Designing a Performance Measurement System at Science Technopark using the European Union Model

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Abstract: The development of Science Techno Park in Indonesia has a goal to increase economic growth and strengthen the role of science and technology. The European Union, as a country that has known Science Techno Park since the mid-1960s, in 2013 compiled the Science Techno Park model and stated that the success of the Science Techno Park was influenced by three dimensions, namely economic, sustainability and process improvement. So that the adaptation of the European Union Science Techno Park model to Science Techno Park in Indonesia is made in designing the performance measurement system. The design of the performance measurement system consists of the formulation of indicators on the dimensions of the Science Techno Park based on applicable rules for the Science Techno Park Indonesia including the assessment of the maturity of the Science Techno Park, display performance indicator properties, and trials at the Science Techno Park in Indonesia. The results of the trial show that Science Techno Park in Indonesia already has targets and documents on performance, but there are still a number of targets and realization that do not have data availability

1 INTRODUCTION

According to the World Economic Forum in 2011, Indonesia is in the category of countries that are at the efficiency-driven stage so that they will try to develop to be in an innovation-driven position. However, Indonesia has a low technological readiness [1]. Therefore President of the Republic of Indonesia declared Nawacita as a nine priority agenda implemented during his administration, one of which reads, "Increasing people's productivity and competitiveness in international markets so that the Indonesian people can advance and rise together with the nations Other Asia." The 6th Nawacita program refers to the development of science technology parks in areas with the latest infrastructure and facilities. The development of science technology park aims to increase economic growth and strengthen the role of science and technology in economic development by promoting a culture of innovation and business competitiveness [2].

During the three years of development of Science Techno Park, of course, many developments and performances have been carried out. Based on Presidential Regulation No. 106 of 2017 concerning the Development of the Science Technology Area in article 24 regarding quality assurance of KST management, it is necessary to have a registration, assessment, giving recommendations, ranking, guidance, and supervision [3]. Quality assurance at Science Techno Park is carried out by the Ministry of Research, Technology, and Higher Education. However, there is no performance evaluation on the internal Science Techno Park on each performance indicator.

The development of Science Techno Park in the European Union began in the mid-1960s to the 1970s. So that Science Techno Park in the European Union is familiar with the characteristics and failures and successes of Science Techno Park. So the European Commission developed the Science Techno Park model composed of government, academia, and business which formed on three dimensions that led to the success of Science Techno Park, namely the dimensions of economic improvement, sustainability, and the process dimension to achieve economic improvement as well as sustainability [4]

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Indonesia, as a country that has recently developed Science Techno Park, requires a performance measurement model. Given the need for performance measurement and keeping in mind that the Science Techno Park model developed by the European Union is ahead of Indonesia, the European Union Techno Park model prepared by the European Commission, Directorate-General for Regional and Urban Policy can be a guide for Science Techno Park in Indonesia which is under development. Performance measurement using the European Union's Techno Park model can be used as a basis for providing recommendations, ranking, assessing, and monitoring on Science Techno Park. Against this background, this study aims to determine the dimensions of the Science Techno Park based on the European Union Techno Park model, to know the rules related to Science Techno Park, to map the rules and to assess the maturity of the Science Techno Park dimensions, to design a Science Techno performance measurement system Park in Indonesia, and know the results of performance measurement trials at the Sepuluh Nopember Institute of Technology and Coffee and Cocoa Science Techno Park.

1.1 First Section

Data collected at this stage are the dimensions of the Science Techno Park based on the European Union's Techno Park model and the rules relating to Science Techno Park. Data collection is done by brainstorming on the data needed

1.2 Model Development

The stages of developing a performance measurement system model at Science Techno Park using the European Union model consist of:

1. Mapping the Rules of Science Techno Park against the Dimensions of Science Techno Park
2. Compilation of Performance Indicators
3. Designing Performance Indicator Properties
4. Performance Indicator Validation and Performance Indicator Properties
5. Designing a Performance Measurement Dashboard

1.3 Testing The Model

The model testing phase aims to find out whether the designed model can be applied to Science Techno Park as well as to find out the results of performance measurements at the Science Techno Park Sepuluh Nopember Institute of Technology and Coffee and Cocoa Science Techno Park. There are two processes carried out in the pilot phase, namely weighing and measuring the achievement of the performance of Science Techno Park. Weighting is done by pairwise comparison by the expert at the relevant Science Techno Park.

2 MODEL DEVELOPMENT

2.1 Data Collection

The data needed to develop a performance measurement model includes the direction of the development and development of Science and Technology based on direction from BAPENNAS, goals, objectives, and functions of Science Techno Park based on Republic of Indonesia's Presidential Regulation Number 106 Year 2017, and maturity assessment for Science Techno Park compiled by Ministry of Research, Technology and Higher Education.

