Defining smart city, smart region, smart village, and technopolis as an innovative concept in Indonesia’s urban and regional development themes to reach sustainability

R Sutriadi¹,²

¹ Department of Urban and Regional Planning, School of Architecture, Planning, and Policy Development
² Institut Teknologi Bandung

Email: ridwansutriadi@gmail.com

Abstract. In Indonesia today, a smart city term becomes a burning issue as new thematic urban development innovation strategy. Some academicians and practitioners interpret smart city highly connected to the cybercity where ICT is a backbone of a concept. On the other side, planners learned that smart city is not just a matter of solving urban problems through technology but more than that, smart city is a matter of willingness to enhance their capacity by considering local wisdom incorporates with knowledge development where technology is a part of it. In this case, global cases can be used to understand the benefits as well as anticipating negative impacts for Indonesian context by considering national planning development system as well as a diverse culture of Indonesia.

1. Introduction

Smart city is now popular and becoming the jargon of urban development strategy that incorporates the application of high-tech to cope with urban problems. Technology, especially information and communication technology has become closely related to the increasing popularity of smart city in Indonesia, application development, e-commerce, e-governance, to e-planning and e-budgeting become very familiar in urban development in modern era. Meanwhile, the core or essence of smart city itself still has a variety of interpretations in the regional autonomy system as well as national planning and development system in Indonesia. However, an associated smart cities terms are available in national development planning document, especially dealing with the improvement of human resource development to manage natural resources effectively and efficiently, as well as a tool to perform urban development innovation to accelerate urban competitiveness by the support of the advance of technologies.

National midterm development plan of Indonesia (RPJMN/Rencana Pembangunan Jangka Menengah Nasional) [2] is entering the third phase, where the spirit of comprehensive national development emphasizes on competitive advantage base on availability of natural resources, human resources quality, as well as science and technology capabilities. Furthermore, it also pay attention to the skilled and smart labor as a main capital to develop large national projects in every industrial clusters. It also said that in terms of regulation, government continuously tries to create and enhance a conducive business and investment climate for investors, including debottlenecking unsupported regulations for...
investments. In the same time, to respond the national urban development strategy, innovation is a mandatory in performing livable and safety cities, green and resilient cities, smart cities, as well as competitive cities. Besides, the government also put attention to rural development enhancement in order to create a self-reliance community along with to create independent and sustainable rural development by emphasizing on social, economic, and ecological resilience, as well as strengthening rural-urban economic activities linkage.

On the other side, the third phase of national midterm development plan (2015-2019) pay attention to the smart cities concept in relation with national efforts to develop competitiveness by considering the advance of technology base on local culture. At least there are three national urban development focuses in Indonesia, these are a. developing the economy by developing city branding that supports nation branding; b. Providing public infrastructure and services through the use of information communication and technology (ICT); c. Building innovative, creative, and productive community capacities.

In particular, the embodiment of smart cities and urban competitiveness also described in the third phase of national midterm development plan. Firstly, developing city branding through excellent products, excellent human resources and have local social cultural character that is tourism potential. Secondly, increase the number of experts and skilled workers through the provision of higher education and vocational training facilities in the field of tourism in order to have competitiveness and the ability to market superior products (agriculture). Thirdly, providing public services based on information and communication technology to support the activities of all sectors in the form of e-government in the government sector, e-commerce in the trade sector, e-procurement or electronic auction. Fourthly, providing public services as well as planning, operating, and maintaining urban infrastructure with information and communication technology in the form of e-government and e-commerce. Fifthly, develop financial markets in the form of providing soft loans to small industries, cooperatives, as well as small and medium enterprises (SMEs).

In line with the importance of the advance of technology for better urban development quality, the third phase of midterm national development plan begins to strengthen the national policies related to the capacity improvement of urban development governance. These are firstly, implementing systems, regulations, and procedures in urban government bureaucracies that are responsive to urban needs. Secondly, increase the capacity of visionary city leaders and the capacity of government apparatus in building and managing sustainable cities, both via decent and comfortable cities, green cities, and smart cities, through education, training and coaching on a continuous basis. Thirdly, simplify the process of licensing and striving for economic actors including the availability of one stop integrated services (PTSP=Pelayanan Terpadu Satu Atap). Fourthly, establish and develop inter-city development institutions and cooperation, to implement sustainable cities. Fifthly, develop and provide an easily accessible integrated urban information data center. Sixthly, enhance the active role of private sector, community and professional organizations in both planning dialogue forums with governments and urban communities, as well as in sustainable urban development, such as urban infrastructure development as well as inputs to urban spatial planning.

