IMPLEMENTATION OF SMART CITY: COOPERATION DEVELOPMENT AMONG MUNICIPALITY, PRIVATE SECTORS, AND COMMUNITIES (THE STUDY OF MUNICIPALITY OF BANDUNG)

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Abstract: As one of the strategic cities, Bandung has many social and economic problems to be solved such as traffic jam, health, education, law and order, etc. In this regard, ICT implementation would likely one of the effective ways to overcome those problems. The objective of this study are:(1) to describe and to analyze how the municipality make the three main dimensions, technology, community, organization, have the same perspective in establishing smart city: infrastructure integration and technology service mediation, social learning for human infrastructure strengthening, as well as management of organizational improvement and community involvement. (2) To describe their roles and their commitment in realizing "Bandung Juara" program with the goal Bandung as a comfort and modern city. In this study, the authors use descriptive qualitative method. There are 5 cooperated aspects of urban development such as tourism and transportation, public service and business, education, health, as well as governmental management. The local government applies three strategies to build the city of Bandung, namely innovation, decentralization and collaboration. The research provides some contributions to understand the collaboration facets of cooperation development in the smart cities context.

Keywords: Smart City, Cooperation, Municipality, Private Sector, Infrastructure Integration.

A. INTRODUCTION

Urbanization continues to occur in the city led to the declining performance of the city. Various problems arise along with the city's rapid urbanization. Urbanization is characterized by a growing population density making the city must be prepared to face the other problems due to it such as scarcity of resources, the emergence of slum settlements, waste and pollution, traffic congestion, environmental degradation, are some of the physical problems.

Not only physical aspect but also the low quality of the city to improve the conditions will create distrust of the society to the government that will lead to social problems. These social problems associated with various stakeholders, it cannot be solved by the government itself but the role of the various parties, and the more complicated to be resolved. Those problems have made the city even more uncomfortable to live in.

In solving those problems and maintain its performance, the various concepts of development and management of city are being developed by academics and practitioners. Various emerging concepts are being developed in order to obtain a precise formulation of the concept to provide a sustainable comfort for the residents. They could be a development concept of the city as a whole, as well as based on certain priority issues such as the concept of green city prioritizing to provide of green open space that is closely related to environmental degradation.

Along with the change of the world, the rapid technological innovation is also be a new breakthrough that is used by the city to provide the best services for

the society, then it appears the concept of Intelligent City, Ubiquitos City, Digital City, Wired City, City Information, and Smart City. Those concepts are developed based on the application of information and communication technologies in managing the city. From the literature, it is known that the concept of Smart City is the end of urban development and management of information and communication technology-based development concept (Schaffer *et al,* 2011), To manage and use the city's data efficiently, the 3D analysis and visualization of the city's information are held on the platform of the smart city. With the new platform, a series of e-government services can be conducted to manage the makers and operation supervisors in the government agencies and other smart city industries, such as urban disaster and environmental protection, intelligent transportation, monitoring and evaluation of the urban resource centers. All services presented on the platform are extracted from the government departments' practical demand.(Lv et al. 2018).

The concept of Smart City is a concept that has been through a perfection of the concepts that have first evolved to patch flaws that exist and consider aspects that may not exist on Information and Communication Technology-based concept has appeared previously, The concept is ultimately based on not only the development and management of the city in the technological dimension but also the human and institutional dimensions (Nam & Pardo, 2012).

Regarding the growth of the smart city concept, an understanding of the concept is not clear and consistent yet. Cities called Smart City initially have a new breakthrough in the problem settlements which later successfully increase the performance of the city. In general, the development of city towards Smart City begins with the use of information and communication technologies that usually partial, on priority issues. For example, Amsterdam which use ICT to reduce pollution, or Tallim as the capital of Estonia which started managing smart city in terms of administration with e-government and the use of smart ID card in service for the residents, and the city of Songdo in South Korea use ICT for urban development to develop Songdo as an international business center.