2.2 Model Development

Model development begins with mapping the rules of Bapennas and the Republic of Indonesia's Presidential Regulation No. 106 of 2017 to the Science Techno Park dimension, mapping the maturity assessment of the Science Techno Park dimension as well as compiling performance indicators from the mapping results, then adjusting to the rules of the Bapennas and the Republic of Indonesia's Presidential Regulation Indonesia Number 106 Year 2017.

Table 1 Results of Arrangement of Rating Elements Based on Mapping Results

Index	Dimension	Index	Rating Element
1	Economic Improvement	1.1	Tenant and client served
		1.2	Output Science Techno Park
		1.3	Startup income
		1.4	Increase in start-up capital
		1.5	Science Techno Park Revenue
		1.6	Technology Transfer
2	Sustainability	2.1	Tenant with regional potential
		2.2	Support from universities and research institution

Index	Dimension	Index	Rating Element
		2.3	Applied Research and Development
		2.4	Network with regional, national, international
		2.5	Financial independence of the management organization in operational activities
		2.6	Investments in the development of Science Techno Park
		2.7	New Technology
		2.8	Science Techno Park field
3	Process	3.1	Integration between the production process and preparation with marketed products and services
		3.2	Managers
		3.3	Partners
		3.4	Development of tenants
		3.5	Branding Science Techno Park
		3.6	Completeness of supporting facilities

Table 1 is an assessment element formed based on the results of the mapping of rules based on the Bapennas and Presidential Regulation of the Republic of Indonesia in 106 of 2017 relating to Science Techno Park and mapping of maturity assessment on the Science Techno Park dimension. For each assessment element formed, there are indicators used to measure performance in Science Techno Park.

Table 2 Performance Indicators

Index	Indicator	Unit
1.1.1	Number of tenants who receive services/facilities/ training / technical assistance in Science Techno Park	tenant
1.1.2	Number of clients outside the incubation tenant who receive services/facilities/ training / mentoring Science Techno Park	partners / clients
1.2.1	Number of new startups formed	startup
1.2.2	Number of spin-off companies formed (accumulated)	companies
1.3.1	Average start-up income in the current year of the	rupiah
1.4.1	The amount of start-up capital that is increased to increase turnover and asset value through business cooperation with the industry	rupiah
1.5.1	Total Science Techno Park income per year	rupiah
1.5.2	Total contributions of Science Techno Park to the parent agency	rupiah
1.6.1	Number of research technology applied to tenants/clients	research
2.1.1	Number of tenants who support the potential of areas	tenant
2.2.1	Number of colleges and research institutions to support the development of Science Techno Park	institutions
2.3.1	Total Applied Research and Development is carried out	research
2.4.1	Total collaboration with regional institutions (in the form of employment contracts)	institutions
2.4.2	Number of collaboration with international institutions (in the form of employment contracts)	institutions
2.4.3	Number of collaboration with international institutions (in the form of employment contracts)	institutions
2.5.1	Percentage of the budget obtained from Science Techno Park services and the contribution of partners outside the parent institution to the total operating budget of Science Techno Park	percent
2.6.1	Amount of funds for the investment program	rupiah
2.6.2	Percentage of program facilities development	programs
2.6.3	Percentage of procurement of goods	goods
2.7.1	Number of new technologies produced	HKI
2.8.1	Existence of proof of land ownership for Science Techno Park	certificates

Index	Indicator	Unit
3.1.1	Percentage of products and services that can be accepted and utilized by the community	percent
3.2.1	Number of managers of Science Techno Park	people
3.2.2	Percentage of certified managers	percent
3.2.3	Number of meeting managers to improve manager communication	meeting
3.2.4	Number of HR development programs/managers implemented	programs
3.2.5	Number of HR training (certification) development programs implemented	programs
3.3.1	Number of active and implemented MoUs that reflect the completeness of the Academic, Business, Government, and Community (ABGC) partner	MoU
3.4.1	Number of workshops, focus group discussions (FGD), seminars conducted to improve the competence of tenant	workshop
3.4.2	Number of research, development, and technology business facilities to support the basic functions and services of Science Techno Park	facilities
3.4.3	Number of innovation services (R&D, technology transfer services, specialized high-value scientific equipment)	services
3.5.1	Percentage of internet and website utilization as media branding and information	percent
3.5.2	Number of socialization and promotion programs for the Science Techno Park branding of the community	program
3.5.3	Number of conferences, business meetings, business matching	conferences
3.5.4	Number of contracts resulting from conferences, business meetings, business matching	contracts
3.6.1	Existence of a meeting room	space
3.6.2	Existence of secretariat services	space
3.6.3	The existence of worship places	space
3.6.4	The existence of a cafe and recreation facilities	space
3.6.5	The existence of the exhibition center	space

