

Integrating the One Map Policy into the One Data Policy within the Pontianak City Government

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Abstract: *In the pursuit of implementing the one-map policy through the establishment of a Regional Geospatial Information Network (JIGD), the Pontianak City Government is potentially confronted with issues of inefficiency. JIGD possibly resembled the existing data management system, namely the One Data Indonesia system (SDI) that is well established since 2019. This study analyzed the possibility of whether to build JIGD as a standalone structure or to integrate it into SDI to address inefficiency issue. Employing a qualitative methodology, this study embarked on a comprehensive literature review encompassing both general data types and spatial information within the data management system to understand the nature of the data and the surrounding environment. Those then were analyzed based on the data characteristics, the organizational structure, supporting technology, human resources, and applicable regulations regarding it. The results suggested that integration is more feasible but should modify the organizational structure of the existing SDI system.*

Keywords: *One Map Policy, One Data Policy, JIGD, SDI, Integration, Spatial Data*

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1. INTRODUCTION

The necessity for integrated data management has become increasingly pronounced, driven by the exponential surge in data production from diverse sources including government entities, the private sector, communities, individuals, and non-profit organizations.. Internet and social media enriched the atmosphere. We are experiencing an era of data flooding. Data is available everywhere. Unfortunately, when it is needed, it is difficult to find. If it can be found, other problems occur. It may not be feasible either of its quality or the source. However, still "data is the new oil". Data is a new source of wealth. When it is managed properly, it will give multiple benefits.

Based on the need and the potential benefit of managing big data, the Central Government issued the One Data Indonesia policy. It regulated a mechanism of integration data management to be applied either by central government or local governments. The underlying spirit of this policy is to manage the vast amount of data produced by various government agencies in an integrated manner. Thus, the data can be harnessed more optimally and efficiently since integration means easy to share between various agencies without additional cost to produce the same data. Besides, the open data policy was also a part of the implementation of the transparency principle (Heald, 2006; Oliver, 2004). When data access is opened for the public (Birkinshaw, 2006), it can freely be utilized not only for Government but also for businesses, academics, non-profit organizations and common citizens (Fenster, 2012; Meijer, 2007). The disclosed information used by the public can encourage accountability of the government (Davies & Bawa, 2012; Fung et al., 2007, 2010). Thus, it will hopefully further public aims (Avila et al., 2010; Ossebaard et al., 2012).

Currently, the Pontianak City Government has an integrated data management mechanism called One Data Indonesia (SDI) of Pontianak City, which was regulated on Mayor Regulation Number 46 of 2021 concerning One Data of Pontianak City. The SDI is expected to support a higher quality, precise and integrated

policy-making process by providing accurate, up-to-date, integrated, accountable, easily accessible and usable data (Hardjaloka, 2014).

As well as with SDI, One Map Policy also mandates integration of data management (Nurwadjadi et al., 2019). Map policy comes from the belief that spatial information can enhance the transparency of government due to the ease of understanding the data (Akingbade et al., 2009; Arisanto & Pratiwi, 2022) and conceptionally can demand accountability (Bovens, 2007). Differ from one data policy, the one map policy is specifically addressed to geospatial data and information. Historically, the policy was initiated when the problem caused by the duplication in maps arose on the national scale (Nurwadjadi, 2020). Conflicts occurred due to differences of maps of a same object but with different makers. This raised issues of fighting over land rights, spatial planning problems and disputes in the community (Rahmawati & Bangsawan, 2022). This was exacerbated by the difficulty to access maps and spatial data by interested parties (Coleman et al., 2009). Thus, the One Map Policy was applied with the enactment of Law Number 4 of 2011 concerning Geospatial Information to address issues around spatial data problems.

Technically, the Law was then elaborated in more detail in Presidential Regulation Number 27 of 2014 concerning the National Geospatial Information Network. This regulation instructed all Indonesian Regional Governments to establish a regional geospatial information network (JIGD) as part of the national network (JIGN).

Unfortunately, Pontianak City Government, until early 2022 has not formed this JIGD. While the Provincial Government of Kalimantan Barat had already formed it in 2019 through the enactment of Governor Regulation Number 131 of 2019. Other 5 Regencies governments in Kalimantan Barat had also formed JIGD around 2020 and 2021. Therefore, lagging behind other regional governments as well as encouragement from the Republic of Indonesia's Geospatial Information Agency (BIG), the Mayor of Pontianak then committed to establish the JIGD in Pontianak.

In establishing JIGD, the Pontianak City Government must pay attention to the existing mechanism of the SDI. At first glance, it was noticed that the JIGD shares the same spirit as SDI. Thus, those may have some similarities in mechanism, environment, and human resources involved. That opened up the possibility of integrating the two mechanisms into one. The integration may result in efficiency in terms of cost, human resources involved, and technology. However, it is still questioned whether it is applicable to spatial data which have certain characteristics, certain mechanism to collect and store the data, and specific technology used. If it is not, it may be more efficient to build JIGD separated from the SDI system.

Therefore, it is necessary to consider two options, build the JIGD as a standalone structure or integrate it into the existing SDI structure. This study aimed to analyze the efficiency considerations between integrating JIGD and SDI into one system or establishing them separately. The study encompassed the organizational structure of data management, mechanism of collection, storing and securing the data, regulations related to data management, human resources, data characteristics, and technology. This analysis will be used as suggestions and material for drafting the Mayor Regulation concerning Regional Geospatial Information Networks (JIGD) in the Pontianak City Government.

