zealand to study geothermal which is very thriving there. " [32].

The participation of universities in fostering and mentoring vocational high school is also very necessary. Several vocational high schools have received guidance from universities that have implemented technoparks, such as 22 tourism vocational schools from all over Indonesia which are fostered by the NHI Bandung Tourism College (STP) to develop technoparks. These include SMKN 3 Bogor, SMKN 3 Samarinda, SMKN 3 Malang, SMKN 4 Yogyakarta, and SMKN 2 Jayapura which are the leading vocational high schools. One of the indicators for choosing the SMK is the application of the teaching factory that is already running in these schools [33]. Apart from STP NHI Bandung, the Bogor Agricultural Institute (IPB) also provides training to school principals, teachers, and technopark managers. 124 participants from 31 Vocational High Schools throughout Indonesia participated in training and comparative studies on technoparks engaged in agribusiness and agro-technology. Participants came from 24 provinces consisting of Aceh, Bali, Banten, Bengkulu, DKI Jakarta, Gorontalo, Jambi, West Java, Central Java, West Kalimantan, South Kalimantan, Central Kalimantan, East Kalimantan, Lampung, Maluku, West Nusa Tenggara, Papua, Riau, West Sulawesi, Central Sulawesi, Southeast Sulawesi, North Sulawesi, West Sumatra, and North Sumatra. In this activity the participants were trained in many things by lecturers or experts related to the fields of agribusiness and agrotechnology, starting from the establishment of a Vocational School Technopark, designing a technopark profile, compiling a technopark action plan, compiling a business model, mentoring techniques for technopark tenants, product innovation, drafting Technopark SOPs to visited the IPB Business Incubator Center [34].

The Technopark concept in vocational high school is in line with the Teaching Factory, which is the government's priority program in revitalizing and reforming Vocational High Schools. A teaching factory, which is a production-based learning model that produces goods or services, of course, requires a container or means of selling these goods or products to consumers or industry. So Technopark is one of the places to connect educational institutions with the business world and industry in selling and promoting goods or products produced by the teaching factory. In other words, technopark and teaching factory were intertwined and interdependent. Technopark can be implemented if the vocational school has implemented the teaching factory because the technopark is the center of several teaching factories in vocational high school.

One of the efforts made by the Directorate General of Primary and Secondary Education Management so that vocational high school graduates can be accepted in the business and industrial world is to strengthen entrepreneurial skills [35]. According to the head of the ITB expert team companion, Dr. Gita Winata, M.Ds, Technopark is a company to do business or a vocational school for entrepreneurship. The goal is as a forum for ideas for developing new types of entrepreneurial vocational products based on innovation, an information center for the provision of human resources and creative-innovative products, a training center for vocational high school and the community, and a marketing center for teaching factory products/production units," [36]. Therefore, with the Technopark program, the entrepreneurial skills of these students will be more honed.

The facilities owned by Technopark include a business incubator (support room), angel capital (personal capital), seed capital (initial capital), venture capital (given money capital, in this case, the government). Stakeholders of a Technopark are usually the government (usually local government), the research community (academics), the business, and the financial community. Stakeholders cooperate together to integrate the use and utilization of commercial buildings, conference centers, research facilities, and hotels. For local governments, Technopark in vocational school creates jobs and increases local income because the potential products of the area become better known in the community, which will eventually grow the local economy. For workers with high enough income, Technopark has an appeal as a result of the situation, location, and lifestyle. People who are interested in the products of the vocational high school products can buy them online without having to go to shops and waste time. Technopark attempts to combine ideas, innovations, and know-how from various vocational high schools implementing Teaching Factory and the financial (and marketing) capabilities of the business world. The implementers of Vocational high school can learn from each other and visit (best practices) and share knowledge and experiences by conducting joint seminars, bazaars, or exhibitions that can be jointly funded or in collaboration with industry and local governments with the aim of introducing their products to the community. Hopefully, this merger will increase and accelerate product development and decrease the time taken in the hope of achieving high economic levels to transform innovation into marketable goods.

3.1 The purpose of Technopark in vocational high school

According to the Directorate of Vocational High School Development, the objectives of Technopark, in general, can be summarized as follows:

a. As support for local economic potential following industrial needs.
b. As a "think-tank" for the development of products and services following industry needs and local potential in particular, as well as globally in general.
c. As a "One-Stop-Solution" for industry needs for HR and innovation in the field of products and services.
d. As a "coordinator" of several vocational high school Teaching Factory, making it easier for the industry to reach vocational high school with its Teaching Factory, and vice versa.
e. To become a training center for vocational high school for the development of Teaching Factory.
f. As a showcase of vocational skills, which is proven by the results of products and services.
g. Facilitating business incubators (“entrepreneurship”) in collaboration with other agencies (vocational high school, community, universities, industry, government) to develop potential in accordance with the needs of the region and its surroundings [11].

