

## Toward better City Management through Smart City implementation

**Rini Rachmawati\***

*Universitas Gadjah Mada, Indonesia*

Smart City is currently becoming a global issue in the context of better city management. This paper discusses the implementation of Smart City and its effect on better city management. The discussion is based on a literature study comprising best and empirical practices related to the implementation of the idea of Smart City in Indonesia. The discussion focuses on the elements of Smart City, support from structural aspects, infrastructure, supra-structure and its relationship with city management as well. This paper can be the description of the best practices of the implementation of Smart City toward better city management with the Program of Toward 100 Smart Cities in Indonesia and the issue of moving the capital of Indonesia in relation with the need for better City management and the implementation of Smart City.

**Key Words:** *city management, smart city, new capital, Indonesia.*

**Article Info:** Received: *April 3, 2019*; Revised: *July 30, 2019*; Accepted: *August 25, 2019*; Online: *November 3, 2019.*

### Introduction

City management is currently becoming better because it is being supported by the concept of Smart City and its implementation. Many cities in the world have even admitted that they are able to function in a better and smarter way and that Smart City has become a global phenomenon with real staying power (Barlow & Bencheton, 2019). In the past city management used to be implemented in a conventional way. Today city management uses more sophisticated methods by

---

#### \*Correspondence address

Address: Department of Development Geography, Faculty of Geography, Universitas Gadjah Mada, Indonesia  
Phone: + 628.121.598.066 | Email: [rinirachma@ugm.ac.id](mailto:rinirachma@ugm.ac.id)

©2019 Human Geographies; The authors



This work is licensed under a  
Creative Commons Attribution 4.0 International License. DOI:10.5719/hgeo.2019.132.6

applying technology, including information and communication technology. This is implemented in Indonesia by preparing smart cities through the Program Toward 100 Smart Cities organised by the Ministry of Communication and Information Technology in the years of 2017 – 2019. This program has so far been successful in encouraging cities and regencies in Indonesia to become smarter. This paper will also discuss Smart City and its relationship with city management. The concept of Smart City is indicated to have been experiencing changes from conventional to smarter ways in managing cities.

### **The concept of Smart City and its implementation**

Several definitions of Smart City relate it with technology (Stimmel, 2016; Barlow & Bencheton, 2019) and scientific data (Barlow & Bencheton, 2019). Technology and scientific data are important elements. However, how they implementation in Smart City is of primary importance as well (Barlow & Bencheton, 2019). The examples of Smart Cities applying scientific data are, in this case, to determine the size and location of pocket parks, playgrounds, sidewalk extensions, community gardens, pedestrian malls, bike paths, and traffic circles (Barlow & Bencheton, 2019). A Smart City is defined as a new urban environment designed to support works through information and communication technology (ICT) and forms of other physical infrastructures (Stimmel, 2016). Information and communication technology is expected to be able to minimise urban infrastructural loads, mainly transportation, and in which environmental impacts can also be minimised as a result of the increasing awareness and participation from society (Mendes, 2004). Smart technology leads to the application of smart parking, smart streetlights, and smart meters that are measuring electricity consumption (Stimmel, 2016).

The use of ICT is able to improve the rate of livability, workability, and sustainability in a city by connecting and integrating various components from one government to another (G2G), from one government to its citizens (G2C), and from one government to businesses (G2B) (Knowledge@Wharton and Tata Consultancy, 2016). For the government, this is done in order to obtain updated evaluation on how a city can function well at any time, prepare technology needed, and anticipate and handle any arising problems.

To be a smart city is not only a matter of developing and making use of sophisticated technology but also the matter of reaching something smarter than before. In studying the concept of and designing Smart City, it is important to determine that the concept must be in line with the formulated vision and mission of the city (Brown, 2015). In formulating the vision and mission of a city, it is important that strong political leadership and full understanding from people (citizens, businesses, and organisations) are of primary importance to overcome local challenges (Letaifa, 2015).