Currently, smart city is a trend of developing concept of development in most countries around the world. This

concept then triggered tight competition to establish smart city with a variety of services supporting open information for society. Giffinger et al. (2007) highlight the performance of the smart city on related aspects, economy, people, governance, mobility environment, and living, some definitions emphasize the technology aspects. The key part of the definition of R. Hall [2000] is the "city that monitors and integrates the condition of all critical infrastructure." One of the core mechanism in smart city is a system of self-monitoring and self-response. Smart cities represent three major characteristics: instrumented, interconnected, and intelligent [Harrison et al, 2010]. Instrumentation means the source of real-time real-world data from both physical and virtual sensors. Such data may be interconnected in some of the processes, systems, organization, industry, or value chain. The combination of instrumented and interconnected system to connect the physical world effectively to the virtual world. Another definition highlights different aspects. Rios approaches [2008] is based on the architecture of the lens. He see a smart city as a city that is inspiring, sharing culture, knowledge, and life, and motivate people to create and develop in their own lives.

Technology is not the goal of Smart City, but as a tool only to improve a better life. City residents should be raised and applied in providing a variety of positive feedback in the development of Smart City. One of them can be through social media are now widely accessible to citizens, such as Twitter and website. Development of good infrastructures, such as adequate road condition will encourage the economic activity of citizens and the use of natural resources which are environmentally friendly, such as solar and wind power can impact better. There are four important things in establishing a Smart City, including the participation of the citizens, the quality of life (QOL) in cities, ecosystems for economic activities, and protection of natural resources that are environmentally friendly (Schaffers, Komninos and Pallot, 2012). Macke et al. (2018) identified four main QOL domain: socio-structural relationships, environmental well-being, material well-being, and community integration. Based on technological innovations, smart cities are complex ecosystems that have the potential to

improve urban livability, workability, and sustainability through a network of people, processes, and data.

The real conditions of development in Indonesia that unlikely equal in trust as the value of supporting the realization of the concept of Smart City is often still a constraint. Bandung as a city in West Java province is also planned and is being sought to implement the concept of Smart City development. To achieve a smart city, the first thing that must be addressed is the urban community itself, from their behavior to their lifestyle should have been sighted smart.

One city in Indonesia that have implemented smart city is Bandung. Bandung, the capital city of West Java Province, is the only capital city in Indonesia that is located on a highland, about 700m above sea level. Therefore the climate of Bandung is generally pleasant, with the temperature between 19°C to 23°C.. The natural beauty of Bandung has become known since the beginning of the 19th century, therefore, the city, which was established 203 years ago.

Bandung economic growth rate is also quite high. It is above the average of economic growth in Java and Indonesia. Bandung economic growth rate in the years of 2008-2012 was reached the average of 8, 53%, while the national economic growth average was only 5.8% and West Java economic growth average was only 5.86%. The high growth rate indicates that the Bandung city is the one of important sources of economic growth in West Java and Indonesia