Problem Identification

The principle of one data policy requires an integration of data management which include mechanisms for production, storing, security, and dissemination (Cahya et al., 2021). The SDI system in Pontianak City Government had implemented in its business process where all offices and agencies under Pontianak City government involved within the mechanism.

However, the need to build JIGD put the Pontianak City government in dilemma. JIGD will also engage all offices and agencies under the Pontianak City government, just as SDI did. This condition may contradict the principle of integration. Establishing JIGD may inflict two different mechanisms which manage the same

general mechanism, namely the data management mechanism. Separation between spatial data management (JIGD) and general data management (SDI) means there are two data management systems, which need human resources for each as well as budget for establishment and maintenance.

Considering the seemingly similar mechanism between those two systems in managing data, it is reasonable to integrate those into one system. However, there must be deeper consideration rather than only looking at the seemingly similar management data mechanism. The nature of spatial data, for example, may require special treatment that makes it should be treated differently. The separation may be more efficient than integration. Unfortunately, it is still unknown about potentials of integration or separation of the system, which one is more beneficial and efficient.

The problem identified here was the difficulty to determine whether to build JIGD by integrating it into the existing SDI system or building it as a stand-alone system. The difficulty comes from the complexity of consideration to choose which one is more efficient. Separation may cause more budget and inefficiency. However, the integration will also bring problems in terms of the complexity of uniting two concepts, two managements and two regulations into one mechanism. It will potentially incur more budget also.

Objective

The objective of this study is to consider whether to build the JIGD as a standalone structure or integrate it into the existing SDI structure to address the inefficiency issue. The consideration will later be used as a suggestion for drafting the JIGD Regulations in Pontianak City Government. Besides the consideration, this study may offer some features that can be applied to develop the organization of data management that accommodates the management of spatial data and information.

This objective requires a review of existing SDI mechanisms, as well as a review of the concept of the JIGD mechanism. From this review, we look for aspects of similarities that allow integration. Diversity aspects are also sought to consider the feasibility of those two mechanisms are separated.

Output

The expected outputs of this research are several considerations, which are framed in several important aspects that make up the data management system. These aspects were derived from the Network Development Guidelines released by the Indonesian Geospatial Information Agency (BIG). Each consideration will assess which option (integration between JIGD and SDI, or separation) is more feasible.

Besides the consideration, the other output of this study is a concept of minimum spatial data to produce and its producers. It will be used to portray the scope of the JIGD work.

Thus, here are the expected outputs:

- a. Consideration in terms of the organizational structure of the data management system;
- b. Consideration in terms of technology to support system;
- c. Consideration in terms of human resources for the development and implementation of the system;
- d. Concept of minimum spatial data to produce and its producers;
- e. Concept of organizational structure of data management that accommodates the management of spatial data and information.

2. DATA AND METHODS

This study needs to acquire a clear overview of the existing SDI system of the Pontianak City Government to comprehend its structural framework, thereby exploring the potential integration of JIGD into it. Additionally, the configuration of the forthcoming JIGD needs to be distinctly depicted to identify the aspects and structures that can be incorporated into the SDI. Therefore, several data, information, literature, concepts, and regulations are required to support the analysis.

Information about the current structure and work procedures of the existing SDI, and the roles and duties of the parties involved in SDI were obtained from reviewing the regulations and literatures regarding it. This method also was applied to find the concept of the structure and work procedures of JIGD which is mandated to be implemented, and the concept of the roles and duties of the parties who will be involved in JIGD.

The types of data and their sources managed by SDI, were explored through the Pontianak City SDI portal. While types of spatial data and their sources, both existing spatial data and planned spatial data that must be produced later, were investigated through geoportal belongs to other local governments. The old spatial data available at the office of the Regional Development Planning Agency of Pontianak City were used as a comparison.

The data was processed through extraction of principles, values, and regulations regarding to SDI and JIGD to get the most important aspects of the two policies. The structure of the JIGD system and the SDI system were compared to find any similarities and differences between the two systems. This comparison as well as a list of any involved parties and their duties were used to build a bridging mechanism for different tasks and structures of the SDI and the JIGD. This then allowed drafting to unify the organizational structure of SDI and JIGD in a structure diagram.

3. RESULT AND DISCUSSION

To ensure a clear presentation of results and discussions, this section follows a specific structure. Firstly, a concise narrative explanation is provided to introduce the SDI (Spatial Data Infrastructure) implemented by the Pontianak City Government and the upcoming implementation of the JIGD (Regional Geospatial Information Network). Secondly, a series of discussions are presented to consider the feasibility of either integrating or keeping the two systems separate. The discussion is organized around three aspects, drawn from the key components comprising the JIGD (Technical Team for Network Node Development Standardization, 2013): 1) organizational structure of the data management system; 2) technology required to support the system; and 3) human resources. Thirdly, the concept of producing minimum spatial data and its corresponding producers is introduced. This additional information is crucial to provide a sense of scale for the JIGD's implementation. Consequently, it serves as an additional consideration in the decision-making process regarding integration or separation.

