The Regional Innovation System Strategy in Semarang City: Positioning in SDGs and Smart City Concept

Santi Mardhotillah
Urban and Regional Planning Engineering
Diponegoro University
Semarang, Indonesia
mardhotillahsanti@gmail.com

Wiwandari Handayani
Urban and Regional Planning Engineering
Diponegoro University
Semarang, Indonesia
wiwandari.handayani@pwk.undip.ac.id

Artiningsih
Urban and Regional Planning Engineering
Diponegoro University
Semarang, Indonesia
artiningsih@pwk.undip.ac.id

Abstract—**Regional Innovation System (RIS) aims to encourage regional competitiveness through innovation and technology. Development policy regards as one of the key successes to build a good RIS. Semarang City as the capital of Central Java Province has the opportunity to develop proper and operational RIS. It means Semarang City should have suitable RIS strategies related to sustainable development goals (SDGs) as the supporting concept. Meanwhile, smart city concept was related to RIS because its implementation is prioritizing science and technology. So, this paper aims to elaborate on the positioning of RIS strategy in SDGs and the smart city concept. The positioning was obtained through content analysis techniques by concluding several literatures (RIS, sustainable development, smart city concept) and other related documents. RIS strategies related to each SDGs pillar which are grouped into four aspects: economic, governance, environment, and social. The RIS strategy of Semarang City also has a position related to smart city concept especially in governance and economic pillars. This paper shows that RIS strategies of Semarang City in line with SDGs and smart city concept. Most of RIS strategies have a position in the governance pillar expected that would be able to be implemented in the upcoming years. The majority of RIS strategies that accomodated in SDGs and smart city concept have a position in collaborative planning and inclusive development aspects.**

Keywords— Regional Innovation System (RIS), Sustainable Development Goals (SDGs), smart city

I. INTRODUCTION

Innovation in development is a key factor in increasing regional competitiveness. Innovation cannot be operationalized in part as it requires collaboration among academia, industry, and policy [1]. These stakeholders collaboration is translated into an innovation process that underlines the uses of knowledge. In addition to RIS, SDGs and smart city are regional development concepts that led by knowledge and technology to enhance regional competitiveness. Regional innovation policy development was needed for sustainable development from regional to national levels [2]. It means that the sustainable development concept can be defined as a supporting concept for RIS.

In the implementation of the smart city concept, ICTs plays an important role in building smart cities [3]. But, smart cities are a complex system, and now the construction of smart cities is more than the application of ICTs. In the other side, the regional innovation platform can provide common technologies and key technologies to enterprises [3]. That ability can lead to improve the economy and achieve the final goal which is the regional competitiveness improvement.

Both the RIS and smart city concept are prioritized the use of science and technologies while RIS is needed in sustainable development. Accordingly, this paper aims to elaborate on the positioning of regional innovation system strategies in the regional development concept, both SDGs and smart city concept. These two concepts are an important supporting concept for regional innovation.

II. MATERIALS AND METHODS

A. Regional Innovation System, Sustainable Development, and Smart City Concept

Innovation system is a network of institutions in public and private sectors whose interactions lead to the invention of new technologies [4]. Innovation system is a system that collects several different institutions to contribute in the development of new technologies, and provides a framework for governments in arranging and implementing policies that affect the process of innovation [5]. Application of RIS basically accommodate RPJMN 2015-2019 through the territorial dimension of development approach to accommodate regional capacity in national development planning. RIS reinforcement concept involves three main points: planning, regional policy innovations & practices of science, and the creation of networking between regions [6].

SDGs are 17 goals with 169 measurable achievements and limits set by the United Nations as the world development agenda for the benefit of humans and the earth. This goal is a continuation or successor to the MDGs [7]. Implementation of RIS and SDGs underline the importance of collaboration among stakeholders in four pillars: economic, environmental, social and governance [8]. In accordance with this theory, in Central Java province 17 SDGs are classified into four pillars: economic, environmental, social, and governance.