The new meaning of the importance of urban and regional planning context can be made from the those essence of the third phase of national midterm development plan, such as related to firstly, the need for comprehensive thematic development breakthrough by considering the sustainability especially in utilizing available land as an element of production factors. Secondly, a continuous human resource development especially in utilizing local natural resources with the spirit of Pancasila. Thirdly, a balance development between urban and rural areas in the context of archipelago as well as sustainable development. Fourthly, considering development diversities base on geographical differences as well as the verities of economic sectors. Fifthly, quick win strategies in terms of development acceleration. Sixthly, developing innovation system to facilitate development acceleration. Seventhly, an appropriate urban governance system in the context of regional autonomy and considering global as well as local concerns. Finally, eighthly, the need to consider the advance of technology as well as participating in developing technologies products and services base on local needs.
The objective of this paper is to define some thematic urban and regional development strategies as a response to the focus of Indonesia’s midterm development plan as well as global concerns especially related to the technological support in achieving sustainable development by doing continuous improvement related to the improvement of human resource development. In particular, terms in innovative thematic urban and regional development strategies that will be focused are: smart region, smart city, smart village, and technopolis.

2. Method
Since this paper is intended to provide popular global terms which will be adapted in Indonesia’s cases, this paper uses literature review as a method in order to define smart region, smart city, smart village, and technopolis for Indonesian context as technological and innovative based in the context of innovative thematic urban and regional development strategies. This paper also cites publication including text books that has been publish by the author.

3. Literature Review
Books on smart cities provides better opportunities for urban development by adapting the advance of technology to accelerate urban economic development in global level. Since livable cities associate with better services, the advance of ICTs become a distinct niche market that can be offered to modernize urban governance system, and this become widely offered by business communities in providing variety of ICTs based products and services as a symbol of modern as well as high-tech cities. On the other hand, attention to the readiness of the urban citizen, socio-cultural conditions, synergies with the existing planning processes and procedures, as well as the process of understanding the meaning ICT itself for achieving inclusive cities, especially by the poor and minority groups, seems to be less prominent [36]. For a developing country like Indonesia which plays as a market for ICT-based goods and services, planners should be aware of the emergence of smart cities fever, it has to be seen whether as a breakthrough model in urban development, or just simply following the world’s urban development mode only. What matters here is whether the content of the communication system of the urban ecosystem that includes the planning processes and procedures well understood when it is associated with the development planning system and the existing spatial planning guidelines. Finally, does the smart city guarantee the implementation of justice/equity, democracy, and diversity as reflections for sustainable city for all? In terms of the transformation of the governance power, the centralized power could emerged and lies in a group of elites (this is in contrast with the idea of decentralization of authority, whereas Indonesia is in a regional autonomy as well as decentralized system), and other development stakeholders will be marginalized since it will have asymmetry information. Two other important things are how to guarantee the implementation of a smart city without sufficient energy support for the impressive ICT infrastructure into the backbone. Other thing is that the study of ethics of planning in the information age itself that are still limited according to the diverse growth and development phases of Indonesia with the variety of geographical conditions along with its natural diversity, socioeconomic conditions, and culture [36].

Many textbooks related to smart city has published during 2012 to 2015. Many cases took developed countries, and provided overviews about the technological based of the cities, ranging from economic competitiveness and the importance of global talent [7], other cases discussed the effectiveness of business locations [19], the advantages of technological products in serving large city’s [41]. There are also concerns about changing relationships among development actors [17], as well as the opportunities in providing efficient planning process by the support of ICT [33].