3.1. SDI System in Pontianak City Government and JIGD

One Data Indonesia system (SDI) in Pontianak City Government

The Pontianak city government has built the SDI system since 2019, but it was legally established in 2021 with the enactment of Mayor Regulation Number 46 of 2021 concerning One Data of Pontianak City. As a data management system, it organizes and integrates the administration of data produced by all agencies and offices under the Pontianak City government. The organization of the data is expected to support the process of planning, implementation, evaluation, control of development, and policy-making process (Sekretariat Satu Data Indonesia Tingkat Pusat, 2021).

SDI system guides agencies and offices in managing data to ensure the availability of quality data. Besides, the data should be published to the public in a manner that is easily accessible and shared. Thus, data is ready to be used by other government institutions either central and regional, universities, citizens, private companies, or NGOs. This is a part of the spirit of encouraging data openness (Cahya et al., 2021) and transparency (Ossebaard et al., 2012). Besides, it is a tool to fight abuse of power and corruption, increase efficiency and effectiveness, and reduce costs in the delivery of public services (Fenster, 2006). However, implementing open data has its challenges. Lack of tradition of sharing information within the government bureaucracy is among the challenges (Hardjaloka, 2014). In addition, technological infrastructure that requires a large amount of money sometimes makes the government have to calculate carefully. Meanwhile, in their minds, the direct benefits obtained are not necessarily balanced by the costs incurred.

The SDI system was also built to also support Indonesia's national statistical system. Thus, the system must comply with 4 principles (Network Node Development Standardization Technical Team, 2013), namely:

1. Meets data standards
2. Interoperability
3. Using reference code
4. Availability of metadata

SDI system was formed both at the central and regional levels. At the central level, the structure includes the Steering Committee, the Coordinator of the One Data Indonesia Forum, forum members consisting of Ministries and State Agencies, and Data Guardian. Its implementation is supported by the SDI Secretariat which provides technical, operational and administrative support to the forum and the steering board. Not much different from the central level, in the regions, both at the provincial and district/city levels, the structure consists of a Steering Committee, the Coordinator of the One Data Indonesia Forum, and members of the forum which contain organizations (agencies, offices, and units) under local government, data guardian, and data supervisors. In the Pontianak City government, the flow of the mechanism in organizing SDI is explained below:

1. The data supervisor recommends the methodology for data collection and planning
2. Data producers produce data according to SDI principles referring to central data registers
3. Data guardian collects and checks the data. Supportive data guardians assist the data guardian duties in collecting data and checking it first-hand
4. The data guardian disseminates the verified data through the SDI portal
5. The SDI Secretariat provides operational, substantive, and administrative technical support to the Forum.

Regional Geospatial Information Network (JIGD)

If the SDI system is set to manage common data such as tabular, text, pictures, and numbers, the JIGD is prepared to handle geospatial data and information. Geospatial data is data that has geographic location, dimensions or sizes, and/or characteristics of natural and/or man-made objects that are under, on, or above the earth's surface (Tim Teknis Standardisasi Pembangunan Simpul Jaringan, 2013). Any data can be considered geospatial data as long as it has a location reference such as coordinates or addresses on Earth. Examples of geospatial data are the location of poor households, administrative area boundary data, road maps, river maps, and so on. The use of spatial data and information is very wide, from the use for technical projects, policy-making processes, poverty alleviation (Redjeki et al., 2014), government transparency, and even for building youth character (Sutomo, 2013). Meanwhile, geospatial information is geospatial data that has been processed to be used as supporting information for policy formulation, decision-making, and policy implementation (Riqqi et al., 2018).

Since the JIGD will be established within the Pontianak City government system, some principles of JIGD may be close to the SDI system. Firstly, the JIGD is built to present a convenient way of sharing and disseminating geospatial data and information. This makes JIGD must involve all stakeholders in the field of geospatial information, both central and regional to ensure the availability of the data and the integration of them. Secondly, the collected data should be able to support the planning process. Create a better process of planning, control, and evaluation. Thirdly, the JIGD is responsible to provide data that can be accounted for, either the source or the standard of data. Besides, the JIGD is assigned to accommodate data and information from various sources, then should ensure the data comply with the principles and standards. Fourthly, the JIGD must become a forum and means of collecting, exchanging, disseminating, and utilizing spatial data and information between government organizations either central or regional, and with the community. Fifthly, the mechanism inside the JIGD must produce data that meet the applicable data standards, the data source is clear, and it has metadata.

3.2. Integration or Separation of the Two System

a. Organizational Structure of the Data Management System

To operate the task and function of the SDI system, the SDI of Pontianak City government has an organizational structure as shown below:

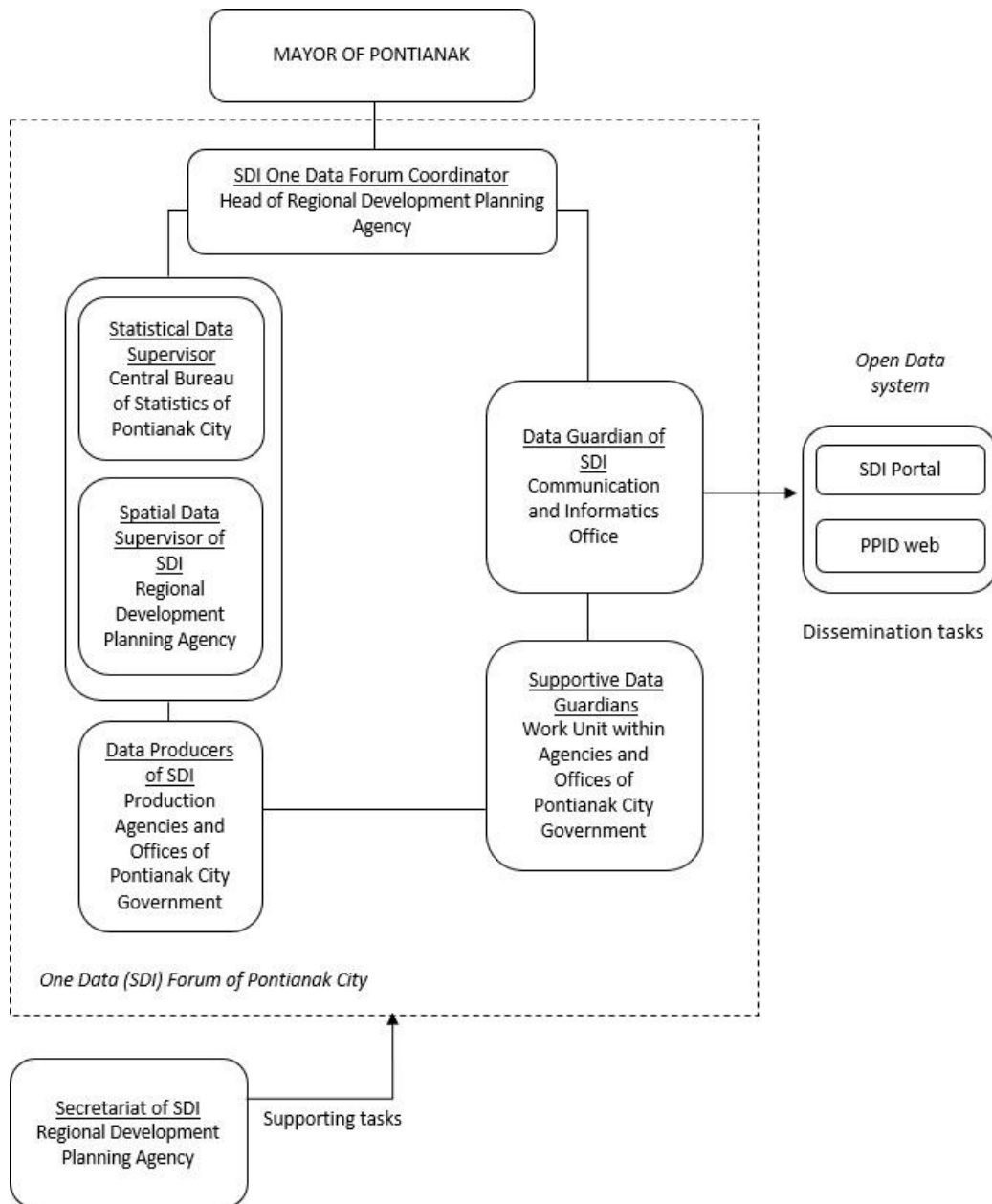


Figure 1. Organizational Structure of Existing SDI System (Author’s analysis, 2023)

The operationalization of SDI of Pontianak City government is carried out by:

- a. One data forum coordinator;
- b. Data supervisors;
- c. Data guardian;
- d. Supportive data guardians;
- e. Data producers;
- f. Secretariat of SDI

Two agencies act as data supervisor, those are Central Bureau of Statistics (BPS) of Pontianak City which supervise the statistical data, and the Regional Development Planning Agency of Pontianak City which

supervise spatial data. The data supervisors' tasks are providing recommendations in the data collection planning process and guiding the implementation of one data policy.

The data guardian task is done by the Communication and Informatics Office of Pontianak City. The tasks are:

- a. Coordinate the preparation of the proposed data list;
- b. Check the suitability and the completeness of the collected data;
- c. Disseminate the data on the One Data Indonesia Portal and the Pontianak City One Data Portal;
- d. Assist the data supervisors in fostering data producers.

Data guardian is assisted by supportive data guardians which are work units in agencies or offices under the Pontianak City government.

In the SDI system, data is produced by Data Producers which are each unit in agencies or offices under the Pontianak City government. They produce data according to the data list and according to the Mayor's assignment. The data producers can advise the data supervisors regarding data standards, metadata, and data interoperability. Data producers in producing data must comply with the principle of one Indonesian data and submit the data and its metadata to the supportive data guardians.

In supporting the operationalization of SDI, a forum was formed namely the Pontianak City One Data Forum, in which the participants were data supervisors, data guardian, and supportive data guardians. This forum is chaired by the head of the regional development planning agency. This is a forum for communication and coordination in the implementation of one data policy in Pontianak City.