The Indonesian Ministry of Communication and Informatics (Kemenkominfo) is presently undergoing the Program of 100 Smart City

Movement in the country. In 2017, 25 cities and regencies were appointed to participate in the program. In 2018, 50 cities and regencies were following to participate in the program. Moreover, by the end of this year, 2019, the other 25 cities and regencies have participated in the program. Several considerations are taken into for the cities and regencies to belong to the movement toward 100 smart cities such as regional financial capability, green-city index, local government performance index and sustainable cities index (Bappenas RI and Kominfo.go.id). Meanwhile, for comparison, in India the cities that are chosen for the mission of being a smart city are based on the citizens living in slum areas, public services with high intensity, and the availability of the projects for urban infrastructure (Smith et al., 2019).

Each city and regency that has been appointed is in charge of composing the Master plan of Smart City. In composing the master plan, each city and regency receives assistance from experts and practitioners in this field from various universities and mentors from Kemenkominfo. In general, the content of the Master plan of Smart City consists of the Vision of Regional Smart City, the Development Strategy of Smart City, the Action Plan of Regional Smart City, and the Road Map of Development of Regional Smart City. In this case, the Vision of Smart City needs to be adapted to the regional vision even though it is not precisely the same and it needs to be adapted to the city conditions and problems.

In relation to the development of preparing its Smart City status, the following essential aspects need to be taken care of i.e. structure, infrastructure & supra-structure as a driver, culture (people's readiness) as a mediator, and nature (resources, life, ecosystem) as an enabler (Citiasia Inc. in Direktorat Jenderal APTIKA – 2018). The structure consists of the availability of human resources, ability of bureaucracy, and ability of budget; infrastructure consists of the availability of physical facilities, ICT, and social aspects. Meanwhile, supra-structure consists of the readiness of policies (regional regulations), institutions, and implementation (Citiasia Inc. in Direktorat Jenderal APTIKA – 2018).

There are six elements of a Smart City that become the study in the Master Plan of Smart City made by Kemenkominfo, namely Smart Governance, Smart Economy, Smart Branding, Smart Society, Smart Living, and Smart Environment. Each element's related activities is as follows, the elements of Smart Governance covers Public Services (related to improving performance of public services), Bureaucracy (related to improving performance of the government bureaucracy), and Public Policy (related to improving efficiency of public policies). Meanwhile, the elements of smart branding consist of tourism (related to the development of the ecosystem of tourism), businesses (related to the development of business competitiveness, this is TTI and creative industry), and city appearance (related to the setting of facial appearance of a city).

In addition, Smart Economy consists of industry (related to the management of primary, secondary, and tertiary industries), welfare (related to the improvement of social welfare), and transaction (related to the development of financial ecosystem). Besides, Smart Living consists of harmony (related to the harmonisation of the quality of life and the environment), health (related to the

guarantee of health facilities and services), and mobility (related to the development of transportation and logistics). Next is Smart Society, consisting of community (related to the development of smart people), learning (related to the development of educational system), and security (related to the guarantee of security and safety). Last but not least, Smart Environment consists of protection (related to the environmental protection), waste (related to the garbage and waste sewage system), and energy (related to the development of competitive and sustainable energy).

In relation to the elements of Smart City as discussed above, Giffinger et al. (2007) proposes six points i.e. Smart Economy (competitiveness), Smart People (social and human capital), Smart Governance (participation), Smart Mobility (transport and ICT), Smart Environment (natural resources), and Smart Living (quality of live). In this case, smart mobility comprises local accessibility; (inter)national accessibility; availability of ICT-Infrastructure; sustainable, innovative and a proposition for including safe transportation system exists. In Indonesia, there is not much discussion on smart mobility because of the limited transportation system, particularly public transport. City mobility will affect land use, environment, health, and that will be more complicated than inter-city mobility (Blanco & Moudon, 2017). In addition, limited amount of funds for public transport will also lead to the rapidly increasing number of private vehicles and that traffic congestion and damaged roads will also increase (Blanco & Moudon, 2017). Therefore, problems could arise related, and the provision of public transport should be one of the top priorities that need to be implemented in smart cities for the sake of their city management.

