



Institutional Model of Science Techno Park Local Governments in Indonesia

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Abstract. Recent economic expansion is mainly attributable to scientific progress and technological advancement. Nevertheless, technology's contribution to Indonesia's economic growth remains insignificant. The National Medium-Term Development Plan identifies the development of Science Techno Park (STP) as one of its top priorities (RPJMN). With the establishment of STP, it is envisaged that challenges associated with advancing national science and technology can be resolved. This research used qualitative research methodologies to determine the most suitable institutional model for Indonesian STPs, particularly those owned by local governments. Based on an analysis of the development progress and prospects of STPs owned by local governments in Indonesia, it can be concluded that STPs owned by local governments can reach the requirement of global STP standards by employing model 1 (one) or industrial scale STPs with an innovation process and high level and complete components.

Keywords: Science Techno Park · Institutional Model · Local Government

1 Introduction

Indonesia is currently categorized as a country in the efficiency-driven phase. Thus, a nation whose economy relies on efficient industrial procedures [1]. The government is committed to accelerating the transformation of the Indonesian economy from everyday tasks to specified and quantifiable priorities involving all stakeholders. Considering the current state of Indonesia, the critical issue is the low degree of domestic research and adoption of technology by industry and other technology users. In order to address these issues and accomplish the objective of becoming a developed and affluent nation by 2025, the government has chosen to adopt the Master Plan for the Acceleration and Expansion of Economic Development in Indonesia (MP3EI) [2].

Developing suitable human, scientific, and technical capabilities in each economic corridor is one of the measures for implementing MP3EI. Creating industrial estates, creating regional innovation clusters for equitable growth, rejuvenating Puspipstek as a Science Techno Park, creating strategic industries to enable connectivity, and empowering innovative actors are some ways to put this approach into practice (talents and

innovations) [3]. Future issues with national science and technology development are anticipated to be resolved through strategic initiatives for human resource, scientific, and technology capacity development, and MP3EI in each economic corridor.

The government has designated the establishment and expansion of Science and Technology Parks (STP) across Indonesia as one of its national goals in the 2015–2019 National Medium-Term Development Plan (RPJMN) [4]. The President's vision and mission include the development of the STP in terms of how technology affects the Indonesian economy. As mentioned in the 6th Nawa Cita of the Republic of Indonesia, this includes constructing several STPs in various Indonesian regions, institutions, and technical colleges with the most modern amenities, infrastructure, and technology [4]. Additionally, the 100 development and development goals of *Science Techno Park* are broken down into many areas, including those at the national level known as (National STP/NSTP), the provincial level (in the form of *Science Park*), and the regency/city level (in the form of *Techno Park*) [5].

If you look at the past few years, STP development in Indonesia has seen considerable growth and development, and STP has started to become organized and spread across the country. The ownership of STP in Indonesia is split between three parties: the government, the corporate sector, and universities. Even if STP has started to advance, probably, there are still challenges with its application and with STP research. The institutional structure of STP has been the subject of numerous studies, many of which compare it. Other studies only expand on a narrow concept without offering a workable institutional picture of what STP looks like [6]. In order to determine what kind of model would be best to use in Indonesia, this study was conducted to assess the models of numerous STPs owned and operated by local governments in Indonesia.

2 Research Methods

The purpose of this research is to identify an appropriate institutional paradigm for STPs in Indonesia, particularly those owned by local governments. Therefore, a qualitative methodology will be used in this research. Which additional data or data gathered for this research were obtained from a number of literature studies, journals, or publications deemed relevant to this research.