Smart city is a concept that emphasizes the concept of urban development of intelligent, improve quality of life, better social life, and greater efficiency [9]. Smart city concept

also emphasizes the integral effectiveness of the city's development, based on the vision of more effective city in the future and more knwoledgeable. While the regional innovation system has an important role in promoting smart cities which can provide technologies [3].

Regional innovation system is a broad enough concept to be applied in regional development. This concept is related to other development concepts including sustainable development and smart city concept. RIS, SDGs, and smart city have the same concept with regional development that lead by science and technology. Innovation is the key to the successes of regional development. In addition, these three concepts lead to the same goal of improving the regional competitiveness.

B. Data and Analysis

Content analysis used to elaborate the important points of each document and then makes a conclusion from all the important points that have been obtained. Documents analyzed consist of literatures that relate to RIS, sustainable development, and smart city concept.

III. RESULTS AND DISCUSSION

A. RIS Strategies of Semarang City

There are 6 regional innovation system development strategies in Semarang City which are built based on SOAR analysis (Strengths, Opportunities, Aspirations, Results) of the conditions of existing regional innovation system. On the table bellow is the Semarang's regional innovation system strategy:

TABLE I. RIS STRATEGIES OF SEMARANG CITY

RIS Strategies	Explanation
Strategy 1: Encouraging creativity to bring new discoveries both in research & innovative entrepreneurship based on social and environmental	This strategy is intended to encourage increased innovation on various platforms, especially innovative research and entrepreneurship. Collaboration between the two platforms will create an inclusive innovation. Research of universities that implemented innovative entrepreneurship will drive the economy. In addition, to align with the global development of innovation activities, Semarang also need to begin applying social and environmental components in addition to maintain the sustainability of resources, increase resilience, and enhamce the economy.
Strategy 2: Increase appreciation of innovative products, activities and/or services.	Appreciation becomes one of the important things to maintain the continuity of achievement. Moreover, this appreciation will also become more visible benefits when appreciation is given to support the implementation of innovation.
Strategy 3: Develop a general framework of innovation that is implementative and inclusive	A general framework of innovation and business that are implementable and inclusive plays an important role in the success of regional innovation. Steps that need to be taken include drafting a baseline or Standard Operating Procedure (SOP), so that the real stages and targets of the innovation system that is being and will be implemented will be clearer. Baseline drafting is done after the piloting project then used as a reference for the preparation of the baseline. SOP consists of piloting project planning, mapping the initiation and appreciation of problems, stakeholder mapping, developing governance/

RIS Strategies	Explanation
	institutional SOPs, developing cooperative SOPs, and prioritizing piloting project implementation. After the baseline is arranged, the concept of cooperation is also important to ensure the continuous implementation of the Semarang regional innovation system.
Strategy 4: Improve collaboration innovation through the application of research results that correspond to the needs of society.	Collaboration is one of the keys to successfully running a system, including the regional innovation system. In this context, universities play an important role to be a link between "knowledge" and government, society, business. Implementation of research results needs to adjust with the needs and ability of the community to utilize its findings. Thus, innovation in addition to providing greater benefits and also relatively easier to distribute.
Strategy 5: Strengthening cooperation and diffusion of innovation through increased use of technology and media.	The concept of collaboration in this strategy is not only collaboration between components in Semarang City but also between regions outside Semarang City. Therefore, the optimal use of technology and mass media is needed. Mass media not only plays a role in spreading information but also involved in the processes that exist in the innovation system. For example, mass media is one of the collaborative partners in marketing innovation products, etc.
Strategy 6: Improving the quality of services and infrastructure with international standards.	RIS achievements that have been obtained if combined with existing opportunities will strengthen Semarang City in global competition. One of them is by improving the quality of services and infrastructure with international standards.

B. Positioning of Regional Innovation System Strategy in SDGs and Smart City Concept

The concepts of smart cities and SDGs were related in the process of collaborative planning and inclusive development (strategies towards equality and empowerment based on poverty reduction, human resource development, social capital development, gender development, welfare and participation in social development and reducing risk and vulnerability) [9]. This connection leads to the importance of collaboration among stakeholders in four pillars: economic, environmental, social, and governance [8]. The collaboration between stakeholders in the RIS translated into an innovation process to improve competitiveness. The linkage of the concept has been accommodated by Semarang City regional innovation system strategy in strategy 1 (encouraging new discoveries in innovative research and entrepreneurship), strategy 3 (general framework of innovation), strategy 4 (increasing innovation collaboration in applying research results), and strategy 5 (strengthen collaboration and diffusion of innovation).