Giffinger et al. (2007) also emphasise on smart economy, but not smart branding. For cases of smart cities and regencies in Indonesia, smart branding is also of primary necessity to accelerate the implementation of Smart City through quick wins and to promote local uniqueness through local smart branding. In relation to the dimensions of smart economy, the strengthening of ICT use in e-commerce and the virtual space use in UKM (Usaha Kecil Menengah / Small and Middle Enterprises) activities will give benefits to increasing access for promoting products and market. The development of SMEs Digital Kampongs as parts of the implementation of Smart City through the strengthening of smart economy needs certainly to be supported by smart people and smart governance (Rachmawati et al., 2018). In its development, shopping should not be done by visiting directly the location of the SMEs. Instead, it can be accessed through virtual space, and therefore the mobility of people can be minimised as well as the traffic and congestion.

### **Aspects of city management**

Asian cities face rapid transformation that makes the management of the urban environment a challenging task that concerns everybody and for which both regional and national policies are needed. Many Asian cities are experiencing

various urban environmental problems such as the management of air quality and urban transportation, solid waste, water supply, and sanitation (Imuraa et al., 2005). Therefore, the right management of a city is necessary.

The United Nations reveal that by 2050 two-thirds of the world population of 9 billion people or so will have lived in cities. Many cities have been working hard to provide basic services for their citizens such as clean water, drinking water, residences, and education and health services. In addition, waste system and sanitation are also essential parts that need to be taken care of in order to create a clean and healthy environment.

Therefore, it is important to pay attention to the following elements of urban management to support urban development, namely: Public private sector relationship; Urban Government Structure and Function; Internal Organization and Management Process; Administrative Leadership; Sub-municipal Organization; Strategic Planning and Management; Performance Management; Urban Government Finance; Taxation; Capital Funding; Urban Government Staffing (Davey, 1993). In order to achieve this, four tasks have been identified: 1) Providing essential infrastructure to the efficient operation of cities; 2) Providing services that develop human resources, improve productivity, and raise the standard of living of urban residents; 3) Regulating private activities that affect community welfare and the health and safety of the urban population; and 4) Providing services and facilities that support productive activities and allow private enterprise to operate efficiently in urban areas (Rondinelli 1990 in Davey, 1993). To provide services for urban citizens translates into roads, traffic light, rainwater drainage, well-managed water supply distributed to homes and communal facilities, liquid waste sewage system, solid waste collection and discard, educational facilities, health treatment facilities (hospital, health clinic, physician, midwifery, dental clinic, and ambulance) (Davey, 1993).

In this ICT and Smart City era, urban management has experienced many changes in providing city services and also in handling its management. A Smart City integrates technology, systems, infrastructure, services, and ability into organic network that is complicated enough as a challenge that needs to be faced (Nam & Pardo, 2011) especially for urban future. Therefore, discussion on Smart City and its role in city management in a smart way is an important part that needs to be taken into consideration in cities of various countries and by urban managers. In this case, it is necessary for better urban management.

### **Smart City and its roles in Smart City Management**

In the application of Smart City, one of the important steps is to identify the needs and priorities of city problems. In this case, it is necessary to identify what have become serious city problems. Therefore, a would-be smart city is expected to be able to solve the problems through the planning and implementation of the concept of Smart City. Thus the role of all stakeholders to implement the plans is indeed essential. It is crucial to identify the problems that become the priority to

tackle. An effective management resource is intelligent management and is expected by an urban manager that a city can be well managed to achieve higher living quality of its residents (Stimmel, 2016). Smart City provides its citizens with the ability and resources they need for their happiness, fulfilment, and prosperity (Barlow & Bencheton, 2019). Thus, to achieve Smart City it is important to involve its citizens to work hand to make a city a better place to live in.