3 Discussion

3.1 Science and Technology Park (STP)

The Science And Technology Parks (STP) movement was founded in the United States (US) in the 1950s and has been active for more than 50 years. Since then, the movement has spread beyond the United States to other countries and regions, including Europe and Japan in the 1970s and 1980s and Asia-Pacific in the 1980s and 1990s (Worldwide in the 2000s) [7]. According to Law Number 18 of 2002 governing the National System of Research, Development, and Application of Science and Technology, the government of Indonesia has supported the development of STP since that year (UU 18/2002) [8]. A science park is described as “a specialized, professionally managed organization

whose major purpose is to create a culture of innovation and competitiveness in connected enterprises and knowledge-based institutions” by the International Science Parks Association (IASP). To accomplish this, Science Park encourages the development and growth of innovation-based businesses by offering high-quality space, facilities, and value. It also stimulates and regulates the flow of knowledge and technology between universities, R&D institutions, companies, and markets where the incubation will go through a spin-off process.

Additionally, STP must be pertinent to the local economy for it to exist. It requires business groups, industries, incubators, and organizations to be involved in the production, financing, and appropriate raw materials. If resources are plentiful in a specific location, the STP there must be able to upgrade as many resources as possible to produce a competitive product. It might be argued that Technopark’s existence contributes to the development of a comprehensive and sustainable innovation process, as opposed to one that would not be possible if universities, research centers, and business incubators were the only sources of invention.

The following are generally the primary components of STP [9]:

- 1 The ongoing process of development, innovation, and discovery produced by businesses and institutions, whether it takes the form of contract, team, or individual research.
- 2 Managers, include professional and specialized area managers who can create networks between components, arrange technical, marketing, and financial consulting, offer additional education and training, get ready for the certification, and guarantee the sector’s long-term financial independence.
- 3 Companies or tenants, namely startups, enterprises, potential new entrepreneurs, and businesses created by a land leasing company’s R&D division. Include alumni incubators, *Spin-Offs*, and anchor businesses.
- 4 Infrastructure includes land and structures, training facilities, incubators, prototype centers, and connections to financial institutions.

The primary STP components, meanwhile, typically adhere to the linkages and interactions between other components. According to the Policy Brief, the STP’s significant elements are as follows [5]:

- 1 Building shared tools, workshops, and other facilities in suitable places are examples of areas (spaces).
- 2 Professional manager.
- 3 STP’s core area of interest is the origin of ideas, discoveries, and information, particularly from academic institutions and research and development (R&D) organizations.
- 4 Startup with a focus on technology and innovation.
- 5 Incubator for managing novel items from emerging businesses that will be industrially marketed.
- 6 The industry is an angel investor, a tenant, or a user of R&D.

3.2 Institutional Model

According to Saxena et al. [10], there are six essential components to bolstering or designing an innovation system. According to the definition of roots in the model’s

construction, the factors included are (i) stakeholders who are involved, (ii) stakeholders or groups who are affected, (iii) program needs, (iv) problems or barriers encountered, (v) potential/desired improvements, and (vi) necessary activities. Sub-elements are defined as determinants for each main element. The institutional model seeks to explain how various tasks are related, how each party contributes to overcoming challenges, and how institutions can be strengthened to increase industrial competitiveness. Each job within an organization complements the others to meet program needs, consider potential modifications, and carry out tasks that increase industry competitiveness.

3.3 Development and Development of Local Government STPs in Indonesia

The growth of STP in Indonesia has not yet reached the ideal stage of development, according to research by the Bappenas Policy Analysis Team [11]. Various experiments are required to determine the best form of STP to be copied by STP, especially those controlled by local governments in Indonesia. It is envisaged that in the future, there will be many STPs that can establish new industries in the regions.

Table 1 highlights the STP's current areas of focus as administered by the Regional Government.

Figure 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 is the organizational structure of each STP.

As seen from the chart and organizational structure above, there are still many STPs run by local governments whose components are still incomplete. Since other components can be created over time, it is also known that the focus of the STP-STP aid is different and diversified, ranging from agriculture, plantations, agroindustry, technology, and food health to the creative economy such as crafts, films, and so on, based on an examination of the 11 STPs held by local governments. According to the organizational chart and table, it is also known that, on average, each STP's regional bappeda oversees the management of STPs that belong to the regional government and that the money used for this purpose also comes from the regional budget of the STP. This demonstrates how the government has constantly demonstrated that initiatives relating to the expansion of STP in Indonesia have started to take shape and expand over various locations with diverse facilitation foci.