Table 2 is a performance indicator that is formed based on the results of the mapping of maturity assessment of the Techno Park dimensions and adjusted to the rules that apply to Science Techno Park. From the performance indicators formed, then the performance indicator properties are compiled, which include the nature of the measurements, the frequency of measurements, the frequency of reviews, formulas, and data sources. The majority of measurement properties are higher is better, except for the Science Techno Parkland valuation element, and the supporting facilities are zero one. The measurement frequency is adjusted to the maturity assessment conducted by the Ministry of Research, Technology, and Higher Education, which is quarterly so that the average measurement frequency is also done quarterly. While the frequency of reviews is done per semester. The formula is a formula used to calculate performance indicators. And the data source is a document that is needed to calculate performance achievements.

After the performance indicators and performance indicator properties are formed, then an expert is validated to determine whether the performance indicators and performance indicator properties that are formed are valid. If it is considered valid by an expert, then a dashboard of performance measurement is designed to help in measuring performance.

Figure 1 Home Page Dashboard

Figure 2 Menu Page Dashboard

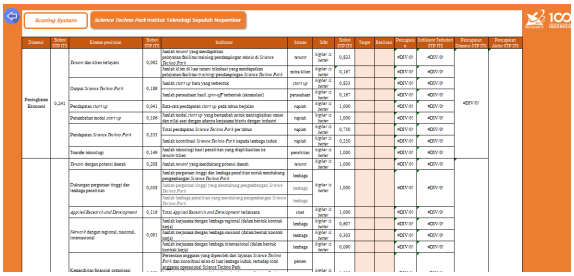

Figure 3 Scoring Page Science Techno Park ITS

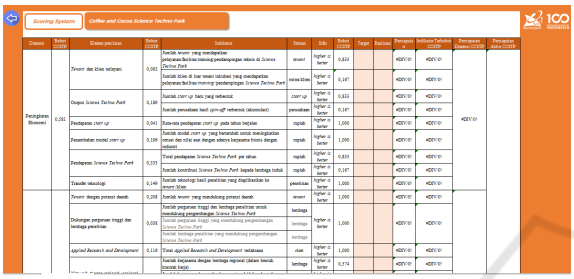

Figure 4 Scoring Page Coffee and Cocoa Science Techno Park

Figure 1, Figure 2, Figure 3, and Figure 4 are some of the views on the dashboard measuring the performance of Science Techno Park. Figure 1 shows the first page that appears on the dashboard as the home page. Figure 2 shows the menu on the dashboard. There are four menus provided, namely the Science Techno Park dimension menu, the Performance Indicator menu, the Performance Indicator Properties menu, and the Scoring System menu. Figures 3 and 4 are the views on the Scoring System menu. Figure 3 only shows the scoring system for Science Techno Park at the Sepuluh Nopember Institute of Technology, and Figure 4 shows the scoring system for Coffee and Cocoa Science Techno Park.

Scoring on the performance assessment of Science Techno Park can be done by entering the target value and realization in the target and realization column. After completing the target values and realization, the dashboard will process the results of the achievement of the performance of Science Techno Park.

Dashboards can also be used by Science Techno Park other than the Science Techno Park of the Sepuluh Nopember Institute of Technology and Coffee and Cocoa Science Techno Park but must first enter the weight of each indicator, element, and dimension on the dashboard

3 MODEL VERIFICATION

3.1 Trials at the Techno Park Science of Sepuluh Nopember Institute of Technology (ITS)

Based on the weighting trial results, dimension 2 (sustainability) has the greatest weight compared to other dimensions. Because the dimension of sustainability has the greatest weighting of 54.8%, it will simultaneously make the element of financial independence have the greatest weight among the other elements. This is because the element of financial independence is in the sustainability dimension. So the success of this element will drive the success of Science Techno Park in measuring overall performance.

Based on the results of trials at the Science Techno Park of Sepuluh Nopember Institute of Technology in 2018, only target a number of arranged indicators. The targets determined only cover tenant indicators that receive services/facilities/ training / technical assistance in Science Techno Park, number of new start-ups, number of technology transfers, existence of certificates, applied R&D implemented, number of HR development programs, number of HR certification development programs, the number of new technologies in the form of IPR, the number of innovation services, and the target of procuring conferences / business meetings / business matching. In addition to the limitations on setting targets, many of the realization of the indicators on the performance measurement system have not been filled because Science Techno Park does not yet have a comprehensive record of all activities and agreements on Science Techno Park. The record on the performance of the Science Techno Park Sepuluh Nopember Institute of Technology, is the most staggering at each center, with varying availability at each center. There are centers that set targets, don't set targets, take notes, or don't take notes. Given the limitations on-target information and realization for Science Techno Park, it causes obstacles to conducting a comprehensive performance measurement of the Science Techno Park Sepuluh Nopember Institute of Technology.