Nevertheless, the role of the government is of primary importance in the efforts of establishing city infrastructure to facilitate the citizens in their activities. In urban development, it is necessary to provide adequate infrastructure because it is a supporting factor in implementing an integrated city with interconnections among sectors. In this case, it is, for example, necessary to integrate and interconnect sectors such as energy, economy, and demography. In relation to the revolution of current urban energy, energy supply needs to be sufficiently provided with the availability of energy resources from renewable energy already implemented in cities (Etezadzadeh, 2016). It is important to discuss this issue further since the availability of effective and efficient infrastructure is really important to obtain Smart City. Moreover there has been registering a phenomenon of growing discrepancy between infrastructure demand and offer as well as significant urban environmental services in Asia (Imuraa et al., 2005).

In general, several public services that are needed in planning smart city and they are the ones that cover sectors of government, health, education, taxation, complaints from people, permits, as well planning. Those services are expected to make people's activities easy. The application of those public services is supposed to include contents that fit 1) inter probability or a system that is adaptive to both the present and coming times, 2) portability or a service system that is movable, 3) assurance or a system with safety guarantee for its users, 4) availability or a service system that is able to help public services, 5) usability or a service system that can be used in line with its function, 6) adaptability or a system that is adaptive to its users and environment (Dubai Government, 2017)

Smart City is seen as a holistic view of all human activities in many places, including government, schools, hospitals, infrastructure, resources, businesses, and society (Knowledge@Wharton and Tata Consultancy, 2016). Its fulfilment and development need to be adapted to what it really needs. Therefore, the implementation of Smart City will be much better if it is correlated with the six elements of smart city as discussed above. Each element is closely relevant to urban management.

However, the elements of smart living, smart society, and smart environment are more predominantly related to urban management. As it has been stated above, the availability of efficient infrastructure is really important to run in a city. An example of this is among others the availability of efficient urban transport. Being efficient in this case can be seen from the side of both the provision by the government and the benefits to people. Therefore, transportation becomes the element of achieving smart living. The same case is the need for services that are able to improve human resources, productivity, and living standard of urban citizens. Therefore, all these combine to increase the achievement of smart living

and that social welfare, people's health, and the safety of urban citizens can also be achieved.

The provision of services for urban citizens comprises road, traffic lights, rainwater drainage, well-managed water supply distributed to homes and communal facilities, liquid waste sewage system, and solid waste collection and discard. Everything related to waste (garbage and waste management) and energy (creating competitive and sustainable energy) exists in the context of achieving smart environment.

Several cities, as an example, have made an application to monitor garbage landfills and garbage-transporting process. Meanwhile, in relation to energy efficiency, several cities have also applied smart road light systems; by introducing automation in turning on and off the road lights and voltage adaptor as well. The provision of educational facilities also falls in the context of achieving smart society. Meanwhile, the provision of health services (hospital, health clinic, physician, midwifery, dental clinic, and ambulance service) is part of achieving smart living.

In Indonesia, the Ministry of Communication and Informatics has provided the call-centre service 112 for emergencies like fire and ambulance aid. This kind of service is intended for citizens when they are in emergency situation, just like 911 in the USA. This program is almost the same as the call centre 119 made by the Ministry of Health. In the future, both will be integrated (Medistiara, 2017). Several hospitals and even public health centres have applied online for the admission in the online medicine service, and provide online information of ward availability. In addition, another online service regarding health is available as well as online health service in case there is an accident in homes.

City management needs to pay attention to policies, plans, programs, and practices to make sure that the population growth is adapted to access to basic infrastructure, people's homes, and other facilities (Davey, 1993). In relation to this, the master plan of smart city needs to cover all the elements of Smart City, including smart living and smart environment. Action plans and road maps that reveal long-term plans (10 years), middle-term plans (5 years) and short-term plans (1 year) as well as quick wins (quick plan for the benefits to public) must also be included in the master plan of smart city. The roadmap composition also needs to include feasible ideas as well as planning how to implement them. A roadmap is of great help in giving guidelines for important steps that need to be taken to realise Smart City. It takes years to create a smart city (Davey, 1993). Thus this plan must be in line with the regional Long and Middle-term Development Plan.