The same goes for ongoing partnerships between businesses and colleges. These findings show that 11 STPs already have a collaboration feature. However, some STPs still need to develop their cooperation aspects. The local government's STPs are thought crucial to improve this feature because it is one of the critical aspects of STP. STP does more than only incubate businesses or tenants; it also organizes thorough training at places like Solo Techno Park, where classes are held on techniques, and Technopark Ganesha Sukowati Sragen, where classes are regularly held every few months on technology. Yearly. The same is true for STP infrastructure and amenities, which are complete and sufficient for the administration of STP tenants and are in line with the main areas of their support.

Table 1. Science techno park local government.

No	STP Name	Manager	Mentoring Focus	Finance	Collaborate	Engagement With Universities	Facilities
1.	STP South Sumatra, established in 2006	Balithangnovda Prov. South Sumatra	Genetically Engineered Superior Seeds From Local Livestock Technology Ruminants (Ruminant Science), Will be Based on Local Resources (Feed Technology) The technology of Microclimate Engineering Control Results (Off-Farm) And Cold Supply Chain Management Innovation.	APBD	Kementristekdikti Provincial Livestock Service UPTD BIB Sembawa PT Karya Anugerah Rumpin (KAR) PT Great Giant Livestock (GGL) PT Elders Indonesia (Elindo) PT Indah Gemilang Perkasa (IGP) PT Berdikarsi (BUMN) People's Livestock Center (SPR): Banyuasin, Musi Banyuasin, & OJC, Association of Village Building Scholars (SMD), Gapoktanak (OI And Muara Enim), Poktanak Lingkar STP Regional Development Bank (BPD) Sumselbabel State-owned banks	Unsri IPB LIPI Batan	Cowshed Cattle Farm Chicken Farm Tenant Management Building Tenant Class Building Multipurpose Building.

(continued)

Table 1. (continued)

No	STP Name	Manager	Mentoring Focus	Finance	Collaborate	Engagement With Universities	Facilities
2.	Technopark Kaur-Bengkulu	Unit Executive Regional Technical (UPTD) Manager Hut Heirloom Techno Park (P3T) Owned Bappeda-R&D	Agro-industrial field	APBD	Bumdes Cooperation / Kadin / Medium Industry Indonesian Coffee Exporters Association of Bengkulu Province Kawo Ite Bengkulu Province. Dangau Datuk Bengkulu Souvenir Center BPOM Bengkulu Province MUI National Standardization Agency Regional Apparatus Organization of Kaur Regency/Bengkulu Province Pustifikoka And CCSTP Iember Sumbawa Techno Park	Available, Already Running, But Not Yet Optimal	Workshop Building Data And Information Center Building Tissue Culture Laboratory Building Net House Building Greenhouse Building

(continued)

Table 1. (continued)

