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ARTICLE

Designing the Concept of Regional Innovation Sustainability

The Triple Bottom Line Concept Approach and Sustainable Evaluation

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Abstract: Sustainability of performance target achievement. While quantitative target achievement has reached an ideal state, it is often accompanied by a lack of sustainability as a continuous cycle. This cycle should be established from the inception of regional innovations, preventing them from becoming a burden on the government due to the utilization of various resources, including budget, time, and innovation actors. This research employs a qualitative approach with literature review data analysis to explore research perspectives and establish a framework aligned with the research subject. This approach facilitates developing or deepening theories and insights into the research subject. Previous research has focused on applying sustainability concepts within companies or corporations to enhance economic growth (revenue), social responsibility (community), and environmental sustainability. This research formulates a conceptual design for a sustainability assessment standard using empirically tested indicators for local governments. The concept utilizes the triple bottom line (TBL) approach, encompassing three dimensions: prosperity, people, and planet. These three dimensions serve as the focal points of intervention within the sustainability framework of this concept. The concept evaluates the potential for developing and continuing existing practices or, alternatively, identifies opportunities for cessation and replacement with more effective and efficient implementation methods through economic, social, and environmental dimensions. This research successfully develops an evaluation matrix for assessing regional innovation and establishes indicators that can be used as measurement tools within local government organizational units at smaller scales. However, the research is limited in its ability to generalize sustainability from a single framework or concept to diverse concepts tailored to the specific conditions of individual local governments. Time and methodological constraints also limit the scope of the research, leaving room for further refinement and expansion in future studies.

Keywords: Assessment Tool; Evaluation; Regional Innovation; Sustainability.

1. Introduction

Sustainability is a concept that seeks to preserve a system or process (Leesatapornwongsa et al., 2023). This means that the system or process is able to survive and develop in the long term (Wardani & Apriani, 2023) without sacrificing the needs and well-being of future generations (Weimin et al., 2022). In development, sustainability is the main key. Sustainable development must be balanced between economic, social, and environmental aspects (Elkington, 1997). Rapid economic development without regard to social and environmental aspects (Garay et al., 2018), will only bring benefits to the current generation (Albert, 2019), but plunges future generations into trouble.

Development in Indonesia is based on the noble ideals of the nation's founders, as stated in the Preamble to the 1945 Constitution, which states that the purpose of the Indonesian nation was to advance public welfare, educate the nation's life, and participate in implementing world publications. From the phrase advancing public welfare, the concept of development is conceptualized with physical development and non-physical development throughout the territory of the Republic of Indonesia.

The government then encouraged development to be implemented through new ideas (Failaq & Madjid, 2023), a new way that prioritizes faster, smarter, cheaper processes in achieving development (Nadaa & Priyanti, 2023) through a regional innovation concept to accelerate the completion of existing development targets.

The government, through Government Regulation Number 38 of 2017 concerning Regional Innovation as a mandate of Law 23 of 2014 concerning Regional Government, emphasizes efforts to encourage and facilitate the creation of innovation in the regions (Perdana et al., 2023), which is the key to improving the performance of regional government administration (Vidiastuti et al., 2023), accelerate the realization of community welfare and increase regional competitiveness (Barsei et al., 2023).

With the existence of PP 38/2017, it is hoped that regions in Indonesia will be encouraged to create breakthroughs in implementing government and public services (Marsanty & Fitriati, 2023). This will have a positive impact on improving regional performance and competitiveness.

Regional innovation is an important key in driving economic development (Sitompul & Sumule, 2016), improving community welfare (Ikhsan et al., 2024), and preserving the environment in Indonesia. In the midst of the era of globalization and the complexity of development, regional innovation is increasingly important to face various changes and take advantage of existing opportunities (Artha et al., 2023). Regional innovation not only increases regional competitiveness (Naibaho, 2021), but also empowers local economies through the development of new products and services (Sukmadi, 2021), and opening up new job opportunities. Moreover, regional innovation enables regions to adapt to global change by identifying local advantages (Fatoni, 2022), and develop innovative solutions to address challenges (Rubio-Andrés et al., 2022), adapting to climate change, especially disaster mitigation (Herlina et al., 2021).