It is likely to reconsider the definition of Smart City in a more comprehensive way as Branchi et al. (2014) once described a smart city as a space for coexistence based on the available technologies which can ensure that its residents thrive and develop while managing the city's economic, social and environmental sustainability. This definition has encouraged many cities to be smart for better urban management.

**The issue of moving the capital in Indonesia: The need for better City Management and the implementation of Smart City**

The Indonesian Government has been working hard to move its capital Jakarta. Several regions have been studied. The last study shows that some parts of the Regency of Penajam Paser Utara and Kutai Kartanegara, East Kalimantan, have the biggest possibility to be the capital. The issue of moving the capital is based on the fact that city management is quite hard to implement in Jakarta, considering that the number of people living in Jakarta has reached up to 10,467,630, according to the 2018 data at the Statistics Central Bureau. With its current population density, Jakarta functions as the centre for government, business, finance, trade, and services. High urbanisation has made Jakarta more and more crowded, and in situations like these problems are inevitable, such as high pollution and traffic congestion due to the limited availability of public transport, and therefore the use of private vehicles keeps increasing. The same case is the need for housing which is not balanced between supply and demand, and therefore a certain group of people cannot afford to own a house. Consequently, slum area in some places is unavoidable. The availability of green-open spaces is even far from enough.

In a new place where the capital will be located, it is expected that the space uses can be balanced, i.e. there will be a balance between offices, housing for officers, educational facilities, trade and services, and adequate green-open spaces as well. The dimensional side of smart environment is the main priority when searching for the new capital. The same case is the supporting infrastructure to facilitate smart mobility available by providing digital-based public transport. Also, digital-based public services in administration sector that will help realise smart governance needs to be available. More importantly, to enable the people to be smart due to the application of ICT in various aspects of their life is an endeavour for smart society, smart people, and smart living to come true. However achieving smart economy should not be the main purpose for the development of the new capital because it can lead to the forming of busy economic activities in the new capital.

The function of the new capital should be directed more to the aspects of non-business centre and trade. The limitation of this function is of primary necessity considering that the multi-functions of the new capital will consequently lead to providing facilities for the fast-growing number of people because this will, in turn, attract more and more people (Takyi, 2016). Constructing business centres in the era of information and communication technology should not be a strategic primary aim of the new capital (Rachmawati et al., 2015). Instead, it can be decentralised in suburb areas or even in rural areas (Rachmawati et al., 2015). However, in relation to smart branding, city appearance needs to be taken into priority and realised as parts of the efforts to realize the beautiful appearance of the city.



## Closing remarks

Considering that more and more cities have declared themselves as smart cities, it is expected that in the future the achievement of well-managed cities will be higher. Part of this achievement is supported by the use of ICT as an aspect of smart city-supporting infrastructure. Besides, the application of structural aspects (human resources and budgeting) and supra-structure (institutions and policies) are also important pillars that should support it. Strategic innovations are expected to develop so that the achievement of Smart City will be higher and that city management will also be even better. Indonesia has been one of the examples for best practices in the movement toward 100 smart cities, cities which enable them to manage all aspects of urban life in a better way and that supports a plurality of aspects from smart governance to all the rest that urban residents need. For the success of future city management, the development of the new Indonesian capital should begin with smart city management, particularly on the aspects of smart environment and smart living.

## Acknowledgements

A part of this paper has been presented in the plenary presentation on ECOSMART 2019: International Conference Environment at a CrossOards: SMART Approaches for a Sustainable Future at University of Bucharest-Romania, September 5-8 2019. The author wishes to thank the Universitas Gadjah Mada for supporting funding to join the Conference.