No	STP Name	Manager	Mentoring Focus	Finance	Collaborate	Engagement With Universities	Facilities
3.	Solo Techno Park, established in 2014	Bappeda Solo	Technique Training: Mechanical Manufacturing, General Welding, Automation, Basic Aircraft Structure, Design Manufacturing, Underwater Wet Welding, Mechanical Garment.	APBD	Ministry of State Secretariat of the Republic of Indonesia Ministry of Industrial RI Kominfo Ministry of Cooperatives and SMEs Brin SKK Migas Surakarta City Government ATMI Petroekno GMD Aero Asia Batam Aero Technic ASTPI (Association of Science And Techno Park Indonesia) Goto Shopee Bukalapak Tokopedia Garena	Sebelas Maret University (UNS) Surakarta Unsi Surakarta Muhammadiyah University of Surakarta	Meeting Area Facilities Podcasts Studio Classrooms MSME Corner Sitting Area In Open Space Seminar Room Seminar Room Oil and Gas Corner Shopee Creative & Innovation Hub Garena Gaming & Community Hub Manufacturing Building Techno-preneurship Building Creative Industries Building
4.	Cimahi Techno Park, established in 2016	Office of Cooperative Trade, Small and Medium Enterprises and Industry of Cimahi City	Developers of Creative Economy, Including Applications And Games, Architecture, Interior Design, Visual Communication Design, Product Design, Fashion, Film, Animation And Video, Photography, Crafts, Culinary, Music, Publishing, Advertising, Performing Arts, Visual Arts, Television And Radio.	APBD	Ministry of Industry of the Republic of Indonesia Cimahi City Government BPPT Lebak Hosting Cimahi Creative Indonesian Creative Economy Agency	General Achmad Yani University TEDC Polytechnic Bandung	Classrooms Multimedia Room Creative Corner Convention Hall Creative Corner 2 Gym & Jogging Area Shared Meeting Rooms Studio Dubbing Coffee Spot Business Incubator Angel Capital Seed Capital Venture Capital

(continued)

Table 1. (continued)

No	STP Name	Manager	Mentoring Focus	Finance	Collaborate	Engagement With Universities	Facilities
5.	Technopark Lampung Tengah, established in 2016	Bapolda, Central Lampung District	Agroindustry With Starchy Plant-Based Fields Such As Cassava, Rice, And Cattle	APBD	PT Sedana Panen Sejahtera	University of Lampung (Unila)	PIBTT Building
6.	Technopark Food Grobogan, established in 2016	Grobogan District Food Security Office	Corn And Soybean Based Food Technology Innovation (Flour Making, Soybean Juice Maker, Soybean Juice Maker Crystal Or Spray, Dryer And Rice Kasteja Derived From Kettle And Corn, And Analog Rice Making)	APBD	Government of Jawa Tengah Province Bappenas Kemernistekdikti	Unika Soegijapranata University of Semarang	Management Office Main Building Production Zone for Flour and Corn Noodles Mocaf And Other Processed Foods
7.	Technopolitan Pelalawan, established in 2020	Pelalawan Regency Government	Palm Oil Industry	APBD	Pelalawan Regency Government BPPT Kemernistekdikti PT Pindad PT Rekayasa Engineering Pusat Palm Oil Research (PPKS) Dewan Indonesian Palm Oil (DMSI)	Pelalawan College of Technology (ST2P) Stiper Agricultural Institute Yogyakarta	Convention Hall Creative Corner Classroom

(continued)

Table 1. (continued)

No	STP Name	Manager	Mentoring Focus	Finance	Collaborate	Engagement With Universities	Facilities
8.	Riau Science Technopark, established in 2018	R&D Body Planning Area (Bapeta)	Kampar Regency Focuses On Riau Specialties Such As Sago, Coconut, Pineapple, And Fish Technopolitan in Pelalawan Province Focuses on Downstream Palm Oil Industry Siak Regency Focuses on Developing Rice Seeds, Horticultural Seeds, and Procurement of Livestock Seeds.	APBD	Government of the Meranti Islands ATT Group Center for Petroleum Production Development and Improvement Studies (PS3PMB) R&D Province Riau	Riau University	Tenant Building Workshop Management Office Pilot Plant Photobioreactor Fish Farming Development Facilities Earthquake Resistant Sample House And Mini Laboratory

(continued)

Table 1. (continued)