The process involves active community participation in planning (Humalanggi et al., 2023) and program implementation, which strengthens the community's sense of ownership and responsibility (Laksana & Gustav, 2022) towards development in their regions. Therefore, the government and stakeholders continue to encourage and support regional innovation as a main strategy (W. Fadli & Fadhillah, 2021) in accelerating sustainable national development in Indonesia. But then what

happened was that the regions were trapped in the concept of quantity (number) (Wardani & Apriani, 2023) regional innovation without thinking about the concept of quality, in this case, the sustainability of regional innovation that has been created or implemented (Allal-Chérif et al., 2023) government innovations that do not materialize, only appear as ceremonial actions in government activities (Sudrajat & Andhika, 2021).

This is also reinforced by eliminating the Public Service Innovation Competition (KIPP), held in 2014. This elimination measures the extent of the sustainability and replication of regional innovations because thousands of regional innovations were created during this implementation. Still, these innovations only became a database without any sustainability of their application in the regions. Based on the 2023 Regional Innovation Index data, the total number of regional innovations inputted is shown as follows:

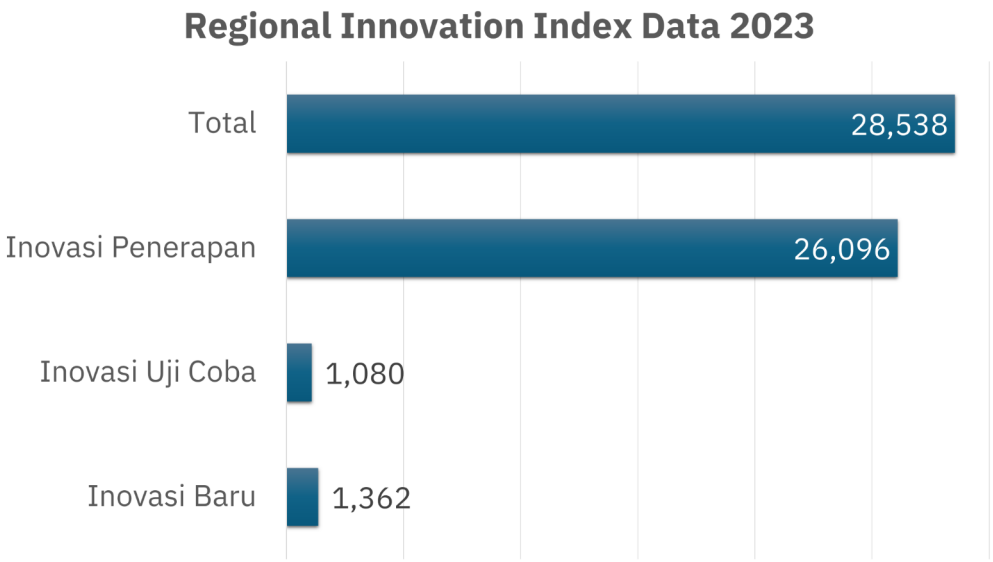

Figure 1. Number of Regional Innovations Until 2023

Based on quantity, as many as 28,538 existing innovations do not fully guarantee quality. Innovation is still hampered by the inability to adapt to various socio-economic conditions of the government and local communities (Bangsawan, 2024). Quality is measured by the sustainability of innovation, which can be seen from the extent to which the impact of the innovation has been implemented, be it social, economic, or environmental impacts, especially in overcoming various existing development problems. Social impacts, for example, are seen in the Human Development Index (HDI) indicator).

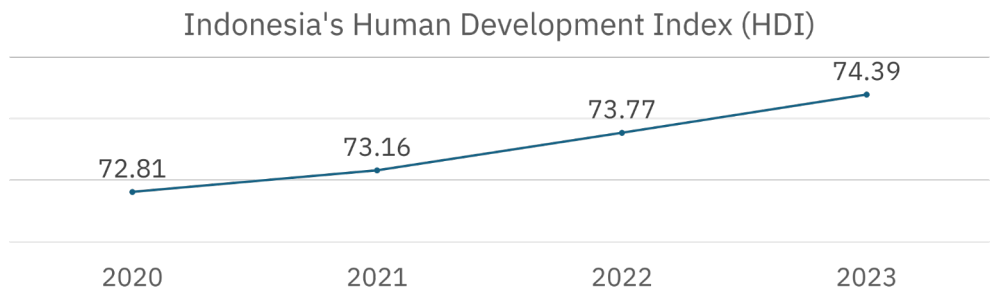

Figure 2. Human Development Index

Social Impact alone is not enough to describe the quality or sustainability of innovation. Besides HDI, there are many other indicators that can be used to measure social impacts relevantly. So, a method or approach is needed to identify processing indicators and analyze them.