The Forum is supported by a Secretariat which provides operational and administrative technical support and services to the Forum. It also carries out other tasks given by the forum coordinator. This secretariat is performed by a unit within the regional development planning agency and its duties are related to data management. Meanwhile, the JIGD that will be established at least should have the organizational structure as shown below:

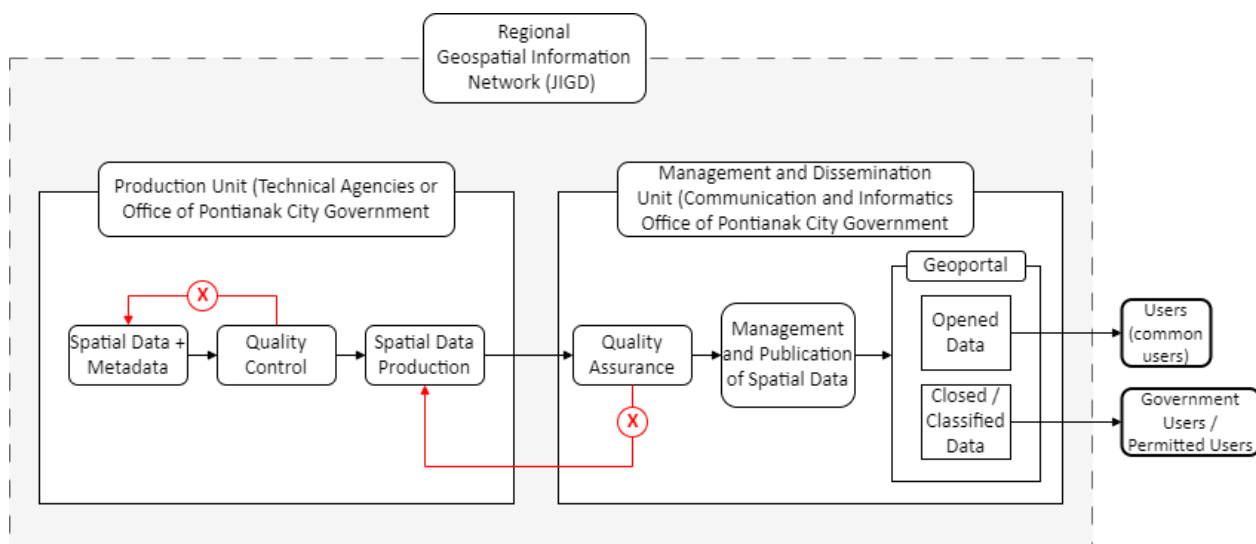


Figure 2. Organizational Structure that Should be Available to Build JIGD (Development Guideline of Geospatial Information Network, BIG RI, 2013)

This structure was suggested by the BIG to support the national geospatial information network (JIGN). The general structure presented above plays an essential role in running JIGD. However, this structure can be modified as long as it does not diminish the main structure.

There are two main units in operating JIGD, those are the production unit and the management and dissemination unit. A production unit is an agency or office or work unit that carries out the activities of collecting, processing, storing, and utilizing spatial data and information. Meanwhile, the management and dissemination unit is an agency or office, or work unit that is appointed to manage, exchange and disseminate spatial data and information.

If this structure is implemented in the Pontianak City government, then the production unit is all of the agencies and offices under the Pontianak City authority. While the management and dissemination unit will be played by Communication and Informatics Office.

Based on the structures above, either SDI or JIGD, we can argue which is more feasible whether to integrate the structure into one or build each of it separately. The two structures have similarities in three elements. First, the production unit in JIGD and data producers in SDI, both perform the main similar task namely to generate data (general data and spatial data). Also, those consist of agencies and offices under the Pontianak City government. Second, the role of either the management and dissemination unit of JIGD or the data guardian of the SDI, is handled by the Communication and Informatics Office. It is indeed the original task of the office to handle and manage data at the city level. Third, those two systems use a portal (common portal and geoportal) as a technology to disseminate the data that they have collected.

The three similarities then strengthen the argument that it is more feasible and more efficient if the two systems are integrated into one system. The agencies and offices that are involved in the system just need to perform the same task but with different type of data. Although, it still has to consider the various difficulties accompanying the making process of spatial data.

b. Technology to Supports System

The technology used in SDI is information and communication based-technology. The form of it can be hardware, software, and facilities. The technology is harnessed to run systems, applications, data communications, data processing and storage, integration/connection devices, and other electronic devices. The use of the technology must guarantee that the management of data and information runs in an integrated manner so that a sharing platform can be made available between agencies and offices under local government authority. Among the technologies used by the SDI of the Pontianak City government are as follows.

i. Electronic Data Center

The Data Center is a facility for placing electronic systems and other related components in storing, processing data and recovering electronic data owned by the Pontianak city government. It acts as a central office for the organization of collecting, managing, and sharing all of the city's electronic data. The Data Center itself must comply with established standards and comply with statutory provisions. Specifically, it serves:

- 1) Provide an electronic place such as a server to keep safe the electronic data owned by the Pontianak City Government.
- 2) Provide backup data and information stored inside it.
- 3) As a caretaker of confidentiality and security of data stored in it.

ii. Intra Network

Intra Network is a closed interconnection (using optical fiber) that connects all electronic systems owned by offices under the Pontianak City government to the Electronic Data Center. Each office in the Pontianak city government is required to use this intra-network to maintain security in sending data and information. The implementation of intra-networks by local government can use physical networks that are built by the local government or are built by private providers. It is the Communication and Informatics Office that manages and controls the security of the intra-network of the Pontianak City government. In its implementation, Pontianak City has not yet built 100 percent of the intra-network due to the investment costs which are quite expensive.

iii. Interoperability Service System

The interoperability service is an integration of electronic systems built by various agencies under the Pontianak city authority which are connected to each other so that can conduct exchanging data seamlessly. The interoperability service has to be used by all the agencies of Pontianak city government by following provisions such as creating connectivity and access between application and system to the Data Centers. Also, to ensure that the system or application meets interoperability standards.

iv. Supporting Devices

Other devices to support the SDI are:

- a. Infrastructure of Wide Area Network (WAN) and its routers
- b. Fiber optic network
- c. Local Area Network (cable, switch and WIFI)
- d. End user devices (laptops, desktops, gadgets, and printers)

On the other hand, the technology of JIGD is used to create a mechanism for coordination, governing geospatial data and information through the provision of access and sharing of geospatial data and information. Similar to the SDI, JIGD needs massive information and communication-based technology.