No	STP Name	Manager	Mentoring Focus	Finance	Collaborate	Engagement With Universities	Facilities
9.	Technopark Ganesha Sukowati Sragen, established in 2009	Sragen District Government	Mastery of Work Knowledge Skills That Refer to Work Competency Standards (SKKNI, Special Standards, and International Standards), Business Incubation That Focuses on the Field of Technology	APBD	<p>PT. Richtex Garmino Sragen Islamic Financial Institution</p> <p>Adilia&Nashwa</p> <p>Cell Mobile N Accessories</p> <p>Pt. Hanindo Automotive Consultant</p> <p>Tekad Sarana Sejahtera</p> <p>PT Frisian Flag Indonesia</p> <p>Indias Primary Ambassadors</p> <p>PT. Rudy Hadisuwarno</p> <p>PT. The Three Pillars of Prosperous Food, Tbk</p> <p>PT Ndayu Alam Asri</p> <p>Pariwisata</p> <p>Aqeela Home Living Furniture</p> <p>Gas Station-4457216</p> <p>PT. The Sheen of Cheerful Colors</p> <p>PT. Bintang Makmur Sentosa</p> <p>Textile</p> <p>PT. Delta Merlin Clothing</p> <p>Textile</p> <p>Nadia Consultant</p> <p>PT Bank Mega, Tbk</p> <p>RSIA Denta Tama</p> <p>RSIA Restun Ibu</p> <p>Mardi Lestari Hospital</p> <p>RSI Amal Sehat Sragen</p> <p>PT Sapi Gunung Textile</p> <p>SULISMATEX</p> <p>RSIA Sarila Husada Services</p> <p>PT Pan Brother's PT Panji Diana Jaya</p> <p>PT. The scent of Sukowati</p> <p>PT. Multi Pala Agrmusa</p> <p>PT. Bati</p> <p>PT. Kemaria Sragen</p> <p>PT. Delta Merlin Clothing</p>	Sultan Agung Islamic University	<p>Gasoline Car Workshop</p> <p>Diesel Car Workshop</p> <p>Motorcycle Workshop</p> <p>Numerical Computer Machine Workshop</p> <p>Production Machinery Workshop</p> <p>Welding Workshop</p> <p>Workshop Plumbing</p> <p>Workshop Pneumatic Hydraulic</p> <p>Workshop Electro</p> <p>Platting</p> <p>Cad/Cam Workshop</p> <p>Cooling Technique Workshop</p> <p>Electronics Workshop</p> <p>Power Installation Workshop</p> <p>Electric Motor Workshop</p> <p>Wood Building Workshop</p> <p>Stone Building Workshop</p> <p>Computer Accounting Workshop</p> <p>Office Secretary Workshop</p> <p>Language Laboratory</p> <p>Sewing Workshop</p> <p>Embroidery Workshop</p> <p>Garment Workshop</p> <p>Agribusiness Plot</p> <p>Sragenan Cattle Cultivation</p>

(continued)

Table 1. (continued)

No	STP Name	Manager	Mentoring Focus	Finance	Collaborate	Engagement With Universities	Facilities
10.	Semarang Agro Technopark	Bappeda of Central Java Province	ICT, Health, Food, Animal Husbandry	APBD		Unika Soegijapranata Semarang	Information Room Warehouse Incubation Room Seminar Room Small Meeting Room Computer Laboratory Agricultural Laboratory Co-Working Space Co-Production Space Marketing Space Farm Trial Room Livestock Laboratory Communal Space
11.	Agro Techno Park Klaten, established in 2019	Department of Agriculture, Food Security, and Fisheries	Agriculture: Rice, Soybeans, And Cattle Fattening	State Budget Funds and Cost Sharing of APBD II Klaten Regency in the Form of Facilities	Baian Klaten Regency Government		Office Building 1 Ha Agrotourism Rides 3 Ha And Agricultural Development 5 Ha