Some sustainability analysis methods that have been introduced previously are: Rofi et al. (2021) which uses Multidimensional Scaling (MDS) with the Rapfish approach, using the flag method (Bakri et al., 2017) which is based on the bandwidth value which is divided into different sustainability level intervals or known as CTV (Critical Threshold Values), and finally the use of PROMETHEE in selecting the best sustainable concept (Vinodh & Jeya Girubha, 2012).

Based on the existing background, the author is interested in using a different approach, in this case, the use of the Triple Bottom Line (TBL) basic framework, which is then integrated with the metadata of the Indonesian Sustainable Development Goals indicators compiled by the Ministry of National Development Planning/Bappenas to design a concept of regional innovation sustainability. This article is compiled to form a concept or approach related to the sustainability assessment standards of a regional innovation so that it can be measured scientifically and comprehensively using existing and empirically tested sustainability concept frameworks that can be used as assessment standards.

2. Methods

This study used qualitative research by involving data analysis through a literature review. The decision is based on the purpose of the research, namely, to form a concept of sustainability (LaMarre & Chamberlain, 2022) from the basic framework, namely the Triple Bottom Line (TBL) from references that can be collected which will then be structured to form a guide (Pane et al., 2021) fundamentally the form of sustainability indicators according to the chosen framework.

Qualitative approaches are commonly used in social sciences and humanities, such as anthropology, sociology, psychology, and education (M. R. Fadli, 2021). In this context, researchers attempt to explore the perspectives of research subjects. (Cash et al., 2022) and understand the framework that is appropriate to the subject. This approach also allows for the development of (Hadi et al., 2021) or theoretical exploration, which provides deeper insight (Sugiyono, 2015) about the research subject.

The data acquisition process through literature studies involves a series of stages, including keyword identification, literature search, relevance and reliability evaluation, in-depth reading, and reference management (Stadtländer, 2009). Literature analysis was conducted to identify common themes, patterns, differences of opinion, and knowledge gaps (Creswell, 2010), which was then compiled into a logical and coherent literature review to summarize the development of knowledge in the field.

In data collection, relevant keywords and research topics will be used to collect various literature sources such as books, scientific journals, articles, and other documents (Saputra, n.d.). The metadata guideline book of Sustainable Development Goals Indonesia indicators compiled by the Ministry of National Development Planning/Bappenas is the main reference in this study. Literature sources are identified through various sources (Pradono et al., 2018), including online databases, library collections, and interactions with competent experts in related fields. After proper literature selection is made, the next step is to evaluate

the reliability and credibility of the literature sources that will be used (Sutikno & Hadisaputra, 2020).

3. Results and Discussion

3.1. Sustainability Theory

Sustainability, both theoretically and in fact, refers to the ability of a system to survive with existing capabilities (Allal-Chérif et al., 2023) and able to adapt in the long term (Cano et al., 2022), without sacrificing system capabilities (Koval et al., 2023) to meet future needs (Ferlito & Faraci, 2022). including balancing human needs, environmental protection, and economic progress (George et al., 2021), so as not to harm the natural environment (Zhang et al., 2022) not sacrifice social welfare (Afum et al., 2023) and maintain the economy for future generations. Sustainability, in general, is the ability to maintain and meet current human needs and the needs or other humans in the future; in this case there is a balance between meeting human needs, the needs of the natural environment, and the economic progress of a region.

The concept of sustainability rests on the assumption that natural resources are limited (Wang & Juo, 2021) and must be used wisely to ensure human survival (Hanaysha et al., 2021) and biodiversity. The concept of sustainability is nothing other than utilizing these limited resources and utilizing them as well as possible, not carrying out excessive exploitation so that in the future, humans can still utilize the existing natural resources. Theories about sustainability generally combine the principles of ecology, economics, and social interrelated (Awosusi et al., 2022).

Sustainability is not just a theory but also a real action (Liu et al., 2023). Implementing sustainability principles in everyday life is the key to achieving a sustainable future (De et al., 2020). These efforts include responsible environmental management (Urbinati et al., 2023), environmentally friendly economic development (Ibrahim, 2023), and inclusive social development (Cheng, 2020) wise decision-making in natural resource management, environmentally friendly technological innovation, and non-exclusive public policies implemented by the government in terms of supporting sustainable development are some of the real daily actions in implementing the concept of sustainability.