JIGD builds interconnectivity between providers and users to facilitate data exchange over the Internet network. JIGD should also maintain the access system. The tasks at least are supported by a set of technologies consisting of computers, networks, data catcher equipment, GPS, data servers, spatial data processing software, and geoportals. The technology must meet a high standard and reliable enough to serve a very intense flow of usage.

The key feature of the existence of JIGD is the operation of the Geoportal. There should be at least four types of services through geoportal namely:

- a. catalog services (to serve the searching process and publication of the data),
- b. mapping services (to serve images and maps exchange as well as their features),
- c. visualization service (to serve the need to display spatial data in a web form)
- d. data processing services (to serve the analysis of spatial data in web form without using certain computer software).

Based on the description of technologies used by the two systems, we can see there are some similarities and some differences. The similarities are in the use of technologies to store the data and disseminate it, such as servers, data centers, networks, and some end-user devices. While the difference can be seen in technology to capture the spatial data, software to process and analyze the data, and the Geoportal.

It seems that the similarity aspects of technology take the main part of the whole processing to run the two systems. Most of it already exists in the SDI system. While the technology that is specifically used for managing spatial data can be an additional technology (hardware and software) for the existing SDI system. Most importantly, the spatial-based technology is compatible with other technology as long as the other technology is a computer-based system. Thus, from the technology point of view, it is more feasible to integrate JIGD into the SDI system as long as there will be additional technology to the existing system to support the management of spatial data.

c. Human Resources

In the SDI system, personnel who run the whole system are generally divided into two. Some are placed in Communication and Informatics Office to manage the data center. While many others act as nodes of the network and they spread all over 32 offices and agencies under the Pontianak City government. The workflow follows the diagram shown in Figure 1. Most of the human resources inside the SDI system are computer operators who have computer and network skills and have university degrees. Their ability to understand the work of computer and internet networks and data management are essential to manage the SDI system. Each of them who works as a node in each office collects obligatory data and send it to the system SDI

regularly. They also serve the need for data of managers of their offices. Data analysis task is taken by personnel in structural position.

In JIGD, the skills needed for human resources are more specific. Human resources who manage spatial data and information must have certain technical knowledge. In JIGD, technical knowledge is at least needed in the fields:

- Spatial data providers/producers. They may work in mapping units or tasks related to spatial data.
- Spatial data analyst. Besides utilizing data, they can also generate new information from the data they have used. Among them are people who work in policy analysis, policy-making processes, control, and evaluation projects.
- End Users. Those whose spatial information gathered is used to make decisions or carry out specific work. They can be politicians, public officials, technocrats, volunteers, NGOs, etc.

In the development and implementation of JIGD, human resources involved will need general knowledge about JIGD development planning; legal and organizational aspects of JIGD implementation; and technical aspects of JIGD development.

Regarding the technical aspects of the development and management of JIGD, human resources involved should be equipped with knowledge that cover:

1. Basic knowledge of spatial data. Among them are geodetic control nets, reference systems, and survey and mapping processes.
2. Basic knowledge of spatial data system management, such as database systems, geographic information systems, and digital cartography.
3. Basic knowledge of spatial data infrastructure. It covers geospatial infrastructure concepts and principles, metadata, clearing houses, interoperability, spatial data standards, main data, and data integration.
4. Basic Knowledge of Network and Information Technology. It may consist of computer science and programming, networking, and the internet.

The fact that implementation of JIGD needs a sustainable and gradual time, so the human resources who work specifically in JIGD need a consistent and clear career path as well as personnel with relevant competencies. This type of job is more suitable to be filled by functional positions by government employees. If it is filled by general government employees, they can be in a short time moved, promoted, and rotated frequently. So, it will be an obstacle in the development of JIGD. Functional positions that can play a role in the development and operation of JIGD are surveyor and mapper, planner, researcher, computer operator, etc.

However, if it is difficult to be fulfilled, the capacity of available human resources can be increased through formal and informal education. In this case, the Pontianak city government should facilitate the education and training of human resources in JIGD.

The explanation about human resources who work for the two systems shows considerable differences. JIGD need more specific skill and knowledge rather than the SDI system. It seems that a separation system is morefeasible rather than unite the two systems since those two systems may employ different people.

However, in fact, that not all 32 agencies of the Pontianak City government need employees with high spatial skills. Only several technical offices need that skill such as Public Works and Spatial Planning Office, Public Housing and Residential Office, Regional Disaster Management Agency, and Food, Agriculture, and Fisheries Office. Other offices are sufficient enough with human resources who have beginner and intermediate spatial skill and knowledge. This knowledge can come from training of Geospatial Information System (GIS). If we consider this requisite, the integration of JIGD into SDI is more feasible and efficient. Rather than employing different persons who have high spatial skill for the whole agencies, the SDI system can optimize the existing operator of SDI to handle spatial-related works. However, they can only handle the task if their skill and knowledge have been upgraded through GIS training.