Efforts to reorganize the urban community has been done by the government of Bandung, it can be seen from the incessant work program of the special campaign day in which the mayor is demanding work program of the Bandung for smart-sighted both in language, culture, health and energy use. Special Campaign Day consists of Senin Gratis that is free public transportation for students, Selasa tanpa Rokok that ask citizen for stopping from smoking, Rebo nyunda is the use of Sundanesse language as the language of the area in all activities on Wednesday, Kamis English use English as the communication language on the day, and the last is Jumat bersepeda is using bicycle a mode of transportation to work in order to reduce energy emissions in Bandung.
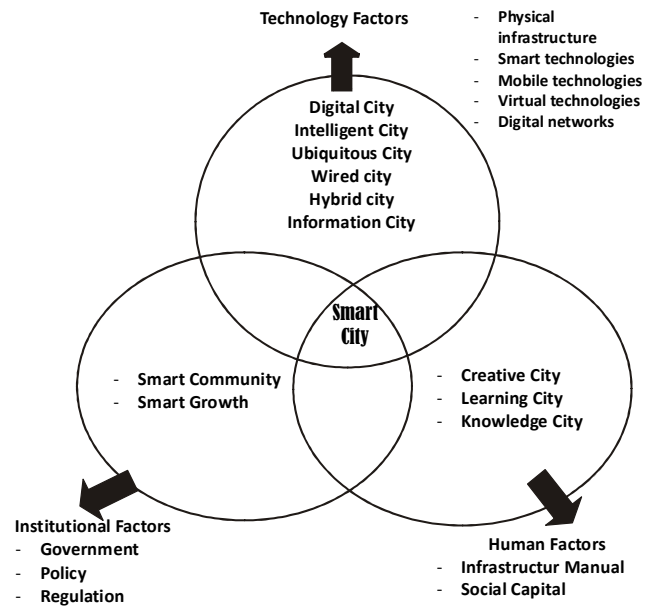
Figure 1: Fundamental Component of Smart City [Caragliu *et al,* 2009]

The local Government of Bandung City has done a lot of cooperation with foreign and local investors in developing smart infrastructure in Bandung, so in the procurement of the infrastructure tend to save the budget. Planned infrastructure development over the long term when one is completed then the use of private vehicles is expected to be reduced significantly, in line with the fuel consumption and emissions are also reduced significantly. It creates smart energy and smart mobility in the city of Bandung.

Fundamental factors which make a city smart according to the literature. The conceptual variants of smart city in the preceding section, key conceptual components of smart city, and re-categorize and simplify them into three categories of core factors: technology (infrastructures of hardware and software), people (creativity, diversity, and education), and institution (governance and policy). Given the connection between the factors, a city is smart when investments in human/social capital and IT infrastructure fuel sustainable growth and enhance a quality of life, through participatory governance [Caragliu et al, 2009]. A description of the linkage to the three aspects can be seen in Figure 1 above.

This study aims to describe and analyze how the city government to align the three main dimensions

(technology, people, and institutions) on the stablishmentof smart cities: infrastructure integration and mediation of technology services, as well as social learning for strengthening human infrastructure, and governance for institutional improvement and involvement residents. How does the city government managing cooperation between city government, private sector and communities to make Bandung Champion, as a comfortable and superior city.

(B) Methodology

In this study, we use qualitative research method with descriptive approach from objective reality and other theoretical Assumptions (empirical). The informants are (1) key informants, Head of Bappeda and his staffs who has made planning and Smart City road map program in Bandung as well as the head of ICT Department and his staff and (2) the main informant such as Head of Work Unit and his staffs who became part of the implementation of the smart city such as the Department of Health, Education and other relevant agencies. Additional informants, those who know and understand the issues in this study, they were employees who has main function as the manager and operator of smart city in the command center, stakeholder providers (partners) and users of smart city programs and services.

The informants are determined by using purposive technique i.e. the specific objective that have correlation with the research problems. Data collection method in this study is conducted by interview, documentation and observation. The primary source of data is obtained through selected information from interviews with related parties who become sources and informants in this study. The secondary data are documents such as legislation, The Regulation of Bandung City, The regulation of The Mayor of Bandung, The Decision of The Mayor of Bandung, books, information from print and electronic media.

(C) Result and Discussion

Improved public services undertaken by the Government of Bandung was further enhanced in line with the implementation of the concept of smart city, which covers the following several areas of priority:

– Government (smart government)
– Education (smart education)
– Transportation (smart transportation, smart parking)
– Health (smart Health)
– Energy (smart Grid/smart Energy)
– Security (smart surveilance)
– Environment (smart Environment)
– Community / Social (Smart Society, Smart Reporting, Bandung Passport)
– Finance (Smart Payment)
– Trading (Smart Commerce)

To be able to achieve the purpose of implementing the concept of smart city in increasing service and effective decision-making, it needs to align the following three main dimensions of the formation of smart cities, technology, people, and institutions.