Sustainability is always relevant to 3 main things that are interrelated, namely:

3.1.1. Economic Pillars

a. Sustainable Economy: John Stuart Mill (1806-1873) is considered one of the early founders of the concept of sustainable economy. He emphasized the importance of maintaining a balance between consumption and regeneration of natural resources (Chen et al., 2019);

b. Green Economy: Lester R. Brown (born 1934) pioneered the concept of a green economy, which focuses on environmentally conscious economic development. (Asadi et al., 2020).

3.1.2. Environmental Pillars

a. Conservation of Nature: Aldo Leopold (1887-1948) was one of the pioneers of the conservation movement in the United States. He emphasized the importance of maintaining ecological balance and ethics in natural resource management (Jiang et al., 2020);

b. Sustainable Natural Resource Management: Rachel Carson (1907-1964) is famous for her book "Silent Spring" which criticized the use of harmful pesticides.

She advocated sustainable natural resource management (Qiu, 2020) and environmentally friendly.

3.1.3. Social Pillars

a. Social Justice: John Rawls (1921-2002) put forward a theory of social justice that emphasized the importance of equality of opportunity and distribution (Hermundsdottir & Aspelund, 2021) of fair resources;
b. Human Well-being: Amartya Sen (born 1933) is an economist and philosopher who emphasizes the importance of human well-being (Ahmad & Wu, 2022) under development. He introduced the concept of "capabilities" as a measure of human progress.

Overall, sustainability is a concept that involves efforts to achieve a harmonious balance between human interests, the natural environment, and economic progress in the long term, both in theory and practice.

3.2. Regional Innovation Cycle

The regional innovation cycle is a framework for understanding and managing the innovation process (Maulana et al., 2021) in a region. In the dynamics of local development, the regional innovation cycle is an important point in responding to and resolving a series of challenges. Haris et al. (2021) faced by local governments in developing a regional innovation concept.

This cycle begins by identifying the problem (Saksono, 2019) specific at the regional level (infrastructure, economy, environment, or social). The next stage is to develop solutions (Laraswati, 2020) creative and sustainable that can overcome these problems by involving collaboration between local governments, academics, the private sector, and the community to produce innovative ideas.

Once these solutions are formulated, the next step is to test and implement the innovations (Kartika & Simorangkir, 2019) on a small scale in an environment that has the authority from the formulation of regional innovation. This trial is important to evaluate the effectiveness (Bhatnagar et al., 2022), sustainability, and its impacts (Albert, 2022) on the organization. Based on the results of this evaluation, these solutions can be adjusted and refined (Harsanto et al., 2022) before being implemented more widely. Once proven successful in trials, local governments can play an important role in expanding (Ahmad & Satrovic, 2023) and implementing solutions (Febrian, 2018) throughout their territory.

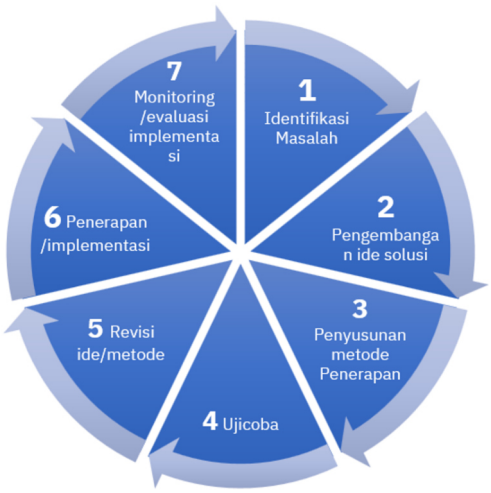

Figure 3. Diagram of Regional Innovation Cycle

The regional innovation cycle is an iterative process (Putranti & Mulyanto, 2020) and sustainable, where local communities are actively involved in solving problems (Suhendra, 2018) and improve their own quality of life. Through this cycle, innovation can become a driving force for development (Aziz et al., 2018) inclusive and sustainable at the local level, creating real positive change for communities.

The regional innovation cycle is a continuous and dynamic process. Factors such as leadership, collaboration, capacity, funding, and policies play a critical role in the success of this cycle.