Even though overall performance measurements cannot yet be carried out, a trial of performance measurement at the Science Technology Park of the Sepuluh Nopember Institute of Technology can show indicators that have not yet been achieved by the Science Techno Park Sepuluh Nopember Institute of Technology, which is indicated by the traffic light system. Performance that needs to be improved and

improved is the formation of a new startup from the results of incubation. In the current year, no start-up was formed from a total of seven tenants incubated. Improved performance results can be done by providing more intensive services or providing motivation for tenants to follow the incubation process better. In addition to the number of newly formed start-ups that are far below the target, the discovery of applied research and development that is still less than the target so that the performance achievement is 70%. In addition to applied research, the number of new technologies or IPRs is still less than the specified target. This was conveyed by the interviewees that the desire for innovation by researchers is still lacking. The existence of innovation is more inclined because of the motivation from outside, such as government funding that has been given and must be used for innovation activities. This requires the implementation of innovation so that funds can be accounted for by the government

3.2 Trials at Coffee and Cocoa Science Techno Park

Based on the weighting trial results, dimension 1 (economic improvement) has the greatest weight compared to other dimensions. Because the dimension of economic improvement has the greatest weighting of 58.1%, this is because economic improvement is the main objective of the existence of Coffee and Cocoa Science Techno Park and is the vision of Science Techno Park. Then at the same time will make the tenant element, and the underserved client will have the greatest weight among the other elements. This is because the tenant element and the underserved client are in the dimension of economic improvement. So the success of this element will drive the success of Science Techno Park in measuring overall performance.

Based on the results of trials of performance measurement models at Coffee and Cocoa Science Techno Park, in 2018, it has set targets for performance. This is indicated by the fulfillment of targets, and the realization of the indicators arranged. However, there are two indicators that have not been targeted and do not yet have available documents, namely the indicator of Science Techno Park's income per year and the number of contributions of Techno Park to the parent institution. If the overall performance measurement is done by giving 0% or 100% achievement on the two performance indicators, it will get a value of 51.182% and 60.843%. So that if the two indicators can be measured, the achievement of performance in Coffee and Cocoa Science Techno Park will be in the range of values of 51.182% to 60.843% with each dimension achieving 13.699%, 20.203%, and 16.089% for the dimensions of economic improvement, sustainability, and process in a row.

Achievement performance of 51.182% to 60.843% shows that there are still many performances that need to be improved and improved to get better performance achievements. There are 14 performance indicators that get red traffic light, which shows that the performance is still far below the target and needs to be evaluated to improve the results.

The fourteen indicators found the need to be given an evaluation, such as holding a conference with better preparation, so that it will provide an outcome in the form of additional investment funds from conference participants, as well as additional start-up capital to increase turnover. With the addition of funds to the investment program, the procurement of goods carried out will be smoother. Evaluation can be done together with all relevant stakeholders so that it will give better consideration.

Therefore, recommendations in general for 2019 and beyond, namely recording all things contained in the Science Techno Park business process, and evaluating the performance in the previous year so that they will get a strategy for implementation in the following year while increasing the results of performance appraisal.

4 CONCLUSIONS

1. The success of Science Techno Park is driven by three dimensions, namely the dimension of economic improvement, the dimension of sustainability, and the process dimension to achieving economic improvement as well as sustainability.
2. The preparation of performance measurement models using rules related to the guidelines for the development and development of Science Techno Park, namely Presidential Regulation No. 106 of 2017, and Development Guidelines by BAPENNAS, and assessment of maturity by the Ministry of Research, Technology and Higher Education.
3. Maturity rules and assessments that apply are categorized or mapped against the dimensions of Science Techno Park so that we get 6 elements and 9 indicators on the economic improvement dimension, 8 elements and 12 indicators on the sustainability dimension, and

6 elements and 19 indicators on the process dimension.

4. Performance indicator properties that are used as guidelines in measuring the performance of Science Techno Park are general in nature so that they can be used for a variety of Science Techno Park, which includes units, properties, frequency of measurement, frequency of reviews, formulas, and data sources. Performance measurements are also displayed in the form of a dashboard using Visual Basic in Microsoft Excel.
5. A trial of performance measurement is carried out at the Science Techno Park Sepuluh Nopember Institute of Technology and Coffee and Cocoa Science Techno Park, which shows that both Science Techno Park already had targets and performance documents in 2018. From the performance measurement trials it is known that Coffee and Cocoa Science Techno Park scores in the range of 51.182% to 60.843%, while the Science Techno Park Sepuluh Nopember Institute of Technology, the results of overall performance measurements are not yet known because there are a number of target documents and the realization of indicators that are not yet available.

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