1. Alignment of those three main dimensions, technology, people, and institutions on the formation of smart cities in Bandung

Technology is the key for a smart city in the use of ICT to transform lives and works with a significant and fundamental way. A well-functioning infrastructure is absolutely necessary but it is still not enough to become a smart city. Utilization of information and communication technology (ICT) to connecting, to monitoring and to controlling a variety of resources that exist within the Bandung city effectively and efficiently in order to maximize service to the citizens are implementation of smart city concept in Bandung Municipality.

Technology and infrastructure prepared by the Government of Bandung to support the implementation of smart city is setting up a command center. Bandung policies Comand Center is one form of public service innovations implemented by the government of Bandung. The main function of the command center at the first stage of the three stages in its development are (1) to enhance external public services and (2) facilitating internal service, it is the faster management of making decision. In this first stage, Bandung Command Centre

is the use of information technology to find out the problems and making decision faster regarding traffic and emergency problems. The second stage, requiring local government work unit to use a smart city, then the third is a refinement (Diskominfo, 2015). Bandung Command Center, which began construction in 2014, called Bandung Command Center 1.0. Furthermore, at the end of 2015 become 2.0, and in 2016, it will be refined into Command Center Bandung 3.0. Indeed, it takes time to develop, because the low of funds.

The existence of the command center may take a wide variety of data and information in every corner of the city, which was obtained through a sensor attached. Sensors are mounted manifold which can be a camera sensor or sensors of social media such as Facebook and Twiiter. All that could provide benefits for governments, businesses and communities in the development of services and public safety, business, education, healthcare and others.

From the stage, currently, BCC is still in the second phase over 1 year run. So it can be said that this program is still in the process of testing and internalization. In the Command Center, there are many applications that can monitor the state of Bandung. In 2015, there were already 150 of 1000 applications planned. There are weather data, maps, video feeds, special vehicles location, video analysis on them. 100 points in Bandung is already installed CCTV from 4000 point planned and 50 vehicles such as fire engines, ambulances and buses (public transportation) mounted GPS. The CCTV recordings will be analyzed in more detail in resulting notifications as needed

Specifically, utilization of the command centers are for carrying out ID Card, checking licence, and congestion or flooding which its process monitoring and dissemination of information can be done in realtime. In the near future, it will be the data center information from all agencies in Bandung municipal government.

The Government of Bandung City consisting of 30 work units and 30 sub-districts must have a data set which increase day by day. Obviously, it need a media to collect and to process the data to be a useful information as a reference for leaders in making decision. It can also be useful for the community and stakeholders.

Monitoring the condition of the city through a sophisticated CCTV in BCC is supported by a system called Intelligent Operations Center (IOC), which allows an operator to monitor the condition of the city. IOC is a system that will automatically see notifications automatically in case of violation. For example there are street vendors (hawkers) in restricted areas could be raised notifications automatically, to be known by the operator without seeing CCTV continuously. So there is an inscription on the screen in red 'There are street vendors'. So there alertisasi own that could be designed to facilitate monitoring. After emerging notifications, related local government agencies will follow to solve problems that occur. The system was also supported by GPSTracking installed in the cars operational Bandung City Government. So it can be seen here, whether they have been moved to the location, when they move, whether of the report was too long or not. There could be seen on their track record for dealing with problems. So the effect of treatment can be faster for people with this command center.