3.3. Minimum types of Spatial Data and Information to be Produced in JIGD

A list of minimums of spatial data to produce and its producers within the JIGD system is important to guarantee the existence of JIGD. This list portrays the scale of the work of JIGD. The list of spatial data is shown in the table below:

Table 1. List of minimum spatial data and information to be produced and the producers in the JIGD system (Author's analysis, 2023)

No	Production Unit / Agencies / Offices	Types of Spatial Data and/or Spatial Information
1	Education and Culture Office	<ol style="list-style-type: none"> 1. Map of distribution of elementary schools and junior high schools 2. Map of distribution of kindergarten schools 3. Map of the cultural heritage/buildings of historical value 4. Map of the cultural facilities (studios, etc.) 5. Map of informal education facilities 6. Map of Quran Education Schools 7. Map of the adequacy of elementary and junior high schools 8. Map of disabled schools and autism center 9. Map of pesantren (Islamic boarding schools)
2	Public Health Office	<ol style="list-style-type: none"> 1. Map of distribution of health facilities 2. Map of neighborhood health post for children (Posyandu) 3. Map of distribution of doctors' practice 4. Map of distribution of midwife practice 5. Map of pharmacy locations 6. Map of medical laboratory locations 7. Map of traditional health practices 8. Map of malnutrition occurrence is found 9. Map of Health facility adequacy analysis 10. Map of the spread of infectious diseases
3	Public Works and Spatial Planning Office	<ol style="list-style-type: none"> 1. Map of Road network and bridge 2. Map of canal/drainage network 3. Map of River 4. Map of the distribution of green open space 5. Map of the distribution of offices and public facilities of the Pontianak city government 6. Geological map 7. Soil-type map 8. Land cover map 9. Land use map 10. Map of spatial patterns plan 11. Map of the spatial structure plan 12. Public open space map 13. Map of distribution of senior and higher education facilities 14. Map of the distribution of government offices outside the Pontianak City Government 15. Map of the distribution of public facilities outside the Pontianak City Government 16. Map of the drinking water network 17. Map of drinking water installation building locations 18. Map of wastewater network 19. Map of the location of the wastewater installation building 20. Map of tree distribution 21. Map of infrastructure work/project locations per year 22. Map of graveyards 23. Map of flood prevention installation facilities

No	Production Unit / Agencies / Offices	Types of Spatial Data and/or Spatial Information
4	Public Housing and Residential Office	24. Map of analysis of road connectivity 25. Map of analysis of canal/drainage connectivity 26. Maps of analysis of spatial utilization according to spatial planning 1. Map of alleyways 2. Map of micro drainage 3. Map of slums area 4. Map of housing and settlements 5. Map of formal housing 6. Map of improperly habitable house locations 7. Map of the location of annual alley construction projects 8. Map of the location of annual micro drainage construction projects 9. Map of flats built by the Government 10. Map of social facilities and public facilities in the housing complex 11. Map of alleyway development needs analysis 12. Map of micro drainage construction needs analysis 13. Map of housing needs analysis
5	Civil Service Police Unit	1. Map of firefighters' unit locations 2. Map of annual fire incident locations 3. Map of land fire occurrence areas 4. Map of the distribution of public hydrant points 5. Map of street vendors area 6. Map of the distribution of regional regulation violation areas per village 7. Map analysis of fire-prone areas 8. Map of analysis of the range of fire fighting services
6	Regional Disaster Management Agency	1. Map of the distribution of disaster-prone locations per type of disaster 2. Map of disaster events 3. Map of evacuation center locations and evacuation routes 4. Map of disaster-resilient Villages 5. Map of disaster infrastructure points 6. Map of disaster pattern analysis per type of disaster
7	Social Services Office	1. Map of poor households per village 2. Map of the distribution of orphanages 3. Map of distribution of nursing homes 4. Map of other social problem management facilities (drug rehab homes, halfway houses, PLAT, etc.) 5. Map of the cemetery of patriot
8	Labor Office	1. Map of the location of the registered companies 2. Map of the location of Job Training Institutions
9	Population Control, Family Planning, Women's Empowerment, and Child Protection Office	1. Map of the Family Planning Village 2. Map of children's play facilities 3. Map of stunting findings
10	Food, Agriculture and Fisheries Office	1. Map of agricultural/plantation areas 2. Map of production location and fishery processing 3. Map of the location and development of agro-tourism 4. Map of fishing port locations 5. Map of fish auction locations 6. Map of areas of food security and vulnerability 7. Map of the location of warehouse infrastructure and other supporting facilities for storing food reserves 8. Map of slaughterhouse locations 9. Map of Livestock business 10. Map of Pet shop 11. Map of marine protected areas