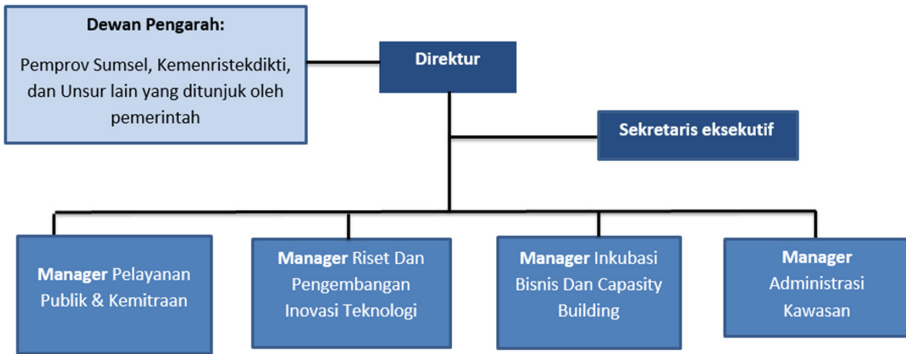


Fig. 1. Organizational structure of STP Sumatera Selatan.

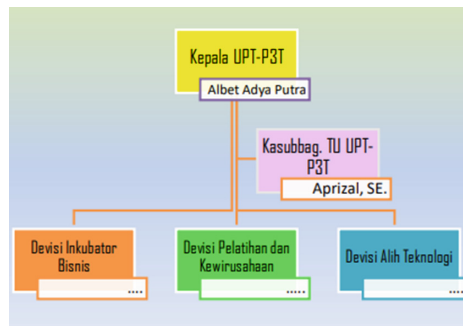


Fig. 2. Organizational structure of *technopark* Kaur-Bengkulu.

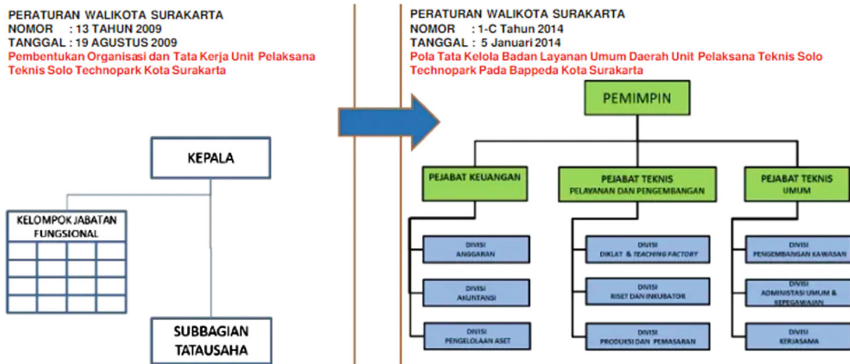


Fig. 3. Organizational structure of Solo *Techno Park*.



Fig. 4. Organizational structure of Cimahi Techno Park.

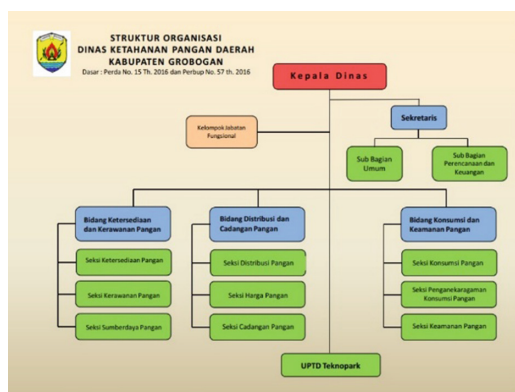


Fig. 5. Organizational structure of UPTD Technopark Pangan Grobogan.

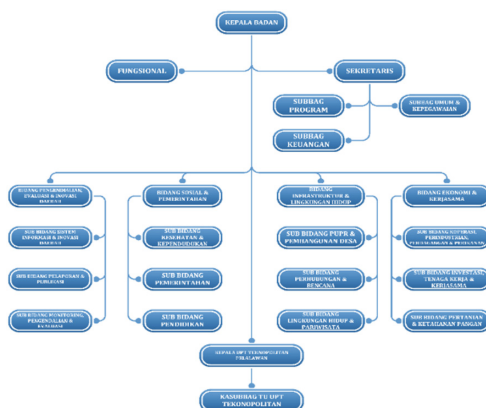


Fig. 6. Organizational structure of UPT Technopolitan Pelawan.