GPS Tracking Software has been designed so that it can be accessed by school children and the community. With the software, people can determine the movement of the bus from stop to stop. So it can be known bus will arrive more minutes so the public can decide whether anticipated or replace other vehicles. BCC is managed by 15 operators are selected through the selection. Employees in the related local government offices also participate in monitoring the condition of the city such as police officers, firefighters and transportation agencies. Software has been developed to provide information and services to the public at the end of 2015 as many as 150 software than 1000 applications planned by the end of 2016. But the software can only be accessed via smartphones based on android and iphone only. To activate the software, the community must install and register stating the data itself including emergency phone number to call

Operator monitor the situation and conditions in the city of Bandung, not only through CCTV but also social media. People are already used to report any events experienced or encountered every day through social media such as twitter and facebook. With mention to

twitter, the operator can know what events and complaints of the citizens. Operators and employees of related SKPD can also see what the most complaints in every sub-district

Monitoring function of the existence of BCC has been executed according to the functions and the purposes, but in the early stages of this strategy and its management have not led to the settlement of the problem directly and realtime. As Ella, S and Rosita N.A (2015) argued, Diskominfo stated that BCC does not contribute directly to cope with congestion, but at least it help in data collection. BCC has a system to count the number of vehicles at points where CCTV installed. If it is an accumulation of vehicles at one point, then the Transportation Department and the Police determine whether it is a congestion or not. For illegal parking, BCC has intelligent video analytics systems to detect parking area. Those data will be submitted to the Transportation Department for further action. It can be said that BCC have no authority to take action, it provide data only to the Transportation Department and the Police. Coordinating with relevant agencies is still through email, telephone and official letter. Although the city government stated that inter-agency coordination has been running well, it has no legal basis yet due to no SOP to adjust coordination among them.

In order to optimize, synergy and synchronization of electronic data management in the government of Bandung City, then they decide that BCC is a work unit under communication and information departement (Diskominfo). The decision provides clarity of the position and the authority of BCC to support the achievement of the objectives.

The perception of technology in smart city initiatives stresses integration of systems, infrastructures and services mediated through enabling technologies. Technological innovation is a means to smart city, not an ends. IT is just a facilitator for creating a new type of innovative environment, which requires the comprehensive and balanced development of creative skills, innovation-oriented institutions, broadband networks, and virtual collaborative spaces (Komninos, 2009).

In an effort to create smart people, the government of Bandung has explicitly approached through technology to its citizens because in the campaigns, it is not only conducted by the government but also through social media with interesting posters that have appeal in particular to the young in Bandung. Bandung has a population of 2.5 million, and 60 percent of them are below 40 years of age. Therefore, technology has been considered to play a significant role in the future development of the city. The concept of smart cities can be distinguished from other similar ideas such as digital city in this case focuses on factors, human capital and education as the main driver of urban growth, it is not merely the role of ICT infrastructure (Giffinger and Gudrun, 2010).

The local government then provided internet access service in various corners of the city to facilitate interaction with the urban, especially in public spaces such as city parks. They will attract people to visit the park. Thus, the function of the park as a public space would be back by itself. Characteristics of healthy city can be seen from citizens who freely interact in parks, and other public spaces. A similar facilities built in places of worship, such as mosques, churches and others. This way will allow people to access the Internet while worshiping.

In order to support the concept of smart city, the mayor requested to village heads in Bandung for technological literacy. Village heads are also required to have a tablet in order to facilitate communication with the municipal government and the community. Sub-district and village offices must also be connected to the Internet. If it is not, sub-district and village heads are asked to report immediately so that the authorities can directly perform the installation of internet facilities. Village heads should also have email, Twitter, and WhatsApp.

The initial breakthrough by requiring all Local Government Unit, subdistrict and village heads in Bandung to have a Twitter account. This is a mayor issue revolutionizing the way communication between government and citizens that there is a direct communication channel open at any time. then train line apparatus is more smart and tech-oriented and open government initiative started.

In addition, the government of Bandung has planned e-governance that will be done gradually. At the present, government of Bandung will be carrying out an

online information service to the village level. In addition, to create smart citizen, the government of Bandung has planned infrastructure supporting the creation of smart mobility by establishing a monorail in the city, cable car, Bandung skywalk, school bus, bike sharing, and BRT.