Furthermore, smart cities literatures consist of four general topics. Those are:

a. Innovation, economy, competitiveness and value added at global level. Some literatures are focused on linking local value added in the global context [9]. It is a discussion that innovation is needed so that citizens have global talents and global networks to enhance their competitiveness [7].
b. The main point to the development of technology and ICT. Some focus on technology as a key solution for a better future [12]. There is also a discussion that it is time for all planning processes to be based on ICT for the reason of efficiency [33].

c. Attention to the stakeholders capacities. There is a discussion of the importance of the private role and the importance of intelligent social capital of society [10]. In this case, smart cities require collaboration among actors or development stakeholders, and smart cities need a process to take place. On the other side, there is a discussion about the importance of community involvement and leadership factors as the key in implementing smart city [13]. There is also a discussion that there will be a shift in the relationship between actors and the need for community empowerment [17].

d. The need for smart city process. Particular characteristic of local condition, like existing planning process has to be considered in implementing a comprehensive smart city as a result that smart city is a solution for current problems. In terms of planning process, smart city concept has to enable either top down or bottom up planning process. In addition, community mobilization is a key to promote smart city concept [16] into action since such concept is to promote better quality of life. Recently, in the book of Smart City Atlas [31], there are three things regarding the repertoire of smart cities literatures. These are:

- First, the parameters of urban characteristics to be considered, including parameters of geographic and climatological conditions, urban and occupancy parameters, economic and socio-cultural parameters, and infrastructure parameters;
- Second, the requirements for quality cities, including how smart cities can reduce the impact of buildings with energy efficiency, how existing buildings to be more sustainable (greenhouse effect and climate change), how to develop urban transport and mobility, and how to encourage the use of ICTs for citizens need;
- Third, commitment to climate change, including how to target community-based initiatives, innovation in cooperation with higher education, how to promote political awareness, how to adopt new and renewable energy policies, how to improve the quality of public services and reduce carbon emissions, pay attention to the non priority sector, and how to encourage community participation.

Meanwhile, in terms of urban and regional planning, city is an ecosystem; the partial change will change the city in the regional context [23]. Ecosystem point of view is important in dealing with implementing innovative approach to the city, since it has to be seen its implication in regional context [37]. As a consequence of the center of activates, cities become bigger and bigger throughout the time, we live in an aggregation of cities and suburbs: a metropolitan community that forms one economic, cultural, environmental, and civic entity. Calthrope and Fulton said that cities in regional context just like a constellation than a solar system. They added that such phenomenon leads the region like a layering of networks: networks of communities, networks of open space, networks of economic systems, and networks of cultures. They also highlight that the health of this region depends on the interconnectedness of these networks, the sophistication of the interfaces, and the vitality of the elements [6]. Calthrope and Fulthon indicates the importance to analyze city or urban area in regional context, since city or urban area has a functional relationships with its surrounding area. City or urban development process to enhance its quality not only could transform city or urban development to better condition but also could have a positive or negative impact to its surrounding area. Then, Calthrope and Fulthon stated that region with cities in it has the internet typed network quality which consists of diverse community, a variety of connections, and a clearly defined common ground. If the internet lacked diverse sources of information, if it had congested links, or if it lacked a common language, it would fail. Related to the smartness term, a region associates with ranging communities from urban centers to rural villages, while each can become one entity from urbanized (metropolitan typed, dominated by build-up area) to non-urbanized area (rural villages typed, dominated by non-build up area). Their linkages can combine virtual technology with face-to-face places, just as they can blend the automobile with transit and walking. The region’s common ground are can be built from its open space systems and its cultural diversity, from its physical history and its economic character.
It is clear that a region is a system consists of urban system where city/cities is/are located, non-urban system where villages are located. Learning from Calthrope and Fulton, economic point of view is not a main consideration to develop cities and metropolitan area as a regional center, for sustainability reason, a region is the basic unit in environmental terms because of the interconnected nature of ecosystems. This brings new perspective of the idea of smartness that developed by Calthrope and Fulton. The importance of looking at regional perspective, the planning issues, based on American cases, is not just how innovative state policies can support local efforts to overcome sprawl using public investment rather than state regulation as the vehicle by smart growth term. By considering types of functions and networks, to construct a sustainable region, it has to deal with at least three regional themes, which are interconnected and affect each other. These are economic region, ecological region, and social region. An interesting example of Silicon Valley that is taking by Calthrope and Fulton describe the fact that Silicon Valley has become both extremely crowded and extremely expensive, and many of the people who work there have become extremely rich. Technological advances, globalization, and the changing nature of work have transformed the economical form. Economic activity is volatile and unpredictable. A planner concern about regional perspective is to provide access to networks of all kinds: job networks, money networks, idea networks, and networks of vendors and services. The strategic way to operate successfully in the network economy is to be physically located in a region where all these networks are located in close enough proximity that they can remain lively and active without a heavy investment in travel or long distance telecommunications. In terms of ecological region consideration, most natural systems do not operate at a local level. They function at a much larger scale or landscape scale, which includes entire watersheds, agricultural territory, and ecosystems that cover many communities. In addition, social region symbolizes a connection among residents within regional context where they bound together in a social compact with one another. Finally, Calthrope and Fulton mentions regional infrastructure as an important element of the importance of viewing cities and villages on a regional scale where they have economic, ecological, and social relations.