3.3. Sustainability Approach With Triple Bottom Line

The Triple Bottom Line concept is a concept with 3 main pillars, namely profit, people and planet, which is further known as the concept of sustainability in the economy, society and environment (Elkington, 1997). This concept was first introduced in 1994 by an American author and entrepreneur named John Elkington in his book Cannibal with Forks, which clearly highlighted how corporations had been carrying out activities that did not pay attention to the enormous impact on the environment.

This concept was translated by John Elkington later into economic prosperity, social justice and environmental quality. Then by the private sector it was narrated into corporate social responsibility (CSR).

The Triple Bottom Line (TBL) concept is a holistic approach to assessing organizational performance (Xie et al., 2019). TBL goes beyond traditional financial measures to consider social and environmental impacts. Organizations that implement TBL focus not only on profit but also on the well-being of society. (Shahzad, 2020) and environmental sustainability. This reflects the social and environmental responsibilities that are increasingly important for modern companies.

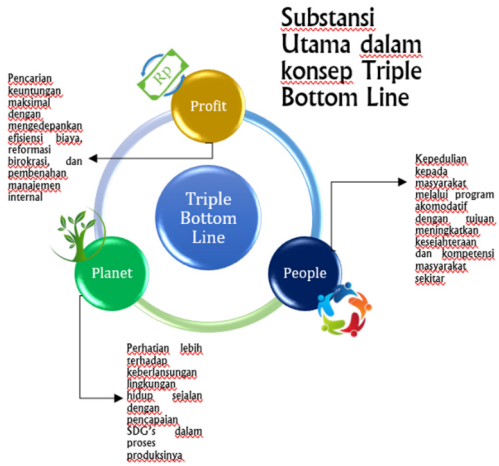

Figure 4. Substance of the Triple Bottom Line Concept

The implementation of Triple Bottom Line integrates sustainability values (Dey et al., 2020) into business strategy. Long-term success is not achieved at the expense of people or the environment. TBL creates balanced long-term value for all stakeholders, (Chege & Wang, 2020): society, environment, and economy. Organizations that implement TBL think long-term, go beyond immediate financial gain and take socially and environmentally responsible actions. Examples include reducing carbon footprints, increasing social equity, and strengthening relationships with local communities. TBL is not only a guide for measuring business performance

but also a foundation for action (Ogbeibu et al., 2020) responsibly for a sustainable and inclusive future.

Sustainable regional innovation based on the TBL (Triple Bottom Line) framework serves as a solid foundation for realizing positive transformation (Kusi-Sarpong et al., 2019) as a whole in society. The TBL approach focuses innovation assessment on financial aspects and the social and environmental impacts (Buhl et al., 2019) that it causes. The application of TBL in regional innovation strategies reflects a commitment to balance (Fasolin et al., 2019) between economic benefits, social welfare, and environmental conservation.

The implementation of TBL in regional innovation ensures sustainability as the main focus. This indicates that the results of innovation generate economic growth and improve the quality of life of local communities and maintain the sustainability of the natural environment. The TBL framework allows regions to measure the impact (Xie et al., 2019) of its innovations comprehensively, taking into account the long-term benefits for all stakeholders, including society, the environment, and the economy.

Moreover, the sustainability of regional innovation with the TBL framework encourages collaboration between the public, private, and civil society sectors in designing holistic and sustainable solutions (Kern et al., 2019). Thus, regional innovation is not only about creating change, but rather about creating sustainable change (Ciulli & Kolk, 2019), which embraces the needs of the present without sacrificing the ability (Rauter et al., 2019) of future generations to meet their needs.

3.4. Regional Innovation Sustainability Design

Conceptually, TBL is formed as a regional innovation sustainability design through the following matrix:

Table 1. Triple Bottom Line Framework

Dimensions	Description	Sustainability Indicators
Economy	Innovations that increase regional productivity and competitiveness.	• Increase in Regional Domestic Product (GRDP) per capita. • Increase in regional exports and investment. • Diversification of regional economy.
	Inclusive and sustainable local economic development.	• Increasing the participation of MSMEs in the regional economy. • Creating green jobs. • Increasing the welfare of local business actors.
	Creation of new jobs and economic opportunities.	• Low unemployment rate. • Increased skills and competitiveness of local workforce. • The emergence of startups and technology-based innovations.
	Increased income and community welfare.	• Poverty reduction. • Improving the quality of life of the community • Improving community access to financial services.
Social	Increased access to education, health and other social services.	• High literacy rates. • Increasing life expectancy. • Wide coverage of health services.
	Capacity development and community empowerment.	• Increasing community participation in regional development. • Increasing community skills and knowledge. • Increasing women's leadership.
	Reducing poverty and social inequality.	• Low Gini Coefficient. • Improving the welfare of the poor and vulnerable. • Equitable access to education and health for all groups in society.