What has been conceived and developed by the Government of Bandung in the preparation of infrastructure construction of smart city at this early stage in line with what was raised by some of the literature? While the wireless infrastructure is a key element of digital city infrastructure, it is only a first step (Al-Hader et al 2009). Technological advancements in ubiquitous computing (UC), wireless sensor networks (WSN), and machine-to-machine (M2M) communication have further strengthened the IoT notion (Silva, Khan, and Han, 2017; Khan et al. 2017). The future, the smart city project is a very complex concept and has many hurdles in its way and many of the hurdles (digitalization service) can easily be solved by IoT (Internet of Things). Urban IoT is designed to support the future vision of smart cities which supported the new hybrid technologies and provide the value-added services to the citizen (Ahmed and Rani 2018).

In the next phase of BCC development is ideally equipped with a master plan and SOP document should be prepared to Bandung Command Center that includes procedures for implementing the duties and coordination among relevant agencies. Bandung Command Center more active role in following up on field data and solid research agreement between relevant agencies; and the need to set out the division of labor, authority, rights and obligations among relevant agencies.

The legal basis for an overarching development process to be unveiled BCC consists of three policy are as follows:

a) Bandung Regional Regulation No 1/2014 on the Revenue and Expenditure Budget in 2014

b) Bandung Mayor Regulation No. 085 of the Translation of the Revenue and Expenditure Budget in 2014

c) Bandung Mayor Instruction No. 002/2013 About the Action Plan Towards Bandung Champion.

Two policies on the budget are above a milestone in the successful development of the BCC. Through this policy, the budget to build the BCC can be issued. Taking into account the time urgent and leadership of a mayor is limited, it was decided to immediately enter into a BCC development program which already is implemented since 2014. The acceptable reason because the required budget can be guaranteed availability. So it is not surprising that the government of Bandung only takes a year to realize that this advanced command room. Moreover, the decision to include the development of BCC's program of duty of communication and information agency also the right decision is closely related to information and communication technology that has become the core business of the agency (Ella and Rosita, 2015).

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A successful smart cities can be built from the top down or bottom up approach, but the active involvement of every sector of society is very important. A united effort to create synergy, which allows each project to build one another to progress more quickly, so that a critical mass involved, the information and training required for the transformation of how the entire community perform their duties

The local government applies three strategies to build the city of Bandung, namely innovation, decentralization and collaboration, as can be seen in Table 1.

2. The Developed Cooperation to Achieve Bandung Juara, as a Comfort and Supreme City

As revealed by Lindskog (2004) IT infrastructure and applications are prerequisite, but without any real engagement and willingness to cooperate between public institutions, the private sector, voluntary organizations, schools and citizens, there is no intelligent city. This means

Table 1
Strategy Implemented By the Local Government in Overcoming the Problems of Bandung City
Through a Smart City Approach

The Strategy	*Program Description*
Inovation	– Make new breakthroughs in providing municipal facilities. Integrating through interconnectivity facilities for monitoring and controlling problems of the city in order to solve complex problems of the city
	– The initial breakthrough by requiring all Local Government Agncies, subdistrict and village heads in Bandung to have a Twitter account. This is a mayor issue revolutionizing the way communication between government and citizens that there is a direct communication channel open at any time. then train line apparatus is more smart and tech-oriented and open government initiative started
	– Innovation of public service and some of which has received recognition and awards, among others the Social Aid Online (community could keep nad control on the proposal, work procedures to who the recipient of social aid is transparent), Prolanis (the health care system with proactive approach, poor people who have chronic illnesses can hospitalized at the health center, so no need to go to Hospital) and Katresna Sadaya (this program facilitates pregnant women in every way. If there are pregnant women, the forum Rukun Warga shall be responsible entirely until the baby was born safely).
Desentralization	– Build a command center in the sub-district. Sub-district heads can monitor through the screen provided, minimum of 4-6 units, and then will connect to the existing CCTV on its territory so that each district head can make decisions faster.
	– Sub-district and village heads on a regular basis and take turns dinner together in homes and the Friday prayers around the village so that officials know so much problems facing its citizens. The assumption is that if leaders understand the difficulties of its citizens, can find a solution well.
Colaboration	– Collaborating with third parties (private sector) to prepare good infrastructure-related hardware, software and humanware.
	– Collaborating with the community through existing communities and drive for the establishment of a new community that will help the city authorities resolve the problem of the city include traffic congestion, street vendors, waste management, and transportation infrastructure, especially the number of damaged roads and streets.

that the smart city can be realized by both when the relevant stakeholders, the government and the community can work together and support each other.