Indonesia has a concern indicated by the emergence of national rural development policy regarding village. In this case, Law No. 6/2014 [28] emphasizes on the administration of the village government with consideration that it has evolved in various forms so it needs to be protected and empowered to be strong, advanced, independent, and democratic so as to create a strong foundation in implementing governance and development towards a just, and prosperous society. Indonesia defines villages or rural areas are areas of major agricultural activities, including the management of natural resources with the composition of the function of the area as a rural settlement, government services, social services, and economic activities. In conjunction with the rural condition in Indonesia, the bottom up planning style is still endure. This explains in a term of empowerment for villages’ context, which defined as an effort to develop the community’s independence and prosperity by enhancing knowledge, attitudes, skills, behaviors, abilities, awareness, and utilization of resources through policies, programs, activities, and assistance in line with the essential issues and priorities of rural communities.

Other things that for Indonesian cases rural development has to be encouraged in the smartness manner (or in global context known with a term of smart village) is the setting of rural development objective. Those are firstly, provide recognition and respect for existing villages with their diversity before and after the establishment of the Unitary State of the Republic of Indonesia. Secondly, provides clarity on the status and legal certitude of the village in the constitutional system of the Republic of Indonesia in order to bring about justice for all Indonesian people. Thirdly, preserve and promote the customs, traditions, and culture of the village community. Fourthly, encourage initiatives, movements, and participation of village communities for the development of village potentials and assets for mutual prosperity. Fifthly, establishing a professional, efficient and effective, open, and accountable village government. Sixthly, improving public services for villagers to accelerate the realization of general welfare. Seventhly, improve socio-cultural resilience of village communities in order to actualize village communities that are able to maintain social unity as part of national security. Eighthly, promote
the economy of rural communities and alleviate the national development gap; and ninthly, strengthen the village community as the subject of development.

It appears that rural development in Indonesia promotes self-reliance concept along with conservation of nature preservation of culture and producing agriculture based activities (primary sector) as well as finding sufficient innovation approach to cope with global competitiveness including finding functional networks with urban areas. As a comparison, India has a concept to emphasize on access to sustainable energy services acts as a catalyst for development, including enabling the provision of good education and healthcare, access to clean water, sanitation and nutrition, the growth of productive enterprises to boost incomes, and enhanced security, gender equality, and democratic engagement, which called smart village [43]. As a lesson learned for Indonesian context, smart village in India which has a spirit ‘global means to the local needs’, promotes rural reconstruction by community based initiative through the enhancement in knowledge and skills to take on the challenges in the information age, which could be products of knowledge or tools for skills are technological based products and services. The enhancement in knowledge and skills continuously in innovative way is a sign for the need for smartness in the context of rural development.

In terms of the importance of knowledge in globalized world, the movement to the knowledge of economy, knowledge behaves differently from other goods and shares many of the properties of a global public good. The planners’ role have supported the governments’ role in protecting intellectual property rights [26]. The challenge is getting higher when knowledge privatized and commercialized through products and services. Especially when most urban communities in general today their lives cannot be separated from the utilization of ICT for work, play, and learning. It is not just a matter of intellectual property right that have to be protected by planners, but also how to maintain the balance of development, between natural environment and built environment, at the level of region, city, functional areas, and rural development.