Fig. 7. Organizational structure of UPT Riau Science Technopark.

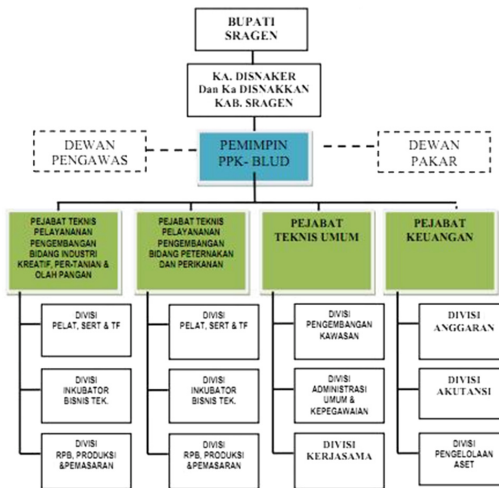


Fig. 8. Organizational structure of Technopark Ganesha Sukowati Sragen.

3.4 Innovation Ecosystem Model in Indonesia

The institutional model that has been developed by Muhammad Arifin Noor, Muhyiddin, and others [5], of which there are multiple models of the innovation ecosystem, is what the researcher draws from several studies on the development of STP in Indonesia. These studies include:

Model 1. Five key STP components can be developed into a finished STP: professional managers, workshops/training, company incubators, in-wall industries, and knowledge sources.

Knowledge sources serve as the primary basis for choosing industrial-scale STP trials. STP uses both research institutes and universities as knowledge sources. High

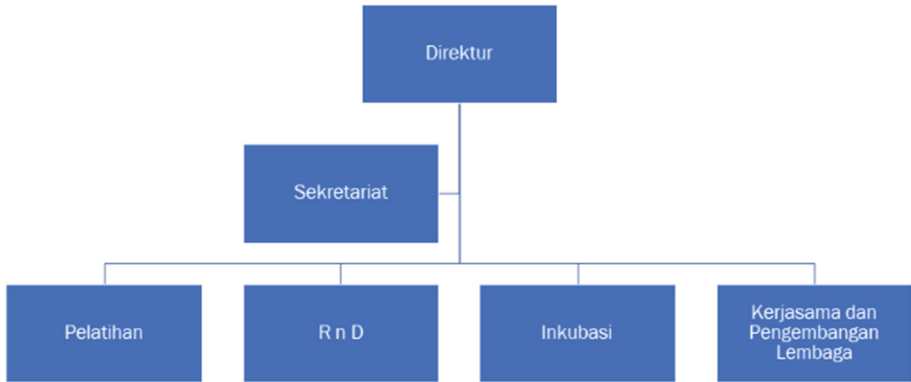


Fig. 9. Organizational structure of Agro Technopark Semarang.

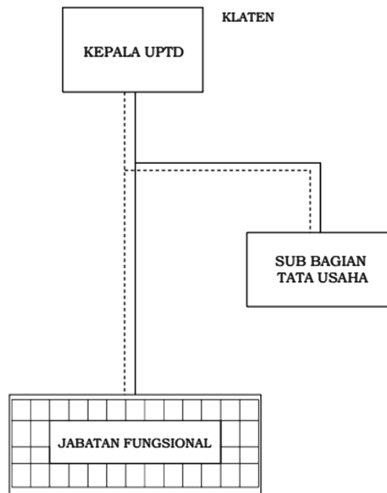


Fig. 10. Organizational structure of Agro Techno Park Klaten.

standards are set for STP using this paradigm, particularly for the knowledge source component. Currently, the University-managed STP ITB and the Center for Science and Technology Research (Puspiptek) are the only STPs using this paradigm 1.