Dimensions	Description	Sustainability Indicators
	Creating a safe, inclusive and welcoming social environment.	• Low crime rate. • Respect for cultural diversity. • Gender equality.
Environment	Sustainable and environmentally friendly use of natural resources.	• Increased use of renewable energy. • Reduction of greenhouse gas emissions. • Sustainable management of water resources.
	Reduction of pollution and greenhouse gas emissions.	• Improved air and water quality. • Reduction of waste and land pollution. • Strict emission standards for industry.
	Conservation of biodiversity and ecosystems.	• Protection of conservation areas. • Handling environmental damage. Increasing public awareness of conservation.
	Improving the quality of life of the community through a healthy and clean environment.	• Public access to green open spaces. Reducing the impact of natural disasters. • Increasing awareness of healthy living.

Source: *Data processed by the author, 2024*

Then, at a smaller work unit level, this can be done by scoring with the following structure:

3.4.1. Determining Indicators and Quality:

(1) Identify relevant indicators for each TBL dimension (Economic, Environmental, and Social).

This indicator can be the aspects that you want to measure and assess to see the progress and achievements of the work unit in the sustainability aspect, in this case referring to the metadata of the Sustainable Development Goals (SDGs) indicators compiled by the Ministry of National Development Planning/ Bappenas, especially the SDGs indicators for the Economic Pillar, Environmental Pillar, and Social Pillar.

(2) Determine the quality for each indicator:

This quality indicates the relative importance of each indicator in the overall assessment. You can use a percentage scale (e.g., Economic: 40%, Environmental: 30%, Social: 30%) or a numeric value (e.g., Economic: 3, Environmental: 2, Social: 2) to determine the weights.

3.4.2. Conducting Measurements and Assessments:

(1) Measurements or assessments should be conducted for each indicator that has been determined. Use the right and reliable method to obtain accurate and objective data. This data can be obtained from various sources, such as surveys, observations, financial reports, statistical data, etc.

(2) Consistency and standardization of measurement and assessment methods used for all indicators. This is to ensure fair and comparable assessment results.

3.4.3. Calculating Values and Scores:

For each indicator, multiply the indicator weight by the resulting weight, which is the value for each indicator. Then, multiply the achievement of each weight by the value to get the score. Add up the values of all indicators in each dimension to get the total score for each dimension.

3.4.4. Determining Description:

Use the total score for each dimension to determine its description, for example:

- Good (score ≥ 86)
- Sufficient (score ≥51 or ≤85)
- Poor (score ≤50)

So, the calculation can be simulated as follows:

(1) Determination of quality and basic values

Table 2. Score and Quality Indicator in TBL Framework

Economic (40%)	Quality Indicator	Score
Increased revenue from waste levies	60%	24
Reduction of operational costs	20%	8
Increased work efficiency	20%	8
Environmental (30%)	**Quality Indicator**	**Score**
Reduction of waste volume	50%	15
Increasing waste recycling	25%	7,5
Reduction of environmental pollution	25%	7,5
Social (30%)	**Quality Indicator**	**Score**
Increasing public satisfaction	60%	18
Improving public health	20%	6
Contribution to social development of society	20%	6

Source: *Data processed by the author, 2024*

(2) Calculation of realization score

Table 3. Score Realization from Target

Economic	Quality Achievement	Score
Increased revenue from waste levies	80 %	19,2
Reduction of operational costs	70%	5,6
Increased work efficiency	60%	4,8
	Total I	**29,6**
Environmental	**Quality Achievement**	**Score**
Reduction of waste volume	90%	13,5
Increasing waste recycling	80%	6
Reduction of environmental pollution	70%	5,25
	Total II	**24,7**
Social	**Quality Achievement**	**Score**
Increasing public satisfaction	90%	16,2
Improving public health	80%	4,8
Contribution to social development of society	70%	4,2
	Total III	**25,2**
	Total (I+II+III)	**79,5**

Source: *Data processed by the author, 2024*

Based on the calculation results, the TBL sustainability matrix score for the work unit of the District Cleaning Service "X" shows that:

- The performance of the work unit in the Economic dimension scored 29.6
- The performance of the work unit in the Environmental dimension scored 24.7

- The performance of the work unit in the Social dimension scored 25.2

The total score was 79.5 with the description "sufficient" and still worthy to be continued with several notes for improvement.