Since smartness cannot be separated from the meaning of changes in social life in promoting better living, the current urban and regional development trend by focusing on technology usage, innovation, and even participatory network are cannot be well implemented without collective awareness that come from personal awareness in conducting just like Amartya Sen concept regarding development [26]. In short, integrity of the community that come from personal awareness is the key to promote changes. Here, changes for better living to achieve sustainable development by fostering knowledge development are keys of smartness. Awareness to encourage smartness has to consider local history and culture in order to understand more about local wisdom as well as local resources, since a deep understanding of local resources can create sufficient local strategy [8]. History and culture are highly connected to the spatial context, where all human activities allocated. Spatial context is can be seen based on its characteristic like built up area or non-built up area, as well as urban or rural area, and inland or coastal areas. Human activities are highly connected to their economic based activities, like primary sector, secondary sector, tertiary sector, or quarterly sector. In order to reach better quality of life, the awareness of continuous improvement and never stop learning have to be encouraged to develop innovation, especially regarding the utilization of economic activities (primary, secondary, tertiary, or quarterly sectors). To drive innovation, smartness ecosystem (people, process, technology, and economic competitiveness) has to be encouraged. Since current development trends closely related to technology apart from innovation and community participation, impacts of technologies into humans live have to be recognized. In addition, it is also important to understand more deeply about the concept of technology readiness level in enhancing competitiveness and sustainability in various level of planning.

4. Defining Smartness in Urban and Regional Planning Perspective: Smart City, Smart Region, Smart Village, and Technopolis as Development Themes to Reach Sustainability

As a condition in defining smartness at various levels, it becomes important firstly to define smartness ecosystem. To ensure smartness concept, it needs a conducive as well as academic atmosphere to enable creativity in responding problems by the support of technology in enhancing competitiveness in a
sustainable way. Based on analysis, at least there are four main smartness concept that have be defined in developing smartness concept in Indonesia, these are:

- **Smart city.** It is an innovation of sustainable planning approach at the city level that promotes knowledge-based development through the continuous learning of human resources as an integrative part of urban resource development, especially in encouraging urban built up area as a part of urban spatial system in the context of national development planning system. This leads to the effective and efficient development of economic sectors, especially tertiary and quarter sectors supported by appropriate technology to high technology as a result of continuous learning which could induce primary and secondary sectors development of its surrounding area.
  - Community’s integrity. The willingness of the people as human resources at urban level to develop their capacities and promote changes to achieve better quality of life.
  - History and culture. Characteristic of urban history and culture as consideration to develop knowledge based development.
  - Spatial context in urban and regional planning perspective. Urban areas as an integrative component of regional and national spatial system
  - Economic sectors. Tertiary and quarter sectors that could induce primary and secondary sectors
  - Technology readiness. It depends on the urban spatial function in regional, national, and global context. In addition, it relates to the number and distribution of universities and research and development centres along with their functions to support urban competitiveness in the national and global context.
  - Technological impacts.
    - Physical and development synergies. There are synergies among urban physical infrastructure and urban telecommunication system.
    - Substitution effects. The limited urban physical flows can be substituted and facilitated by urban virtual flows.
    - Generational effects. A city will be more sustainable and competitive by the synergy between physical and telecommunication infrastructures along with the growth of urban research centres and urban economic activities.
    - Enhancement effects. A city will be more attractive, efficient, and urban physical network (road, rail, water, and energy) will be more adequate to ensure urban connectivity.
  - Technical and political processes. As an innovative translation of urban policy into urban collective action to promote better urban condition.
  - Stakeholders. Promoting participation and collaboration among development actors in urban context.

- **Smart region.** It is an innovation of sustainable planning approach at the regional level that promotes knowledge-based development through the continuous learning of human resources as an integrative part of regional resource development, especially in encouraging harmonization between conservation and developable areas in the context of national development planning system. This leads to the effective and efficient regional development of economic sectors supported by appropriate technology to high technology as a result of continuous learning.
  - Community’s integrity. The willingness of the people as human resources at regional level to develop their capacities and promote changes to achieve better quality of life.
  - History and culture. Characteristic of regional history and culture as consideration to develop knowledge based development
  - Spatial context in urban and regional planning perspective. Regional level, consists of urban areas and non-urban area (including rural areas and conservation areas) as an integrative component of national spatial system
  - Economic sectors. Varied from primary to quarter sectors
  - Technology readiness. Technology readiness level states in regional development plan, including sharing roles of regencies and cities within provincial authority or sharing roles of functional cities and it surrounding areas within regency (priority areas within province or
regencies), including the role of provincial or regencies authorities, and distribution of universities and research development centres within province or regencies along with their mission in terms of provincial or regencies roles and functions.