3.2 Technopark Organization Structure in Vocational High School

The arrangement for the technopark program from one vocational school to another varies depending on the department, human resources, finance, and needs. Some examples are the organizational structure of SMKN 56 Penjaringan, North Jakarta consisting of Directors, Secretaries, Marketing and Production Managers, Event and Incubation Coordinators and Managers, and Event and Incubation Coordinators. The technopark organizational structure at SMK Muhammadiyah 1 Sukoharjo consists of the principal, the main director of the business center (M-one Tech), IT Engineers, and Co-IT engineers. The focus of technopark development at this school is medical equipment, interior design, WEB Development, and Automation Technology. The technopark team of SMKN 1 Purwokerto consists of a person in charge, a director, a secretary, a treasurer, a Teaching factory manager, an incubation & event manager, head of marketing affairs, head of production unit affairs, head of incubation affairs, head of event affairs. While the organizational structure of the Technopark SMKN 1 Mesjid Raya, Aceh consists of the person in charge of the Technopark Chair, Secretary, financial division, technical services division, technology development, and design division, marketing division, business incubator division, and IPR division. The technopark organizational structure of SMKN 3, the technopark chairman, is in charge of marketing managers, production managers, and administration and finance managers in the fields of hospitality, culinary, beauty, and fashion competencies.

3.3 Implementation of Technopark in vocational high school

The existence of a technopark creates a permanent link between vocational high school and industry, resulting in clustering and critical mass from researchers and companies. This makes the company stronger. The optimal A-B-G (Academia-Business-Government) collaboration pattern for Indonesia in the early stages is the triple helix model, which places the government as an element that has a dominant role. In this model, the initiatives of scientists and researchers (bottom-up) get support from the government (top-down) to collaborate with the industry to develop new, innovative products. However, it is hoped that the role of the government will decrease in line with the development of the ICT Technopark. Etzkowitz and Leydesdorff suggest that the Triple Helix model will become an important strategy of the national or multinational innovation agenda in the new age [37]. As a knowledge-based economic model, the triple helix was first introduced by Etzkowitz and Leydesdorff [38]. This model highlights both the role of government, industry and academia and their close relationship. Each helix idea plays a role and has a different interest in driving innovation, which is called the Triple Helix effect [39], [40]. The position of vocational high school in Technopark can be a vocational-technical leader in the implementation of a knowledge-based economy, while the National Innovation System (NIS) highlights the significance of the company's role in innovation. The rearrangement of ABG relationships in Triple-Helix is the result of communication and expectations at the network level. The relationships that appear in the Triple Helix generally start from the efforts of problem-solving and produce strategies when facing difficulties in innovation that are not determined by a particular pattern. Through this interaction process, there will be changes in the actors and the roles they perform. Thus, the triple-helix pattern of innovation is dynamic over time.

The triple helix model implemented in vocational high school is different from the one implemented in higher education as the initial concept of the triple helix itself, where the roles of each sector/actor are as follows; 1) the roles of the school include entrepreneurship, basic technology, coaching, human resource, and cooperation; 2) the roles of Industry include corporate, gallery and marketing, corporate social responsibility and loan capital; 30 the roles of government include research budget, grants, incentive program, life quality, and business facilities [11]. Previous studies have shown that the idea of triple helix proves the beneficial impact of various forms of collaboration [41]–[43], because their collaboration results in the distribution of knowledge, which leads to innovation [44]. It should also be noted that the exchange of knowledge and technology between the three sectors will make innovation happen [45]. The results of the study found four roles played by innovation actors, namely: 1) Detecting needs and solutions, namely government, academia, and industry; 2) Development, production, and commercialization by government and industry; 3) Learning Information Technology and Technology (ICT) by industry and academia; 4) Creation of markets and regulations, both by the government and the ICT industry [46].

The implementation of the technopark program at vocational high school has not been widely implemented and even some of them just started launching the program at the end of 2018, so the results and impacts have not been seen significantly. Training, coaching and mentoring still need to be done a lot both by the central government, local governments, and universities that have implemented the technopark program. Thus, the authors provide several examples of vocational high school profiles that have implemented and several start-ups and products that have been produced, some of which have even been sold online, such as at SMKN 1 Cilegon. The data sources obtained came from the results of visits and interviews with several schools and the websites of each of these schools, as shown in table 1. Thus, it is necessary to conduct in-depth research on the impact of the technopark program on the quality of students and graduates.

The Directorate of Vocational High School Development states that the target planned for the Development of Teaching Factory and Technopark is that there are 200 Vocational Schools that carry out entrepreneurship learning and Teaching Factory in 2019 and 34 Vocational Schools that become Technoparks [11]. Thus, support and intensive cooperation between sectors is needed to achieve the goals. Some examples of technopark profiles collected from various website sources and direct interviews are shown in the table below.