Regional innovation system is one of the levels in the infrastructure of smart cities [3]. Regional innovation platform can be conducive for the collaboration between universities, enterprise, and some financial institutions to facilitate the process of knowledge creation, transfer, and diffusion. So the regional innovation system has an important role in building smart cities. This connection was accomodated in strategy 6 of Semarang City's RIS. Strategy 6 (improving infrastructure and service quality) of Semarang City regional innovation

system has a position in the environmental and social pillars in the form of soft infrastructure and hard infrastructure.

The construction of smart cities is more than the application of ICTs. Final goals of smart cities are evolve to create the learning spaces and innovation [3]. While the relationship between RIS and smart cities, the context is not only on "digitalization" but also in local indigenous for the creation of innovations and enhancing competitiveness. In the process of creating innovation and increasing competitiveness, RIS also plays an important role in collaboration towards social learning and learning region. Strategy 1 of the Semarang regional innovation system has accommodated this link.

The linkage between SDGs, smart city, and RIS from the economic pillar is the development of entrepreneurship and start-up. This component has been accommodated in the first RIS strategy of Semarang City about encouraging new invention in research and innovative entrepreneurship. On the governance pillar, the linkages are information systems in every process from planning, development, monitoring, evaluation, database, and updating innovation data. In this case, this component has been accommodated in strategy 2 (regarding appreciation of innovative activities, products and services), strategy 3 (general framework of innovation), and strategy 5 (strengthening collaboration and diffusion of innovation). For more details, positioning of regional innovation system strategy in SGDs and smart city concept is in Fig. 1.
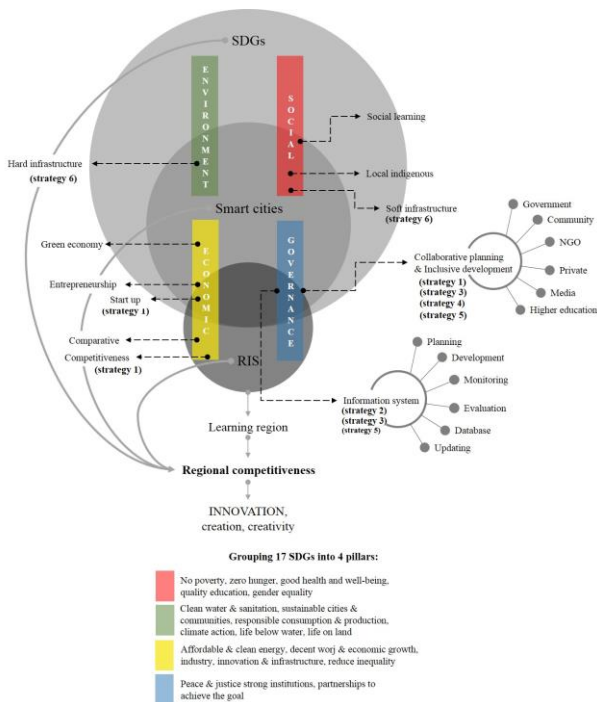

Fig. 1. Positioning of Semarang City's RIS Strategies in SDGs and Smart City Concept

IV. CONCLUSION

Paradigm shifts toward regional development that lead by knowledge including RIS, sustainable development, and smart city. Positioning of RIS strategies in SDGs and smart city concept is important to know the suitability of regional development concept (RIS) with the global supporting concept. Because in this globalization era, the regional development concept will always shifted with knowledge and innovation which plays an important role. Meanwhile, the RIS strategy of Semarang City has been accommodated in the SDGs and smart city concept and most of RIS strategies have a position in the governance pillar. Furthemore, steps that can be taken to strengthen the regional innovation system are integrating RIS with regional planning policies. Because policy is one of the key of successful system.

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