Bandung is one of the strategic town, but it still face a lot of problems in the form of social, economic and others. By cooperation with various parties, the municipal government has to use ICT to obtain an effective solution to overcome these problems.

The government of Bandung City will have integrated connections in various fields from transportation, public services, even to places of worship, to give practical effect and efficient in the management of the city. In this cooperation, there are five aspects of the target include tourism and transport, public services and businesses, education and health, as well as government management. Those program covering education, and public areas. Telecomunication Corporation (PT Telkom) has built 10,000 hot spot spread in any area of the city. Each point has about 3-4 connection. In addition to providing access Internet access in public spaces, Bandung municipal government also plans to issue smart cards in 2016 which can later be used to pay the fare public transportation such as public transportation, buses, and more. More broadly Cooperation with Telecomunication Corporate (PT Telkom) include:

- Urban CCTV Surveilance (180 titik/150 +30 titik)
- Bandung Digital Valley for Business Incubator
- Social Media Analytics
- Public Portal
- Machine to Machine for payment tracking and household energy management
- "Hi Bandung" and "Trans City" application

The Government of Bandung City using the cooperation directly and indirectly held by the leading universities in the city of Bandung, ITB and BlackBerry. Innovation in technology area continues to meet the needs of society. BlackBerry has invested in Bandung Institute of Technology (ITB) which brings BlackBerry Innovation Center (BBIC) since 2015. The main purpose is to deliver a variety of solutions called 'Smart City' needed by the people. Bandung is the location of the development and adoption of innovations conceived by BBIC by launching Smart City BDG. Researchers at BBIC made several research groups in order to more focus to work on the appropriate area of competence. BBIC research focus on transportation, education, smart homes and health through innovation, mobile applications and digital versatile.

LAPI ITB and Telkomsel corporation make cooperation to form smart system platform (SSP) to produce intelligent city management (smart city) in Indonesia including those later applied in Bandung. There are three innovations in Smart System Platform (SSP) that has been generated, ie sensing, understanding and acting. Sensing a concept to know and observe the condition of the city with the help of sensors to collect data. Understanding the concepts to understand the city better through data that has been processed. One function of the SSP is to process, integrate and perform analysis of data has been collected. While the acting is a concept to quickly perform actions from the analysis that has been done. Product innovation to help the process of acting which this is with the command center that utilizes technology SSP.

D. CONCLUSION AND RECOMENDATION

Conclusion

1. A successful smart cities can be built from the top down or bottom up approach, but the active involvement of every sector of society is very important. As the key how the municipality make the three main dimensions, technology, community, organization, have the same perspective in establishing smart city: infrastructure integration and technology service mediation, social learning for human infrastructure strengthening, as well as management of organizational improvement and community involvement

2. There are five aspects of urban development that are cooperated with the various parties such as tourism and transportation, public service and business, education, health, as well as governmental management.

3. The local government applies three strategies to build the city of Bandung, namely innovation, decentralization and collaboration.

RECOMMENDATION

1. In the next phase of BCC development is ideally equipped with a master plan development and SOP document should be prepared to Bandung Command Center that includes procedures for implementing the duties and coordination among relevant agencies. Bandung Command Center more active role in following up on field data and solid research agreement between relevant agencies; and the need to set out the division of labor, authority, rights and obligations among relevant agencies.

2. A united effort is needed to create synergy, which allows each project have progress more quickly, so that a critical mass involved, the information and training required for the transformation of how the entire community perform their duties

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