Table 1: Some examples of Technopark Profiles at vocational high schools

No	Schools	Startup and Products generated	College Training and Mentoring	Industry Partners
1.	SMK Muhamadiyah 1 Sukoharjo	Medical equipment such as baby Crib, children bed, bedside locker, trolley, bowl stand, footstool, bedside screen	Universitas Ahmad Dahlan	a. Rumah Sakit PKU Muhammadiyah b. Sanjaya Group Holding company
2.	SMKN 2 Jayapura	SMK Mart; SMK travel; Educational tourism products for elementary school and junior high school; and First party professional certification agency license (LSP P1).	STP NHI Bandung	All Airlines throughout Papua
3.	SMKN 56 Jakarta	5 Start ups: Zifflet *and* Fifty-Six Market; plastikind.com; loakan.id and sekolahmart.com	Bandung Technopark Telkom University.	a. PT Kualita Persona Indonesia (equkerja.com) b. PT Multicom Persadan International (Mugen)
4.	SMKN 26 Jakarta	a. A propeller-free drone named	ITB	a. PT Daihatsu b. PT Honda

		Bladeless Drone or F-Copter b. Components such as ESC, driver motor, and DC motor c. Special gloves d. A magic wand for the blind		c. PT PLN (Persero)
5.	SMKN 3 Malang	Hospitality: edOTEL and Laundry Bougenville Culinary services: Pastry and Bakery "Vanda", Neo Café "Gaul" and business units for strudel apples and dried milk cake Beauty: Saloon "Lely" Fashion: ThreeCan and Embroidery "Dahlia" fashion studio	STP NHI Bandung	a. Sariayu Martha Tilaar b. L'Oreal c. Studio 8 d. Arva School of Fashion e. Sheraton Surabaya Hotel & Towers f. Mercure Accor Hotels g. Telkom Indonesia h. Paragon Technologi and Innovation
6.	SMKN 3 Samarinda	a. School and office uniforms b. Accessories and beads c. Assorted cakes (Tefa Café) d. Batik sarong Samarinda e. Clothes for Hotel housekeeping f. Catering cooking clothes	STP NHI Bandung	Department of Crop and Food Agriculture
7.	SMK Karya Nasional, Kuningan	Mini CNC Machine, Engine Stand, Lawn Chopping Machine, Wind Power Motor, Motor for disability, Water Pump.	-	a. PT Ever cross b. Auto 2000 Kuningan
8.	SMKN 1 Mesjid Raya, Aceh	A brand with the company name "SMIKE Creative" in the area of expertise in Creative Wood, Textile and Metal Crafts	ITB	-
9.	SMKN 58 Jakarta	Craft products with brands of LALITA PRANA	ITB	-

Based on the information collected in table 1, it can be concluded that the cooperation and collaboration of three sectors, namely government, academia, business, and industry have a significant influence on the products produced by these schools. Besides, teachers who are trained from both universities and industry partners influence the knowledge, quality, and skills they have so that they can transform this to students. Some of the innovative products that they can produce, such as *Dendeng jamur Tempe, keripik paru daun singkong, dan cilok bantel (bandeng tewel*) are produced by students at SMKN 3 Malang. The main purpose of the triple helix collaboration is the birth of product innovation [44], which has a big impact on the skills and skills of students. Not only that, but their entrepreneurial skills will also develop and make them self-sufficient and create jobs for others too, especially after graduating from schools.

4. Conclusion

The development of Vocational High Schools requires the support and direction of national policies implemented by the government, in this case, the Ministry of Education and Culture as a policymaker. Because Vocational High Schools and the world of business and industry have limitations, intensive cooperation between these parties is needed to complement each other, which aims to improve the quality of graduates and to speed up the adjustment time for graduates to enter the world of work and stimulate the growth of student innovation and entrepreneurship. The role of higher education institutions that have implemented technopark also has a significant impact on the success of the technopark program through continuous training, coaching, and mentoring to technopark managers. Therefore, the collaboration between government, industry, and universities known as the triple helix will determine the success of the technopark program. Teaching Factory and Technopark cannot be separated because they are intertwined and interdependent programs. Technopark is a forum that promotes the production results of the school's teaching factory, which can have a branding impact on the local area or school. With the existence of policies to develop and reform Vocational High Schools through the Teaching Factory and Technopark programs which are one of the government's priority programs, it is hoped that in the future, the quality of graduates will be better by fostering and developing the latest innovations tailored to regional potential. In addition, this program and increase the entrepreneurial spirit of students which will ultimately encourage the economy of a region in particular, and Indonesia as a whole.

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Conflict of Interest

No conflict of interest

References

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