- **Technological impacts.**
  - Physical and development synergies. There are synergies among regional physical infrastructure and regional telecommunication system.
  - Substitution effects. The limited regional physical flows can be substituted and facilitated by regional virtual flows.
  - Generational effects. A region will be more sustainable and competitive by the synergy between physical and telecommunication infrastructures along with the growth of regional research centres and regional economic activities.
  - Enhancement effects. A region will be more attractive, efficient, and regional physical network (road, rail, water, and energy) will be more adequate to ensure regional connectivity.

- **Technical and political processes.** As an innovative translation of regional policy into regional collective action to promote better regional condition.

- **Stakeholders.** Promoting participation and collaboration among development actors in regional context.

- **Smart village.** It is an innovation of sustainable planning approach at the village level that promotes knowledge-based development through the continuous learning of human resources as an integrative part of village resource development, especially in encouraging rural areas development as a part of regional system in the context of national development planning system. This leads to the effective and efficient development of economic sectors, especially primary and secondary sectors supported by appropriate technology to high technology as a result of continuous learning which could facilitate sustainable rural urban linkages.

- **Community’s integrity.** The willingness of the people as human resources at rural level to develop their capacities and promote changes to achieve better quality of life.

- **History and culture.** Characteristic of rural history and culture as consideration to develop knowledge based development.

- **Spatial context in urban and regional planning perspective.** Rural areas as an integrative component of regional and national spatial system.

- **Economic sectors.** Primary and secondary sectors that could facilitate harmonious relationships with tertiary and quarter sectors of growth area (urban area).

- **Technology readiness.** It depends on the rural spatial function in regional context, including specific rural resources to be encouraged in ensuring rural urban linkages. In addition, the smartness concept promotes a sustainable and resilient rural area.

- **Technological impacts.**
  - Physical and development synergies. There are synergies among rural physical infrastructure and rural telecommunication system.
  - Substitution effects. The limited rural physical flows can be substituted and facilitated by rural virtual flows.
  - Generational effects. A rural area will be more sustainable and competitive by the synergy between physical and telecommunication infrastructures along with the growth of rural economic activities.
  - Enhancement effects. A rural area will be more attractive, efficient, and rural physical network (road, rail, water, energy, and irrigation) will more adequate to ensure rural-urban connectivity.

- **Technical and political processes.** As an innovative translation of rural policy into rural collective action to promote better rural condition.
- Stakeholders. Promoting participation and collaboration among development actors in rural context.

![Smartness Illustration](image)

**Figure 1.** Smartness Illustration

- **Technopolis.** It is an innovation of sustainable planning approach at the part of city or regional site that promotes knowledge-based development through the continuous learning of human resources as an integrative part of urban or regional resource development, especially in encouraging technology readiness level from basic idea to full commercial application/product of urban and regional system in the context of national development planning system. This leads to the effective and efficient development of economic sectors, especially tertiary and quarter sectors supported by appropriate technology to high technology as a result of continuous learning which could facilitate sustainable linkages among various economic sectors of particular areas, for instance: urban area, rural area, coastal area or small island, inland area, etc.

- **Community’s integrity.** The willingness of the people as human resources at technopolis site within urban or regional level to develop their capacities and promote changes to achieve better quality of life.

- **History and culture.** Characteristic of urban or regional history and culture as consideration to develop knowledge based development at the site where technopolis is located.

- **Spatial context in urban and regional planning perspective.** A part of urban or a part of regional site as an integrative component of regional and national spatial system.

- **Economic sectors.** Tertiary and quarter sectors that facilitates primary and secondary sectors.
Technology readiness. Comprehensive set of technology readiness level from basic idea to basic research, technology formulation, applied research, small scale prototype, large scale prototype, prototype system, demonstration system, first of a kind commercial system, to full commercial application.

- **Technological impacts.**
  - Physical and development synergies. There are synergies among local physical infrastructure and rural telecommunication system along with urban and regional infrastructure system.
  - Substitution effects. The limited local physical flows can be substituted and facilitated by local virtual flows as well as connected to the physical and virtual flows at urban, regional, and global system.
  - Generational effects. A strategic site where technopolis is located will be more sustainable and competitive by the synergy between physical and telecommunication infrastructures with the growth of research and development centres and economic activities at a strategic site where technopolis is located.
  - Enhancement effects. A strategic site where technopolis is located will be more attractive, efficient, and physical network (road, rail, water, and energy) of a site where technopolis is located will be more adequate to ensure national and global connectivity.