## References

- Bappenas RI and Kominfo.go.id (2018), *Indikator Pemilihan Smart City*, 15 September 2019, <https://cutt.ly/8eGcUYd>.
- Barlow, M. and Bencheton, C.L. (2019), *Smart Cities, Smart Future: Showcasing Tomorrow*, New Jersey, John Wiley and Sons.
- Blanco, H and Moudon, A.V. (2017), "Havana's Transportation System: Future Scenarios", *Transportation Research Procedia*, no. 25, p. 4679–4691.
- Branchi, P.E., Fernandez, C. and Matias, I.R. (2014), "Analysis Matrix for Smart Cities", *Future Internet*, p. 61-75.
- Brown, J. (2015), "7 Steps on the Road to Becoming a Smart City", *Shutterstock*, 15 September 2019, [www.shutterstock.com](http://www.shutterstock.com).
- Davey, K.J. (1993), *Elements of Urban Management*, Urban Management Programme, Washington, D.C., The World Bank.
- Direktorat Jenderal Aplikasi Informatika Kementerian Komunikasi dan Informatika (2018) *Persiapan Bimbingan Teknis I Gerakan Menuju 100 Smart City*.
- Dubai Government (2017) Smart Dubai, 15 September 2019, <http://www.smartdubai.ae/>.

- Etezadzadeh, C. (2016), *Smart City - Future City? Smart City as a Liveable City and Future Market*, Ludwigsburg, Springer.
- Giffinger, R., Fertner, C., Kramar, H., Kalasek, R., Pichler-Milanovic, N. and Meijers, E. (2007), *Smart Cities-Ranking of European Medium Sized Cities*, Centre of Regional Science, Vienna University of Technology, p. 12.
- Imuraa, H., Yedlab, S., Shirakawac, H. and Memond, M.A. (2005), "Urban Environmental Issues and Trends in Asia—An Overview", *International Review for Environmental Strategies*, vol. 5, no. 2, p. 357 – 38.
- Letaifa, S.B. (2015), "How to strategize smart cities: Revealing the SMART model", *Journal of Business Research*, vol. 68, no. 7, p. 1414–1419.
- Medistiara, Y. (2017), *Kemenkominfo Buat Layanan Call Center Darurat 112 Seperti 911*, 9 September 2019, <https://cutt.ly/CeGvoYR>.
- Mendes, M.R. (2004) *Urban Environmental Management Challenges in Asia*, Institute for Global Environmental Strategies (IGES), Japan.
- Nam, T. and Pardo, T.A. (2011), "Conceptualizing smart city with dimensions of technology, people, and institutions", *Proceedings of the 12th Annual International Conference on Digital Government Research*, DG.O 2011, College Park, MD, USA, June 12 - 15.
- Rachmawati, R., Rijanta, R. and Djunaedi, A. (2015), "Location Decentralization Due to the Use of Information and Communication Technology: Empirical Evidence from Yogyakarta, Indonesia", *Human Geographies – Journal of Studies and Research in Human Geography*, vol. 9, no. 1, p. 5-15.
- Rachmawati, R., Hapsari, S.A. and Cita, A.M. (2018), "Virtual Space Utilization in the Digital SMEs Kampongs: Implementation of Smart City and Region", *Human Geographies – Journal of Studies and Research in Human Geography*, vol. 12, no. 1, p. 41-53.
- Smith, R.M., Pathak, P.A. and Agrawal, G. (2019), "India's "Smart" Cities Mission: A Preliminary Examination into India's Newest Urban Development Policy", *Journal of Urban Affairs*, vol. 41, no. 4, p. 518-534.
- Stimmel, C.L. (2016), *Building Smart Cities: Analytics, ICT, and Design Thinking*, CRC Press, Taylor & Francis Group.
- Takyi, S.A. (2016), "Comparative Study of Capital City Elements: the Case of Ghana and Nigeria", *African Geographical Review*, vol. 35, no. 2. P. 168-191.
- Knowledge@Wharton and Tata Consultancy Services (2016), *Smart Cities: The Economic and Social Value of Building Intelligent Urban Spaces*, Philadelphia, The Wharton School, University of Pennsylvania.