The Center for Science and Technology Research (Puspiptek), a research facility situated in Serpong, Banten, illustrates this paradigm. Puspiptek has been offering technical services and research-related innovations from its regional laboratories, including studies conducted by R&D institutions under the direction of the Ministry of Research, Technology, and Higher Education, for about 35 years (LIPI, BPPT, BATAN, LAPAN). However, industrial use of it has not been prevalent. Therefore, if the local government develops STP, it can make use of this model, which outlines how correctly manage to strengthen cooperation with universities and R&D institutions.

Model 2. Incubator and Startup Community. It is essential to highlight that some technoparks are particularly strong at providing business incubators and ready-to-work training facilities as an infrastructure for developing new businesses. Cimahi Techno Park is a prime illustration of how model 2 is used. The Technology Implementation Unit (UPT) of Cimahi City's Ministry of Trade, Cooperatives, SMEs, and Industry (Disdagkopind) is located at Cimahi Techno Park. CTP is a community-based organization primarily interested in serving as an ICT incubator. Additionally, CTP has two office spaces in the Cimahi City complex that will be paid for later and a dedicated location where it may assist aspiring business people. Despite their different purposes, the Cimahi Techno Park Technical Implementation Unit is in charge of the bureaucracy that the two building facilities are part of. The Cimahi Technopark building acts as a platform for activities carried out by city and regional officials of Cimahi City, as well as a function to support business formation activities for business actors. While this is happening, the Baros Information Technology Creative (BITC) building will serve as a co-working area for aspiring business owners and a business accelerator. There will be 47 active renters in 2022 who produce templates for programs like Canva and Powerpoint. Seven tenants are in incubation while (creating applications, web). Consequently, it is possible to say that CTP is founded in the community and that its business processes take the shape of business service firms (not purely profit).

The Solo Techno Park is another STP under government management incorporated into this plan in addition to Cimahi Techno Park. Technology from the Pedalingan, Jebres, Solo, and Central Java regions can be found in plenty in Solo Techno Park. This integrated area brings together business, academia, research and education, entrepreneurship, banking, and central and local governments. The Solo Techno Park offers training in various fields, including manufacturing mechanics, general welding, automation, basic aircraft structure, manufacturing design, underwater wet welding, and garment mechanics, in addition to housing tenants.

Model 3. Research Results Dissemination Center. The development of many centers for disseminating research results, referred to as technoparks by local governments, is ideal, with a concentration on locations where applied research outcomes are disseminated. To maximize STP as a research dissemination center, several research centers, Research Results Application Centers, and Pilot Centers belonging to the Ministry of Agriculture, Maritime Affairs and Fisheries, LIPI, BPPT, and other Ministries or Institutions, were also formed. Some of them are held by district or city governments, like the Embryo Technopark that the governments of Bengkulu and Enlecan Kaur proposed in conjunction with LIPI.

From the several models discussed above, the STP 1 (one) model, which is more advanced in research and technology, is essentially what is meant when discussing the ideal conditions that must exist in STP governed by local governments. Due to this, if the regional administration wishes to create this STP in model 1, it is crucial to maximizing partnerships with universities and R&D organizations to enable the local government-managed STP to actualize the commercialization of research findings.

4 Conclusion

Science Techno Parks (STP) or Science and Technology Parks are administered by specialized professionals to enhance member welfare through the development and enhancement of an ecosystem that fosters innovation to boost the competitiveness of the sectors and institutions operating under their aegis.

Science And Technopark (STP) Industrial Scale with a High Level of Innovation Process and Complete Components, Incubator and Start-Up Community, and Research Result Dissemination Center is the STP model already in use in Indonesia. The industrial-scale *Science And Technopark* (STP) model, with its complex invention process and comprehensive components, is the most suitable of the three models for Indonesia because industrial-scale STP has a solid knowledge basis and is capable of meeting the STP standards of industrialized nations.

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