- **Technical and political processes.** As an innovative translation of strategic function within national or regional or urban context into local collective action to promote better condition and competitiveness in national and global context.

- **Stakeholders.** Promoting participation and collaboration among development actors within local, urban, regional, national or global context.

**5. Conclusion**

The uniqueness condition of Indonesia needs particular definition of smartness in terms of urban and regional planning since it has to incorporate with Indonesia’s condition. Based on literature review and existing development policies, it comes up with the need to define at least four terminologies related to smartness as basic understanding in developing smartness concept in Indonesia while most text books related to smartness come from developed cities with established mastery in terms of technology and knowledge. For a case of Indonesia, at the minimum has to understand some planning perspectives like the willingness of the people, history and culture, spatial context in urban and regional planning perspective, economic sectors, smartness ecosystem, technology readiness, technological impacts, as well as technical and political processes.

**References**

[1] Aziz, Fajar Nurghifari, and Sutriadi, Ridwan (2017). *A Note in Identifying Competing Actors of Technopolis. A Case Study of Gedebage Technopolis Core Area Formation*. International Conference on ICT for Smart Society, Bumi Serpong Damai, Indonesia.

[2] Bappenas, Rencana Pembangunan Jangka Menengah Nasional, 2015-2019. Pemerintah Republik Indonesia.

[3] Benninger, C. (2001). Principles of Intelligent Urbanism, 412th ser., *Ekistics*, no. 65 (2001): 39-65.

[4] Berkowitz, Alan R., Charles H. Nilon, and Karen S. Hollweg (2003). *Understanding Urban Ecosystems a new Frontier for Science and Education*. New York. NY: Springer-Verlag. New York, Inc.

[5] Campbell, Scott (1996). *Green cities, growing cities, just cities?: Urban Planning and the contradiction of sustainable development*. American Planning Association. *Journal of the American Planning Association;* Summer 1996; 62, 3; pg. 296-312.

[6] Calthrope, Peter, and Fulton, William (2001). *The Regional City. Planning for the End of Sprawl*. Island Press. Washington.
[7] Campbell, Tim (2013). *Beyond Smart Cities: How Cities Network, Learn and Innovate*. Routledge: London.

[8] Carrier, J. (2005) *Older People, the New Agenda* Presentation to Better Government for Older People Network, London, dalam Pierson, John (2008). *Going Local. Working in Communities and Neighbourhoods*. The Social Work Skills Series. Routledge. NY.

[9] Dameri, Renata Paola & Rosenthal-Sabroux, Camille (2014). *Smart City: How to Create Public and Economic Value with High Technology in Urban Space*. Progress in IS. Springer: New York.

[10] Deakin, Mark (2014). *Smart Cities: Governing, Modelling, and Analyzing the Transition*. Routledge: New York.

[11] Eberhard Becker, B. B. 2014. Regional Innovation and Cooperation among Industries, Universities, R&D Institutes and Governments. In F. P. D.-S. Oh, Technopolis, Best Practices for Science and Technology Cities (pp. 23-42). London: Springer-Verlag.

[12] Editors, Scientific American (2014). *Designing the Urban Future: Smart Cities*. Macmillan: New York.

[13] Goldsmith, Stephen & Crawford, Susan (2014). *The Responsive City: Engaging Communities through Data-Smart Governance*. John Wiley&Sons: San Francisco.

[14] Graham, S., & Marvin, S. (1996). *Telecommunication and the City. Electronic spaces, urban places*. NY: Routledge.

[15] Hall, Peter; &Pain, Kathy (2006). *The Polycentric Metropolis. Learning from Mega-City Region in Europe*. Earthscan. London.

[16] Komninos, Nicos (2015). *The Age of Intelligent Cities: Smart Environments and Innovation-for-all Strategies. Regions and Cities*. Routledge: New York.

[17] Kumar, T.M. Vinod (2014). *E-Governance for Smart Cities. Advances in 21st Century Human Settlements*. Springer: New York.

[18] Kutay, A. (1986). Optimum Office Location and the Comparative Statics of Information Economies. *Regional Studies*, 551-564.

[19] Kolar-Thompson, Lynne (2012). *Smart City in Practice: Converting Innovative Ideas into Reality: Evaluation of the T-City Friedrichshafen*, Jovis: Berlin.