3.5. Continuous Evaluation Concept

The concept of continuous evaluation of regional innovation with the TBL framework can be described as follows:

3.5.1. Planning Stage

a. Determine the objectives and targets of the evaluation to ensure that it is carried out appropriately and usefully.
b. Select evaluation indicators to measure regional innovation's profit, people, and planet aspects.
c. Determine the evaluation method, considering data availability and resources. Commonly used methods are surveys, interviews, and secondary data analysis.

3.5.2. Implementation Stage

a. Collecting data from various sources, such as stakeholders, communities, and related institutions.
b. Analyzing data to determine the impact of regional innovation on profit, people, and planet aspects.
c. Compiling an evaluation report containing findings, conclusions, and recommendations.

3.5.3. Follow-up Stage

a. Following up on recommendations in the evaluation report must be followed up by relevant stakeholders.
b. Monitoring and re-evaluating regional innovation periodically to ensure that the innovation remains sustainable.

Implementation of the Triple Bottom Line (TBL) framework for continuous evaluation of regional innovation offers various positive benefits:

(1) Accountability

By using the TBL framework, stakeholders gain a comprehensive understanding of the multifaceted impacts associated with regional innovation. This transparency ensures that implemented solutions address the desired economic, social, and environmental goals.

(2) Improved Effectiveness

The continuous evaluation process inherent in the TBL framework facilitates the identification of gaps and weaknesses in local innovation. This knowledge empowers stakeholders to implement targeted improvements, thereby maximizing the effectiveness of innovation.

(3) Efficient Resource Allocation

Stakeholders gain valuable insights into resource utilization by assessing regional innovation performance through a TBL lens. This knowledge empowers them to allocate resources strategically, minimize waste, and maximize the overall impact of innovation.

(4) *Sustainability*

The TBL framework goes beyond evaluating immediate outcomes, critically emphasizing long-term viability. By continuously monitoring the social, environmental, and economic impacts of regional innovations, stakeholders can ensure their continued success and positive contributions to the future.

4. Conclusion

Regional innovation in recent years has experienced a significant increase in quantity, but this is not accompanied by the ability of the innovation itself to be sustainable. Existing resources must be evaluated, considering that all resources used in regional innovation must be accounted for. The weak concept of assessing the sustainability of regional innovation requires a scientific approach that has been tested for use, can be carried out, and can be measured comprehensively in all aspects of regional innovation itself.

The Triple Bottom Line (TBL) concept can become a standard for measuring whether or not a regional innovation can be continued. The TBL concept that uses the Profit, People, and Planet framework can then be translated into the Sustainable Development Goals (SDGs) indicator metadata compiled by the Ministry of National Development Planning/Bappenas, especially the SDGs indicators for the Economic Pillar, Environmental Pillar, and Social Pillar. The advantages of the TBL concept that can be integrated with the SDGs indicator metadata of the Ministry of National Development Planning/Bappenas ensure that the assessment or measurement of the sustainability of regional innovation is more standardized so that this concept can be used as an indicator of the sustainability of regional innovation and can become a reliable sustainability concept design in the future.

The sustainability of regional innovation is a necessity as a form of responsibility of an innovator and also the innovation environment in the region to review whether the quality of innovation in terms of sustainability can be continued or not by prioritizing the TBL framework, namely Profit, People, and Planet.

The TBL Framework serves as a powerful and insightful tool for the continuous evaluation of regional innovation. It fosters accountability, increases effectiveness, promotes efficient resource allocation, and maintains long-term sustainability. The framework equips stakeholders with the knowledge necessary to develop successful and sustainable regional innovation.

Based on the findings of the discussion and results in the previous chapter, it is recommended to use other approaches to be able to compare the concept of regional innovation sustainability with different adaptation conditions at different place.

Furthermore, this is related to research limitations regarding using a longer time to involve more actors to develop a more comprehensive concept. Finally, related to the availability and consistency of data to be processed better so that the results obtained can provide clear and measurable output and outcomes in further research.

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