[20] Longworth, Norman (2006). *Learning Cities, Learning Regions, Learning Communities. Lifelong Learning and Local Government*. Taylor&Francis Group. New York. USA.

[21] Meijers, Evert (2007). Synergy in Polycentric Urban Regions. Complementarity, Organizing Capacity and Critical Mass. TU Delft. Delft University of Technology.

[22] Morandi, Corinna; Rolando, Andrea; and Di Vita, Stefano (2016). *From Smart City to Smart Region. Digital Services for an Internet of Places*. Springer. New York.

[23] Niemela, Jari (2014). *Urban Ecology: Patterns, Processes, and Applications*. Oxford: Oxford University Press.

[24] Oh, Deog-Seong and Fred Phillips. 2014. *Technopolis: Best Practices for Science and Technology Cities*. New York: Springer.

[25] Okubo, M. (1998). *Future Technopolis Changes its Form-from Visible to Invisible*. The second Annual Congress of the World Technopolis Association, Taedok Science Town, Taegon Metropolitan City.

[26] Peters, Michael A.; Besley, Tina; Araya, Daniel, ed. (2014). *The New Development Paradigm. Education, Knowledge Economy and Digital Futures*. Peter Lang. New York.

[27] Postman, Neil. 1993. *Technopoly: The Surrender to Culture to Technology*. New York: Vintage Books.

[28] Republic of Indonesia, Law No. 6/2014 about Village.

[29] Robert Hassink, S.-H. B. 2014. Regional Innovation Support Systems and Technopoles. In F. P. D.-S. Oh, Technopolis, Best Practices for Science and Technology Cities (p. 45). London: Springer-Verlag.
[30] Rutten, Roel (2003). Knowledge and Innovation in Regional Industry. *Studies in Global Competition Series*. Routledge: London.

[31] Sanseverino, Eleonora Riva; Sanseverino Raffaella Riva; and Vaccaro, Valentina. Ed. (2017). *Smart Cities Atlas. Western and Eastern Intelligent Communities*. Springer Tracts in Civil Engineering. Springer. AG. Switzerland.

[32] Shioe, Narushige (2000). Urban Planning, Information Technology, and Cyberspace. *Journal of Urban Technology*. Vol. 7, No. 2, pp 105-126.

[33] Silva, Carlos Nunes (2015). *Emerging Issues, Challenges, and Opportunities in Urban E-Planning*, Advances in Civil and Industrial Engineering. IGI Global: Hershey.

[34] Simmie, James, ed. (1999). *Innovation, Networks, and Learning Regions?* Regional Studies Association, London.

[35] Sutriadi, Ridwan (2011). *Mobile Technology and the Challenge to Promote a Communicative City in Indonesia. Case Study Bandung Metropolitan Area*, dissertation, College of Design, Construction, and Planning, University of Florida.

[36] Sutriadi, Ridwan (2015). *Perspektif Perencana: Smart City. Inovasi, Kota Komunikatif, dan Kota Berkeadilan*, Inside Publisher, Bandung.

[37] Sutriadi, Ridwan (2017). *10 Langkah Mencerdaskan Kota*. Seri Smart City dari Sisi Perencana Kota. Penerbit ITB, Bandung.

[38] Sutriadi, Ridwan (2017). *Media Sosial dan Perencanaan Kota*. Seri Smart City dari Sisi Perencana Kota. Penerbit ITB, Bandung.

[39] Sutriadi, Ridwan; Ramadhan, Afrizal, and Vandanu, Hanfie (2017). *From Social Learning to Territorial Knowledge Based Development: Issues in Optimizing Technopolis in Cimahi*. International Conference on ICT for Smart Society, Bumi Serpong Damai, Indonesia.

[40] Steyn, Jacques, and Johanson, Graeme (2010). *ICTs and Sustainable Solutions for the Digital Divide. Theory and Perspectives*. Premier Reference Source. Information Science Reference. Hershey. New York.

[41] The World Bank (2016). *Digital Dividends*. World Development Report. The World Bank Group.

[42] Townsend, Anthony M. (2013). *Smart Cities: Big Data, Civic Hackers, and the Quest for New Utopia*. W.W. Norton&Company: London.

[43] http://e4sv.org/about-us/what-are-smart-villages/

[44] http://smartvillages.org/

[45] http://wearesocial.com/sg/blog/2017/01/digital-in-2017-global-overview