No	Production Unit / Agencies / Offices	Types of Spatial Data and/or Spatial Information
11	Environmental Services Office	12. Map of ornamental plant sales locations 13. Map of the location of farmer groups 1. Distribution map of landfill and temporary waste disposal sites 2. Map of Garden distribution 3. Map of the area of the biodiversity park 4. Map of hazardous waste collection business locations 5. Map of Garbage Bank 6. Map of the area/road that was swept 7. Map of environmental laboratory locations
12	Civil Registration Office	Map of the main population profile per kelurahan
13	Transportation Office	1. Map of Terminal 2. Map of Bus stop 3. Map of the ports and ship docks 4. Map of the distribution of CCTV traffic control points 5. Map of the distribution of traffic lights 6. Map of bike paths 7. Map of distribution of street lighting 8. Map of the location of other means of transportation 9. Map of locations prone to congestion 10. Map of locations prone to traffic violations 11. Map of parking locations
14	Communication and Informatics Office	1. Map of public information services 2. Map of distribution of CCTV points in public areas 3. Map of the intra-government network
15	Cooperatives, Micro Enterprises, and Trade Office	1. Map of cooperative locations 2. Map of distribution of industries 3. Map of markets 4. Map of trading areas 5. Map of the location of the assisted micro enterprises 6. Map of modern stores 7. Maps of warehousing 8. Map of public gas station 9. Map of gas base locations
16	One Stop Investment and Services Office	1. Map of foreign investment locations 2. Map of domestic investment locations 3. Map of potential and business opportunities area 4. Map of tower distribution
17	Youth, Sports and Tourism Office	1. Map of the distribution of tourism destinations and the number of annual visits 2. Map of the distribution of sports facilities 3. Map of hotel distribution and occupancy rates 4. Map of the distribution of restaurants 5. Map of the distribution of cafes and coffee shops 6. Maps of the distribution of tourism groups
18	Library and Archive Service Office	1. Maps of Libraries distribution 2. Map of the location of the mobile library 3. Map of the location of reading houses and reading gardens
19	Secretariat of Regional Government Office	1. Administrative maps City, District, sub-districts, villages, RW, and RT 2. Toponymy map 3. Map of the Regional Government-Owned Companies 4. Map of distribution of financial institutions 5. Map of worship facilities 6. Map of the distribution of the majelis ta'lim (Muslim assembly to recite and study the Quran)

No	Production Unit / Agencies / Offices	Types of Spatial Data and/or Spatial Information
20	Secretariat of Regional People's Representative Assembly (DPRD)	<ol style="list-style-type: none"> 1. Map of the distribution of votes for members of the Regional People's Representative Assembly (DPRD) per electoral area 2. Map of the working visit of members of Regional People's Representative Assembly (DPRD)
21	Regional Development Planning Agency	<ol style="list-style-type: none"> 1. Map of regional development planning 2. Map of development analysis
22	Regional Finance Agency	<ol style="list-style-type: none"> 1. Map of distribution of assets belonging to Pontianak City Government 2. Map of distribution of tax objects 3. Points of billboards, billboards
23	Sub District Office (6 of Sub District area of Pontianak City)	<ol style="list-style-type: none"> 1. Map of the distribution of neighborhood security post 2. Map of the distribution of swiftlet nest buildings 3. Map of sub-district level sports fields 4. Map of the location of community meeting facilities 5. Map of the number of poor people per neighborhood (RT)
24	National Unity and Politic Office	<ol style="list-style-type: none"> 1. Map of the distribution of offices/secretariats of political parties at the municipal level 2. Map of the distribution of offices / secretariats of registered mass organizations

Based on the description of the scale of the work of the JIGD above, also based on the workflow and structure of SDI (figure 1) and workflow and structure of JIGD (figure 2), it can be seen that the scope of the existing SDI system is bigger and can cover the scope of JIGD. Thus, from this point of view, it is feasible to unite the JIGD into the SDI system.

4. CONCLUSION

Based on the analysis of this study, it is concluded that the integration of the one map policy within the one data policy through uniting the JIGD system into the SDI system is highly feasible and can address inefficiency issues. The feasibility is reviewed from 4 aspects which are 1) the organizational structure of the data management system; 2) the technology to support the system; 3) human resources; and 4) the scale of the JIGD when implemented which is shown by the minimum spatial data to produce and its producers.

The organizational structures of existing SDI and JIGD can be integrated due to their common features and characteristics which are similar. The production unit in JIGD and data producers in SDI perform the same main task which is to generate data (general data and spatial data). The unit involved is the same which are agencies and offices under the Pontianak City government. Another similarity is in the role of either the management and dissemination unit of JIGD or the data guardian of SDI. It can be performed by the Communication and Informatics Office since it is the office's main task to handle and manage data at the city level. In addition, the two systems use a same kind application which is a portal (common portal and geoportal) as a technology to disseminate the data that they have collected. The similarities of structural organization propose integration.

The utilization of technology to support the two systems can be integrated since the need for technology shows some similarities with little differences. The similarities can be seen in the use of technologies to store data and disseminate it while the difference is in the need for specific technology related to capturing, processing, analyzing and visualizing spatial data and information. While most of the technology is already exists in the SDI system, the specific technology related to spatial data can be added later when JIGD integrated into SDI.

In terms of human resources, the integration of JIGD into SDI is more feasible and efficient by optimizing the existing operator of SDI to handle spatial-related works. However, there should be upgrading training for the SDI's operators to handle spatial data and information.

The scale of the work of the JIGD and the workflow and structure of JIGD showed that the scope of the existing SDI system can accommodate the scope of JIGD and thus it is more efficient to unite the JIGD into the SDI system.

Based on the four aspects used for assessed the possibility of uniting the JIGD system within the SDI system, it is concluded that the integration is possible even can address inefficiency issues but with modification of the organizational structure of the existing SDI system.

Recommendation

This study recommends establishing the JIGD as a sub-system of the SDI system rather than building it as a standalone system. Based on the analysis of organizational structure, supporting technology, human resources, and the scope of the JIGD, the integration is considered to establish the data management of the Pontianak City government to be more feasible and may address the issue of inefficiency. To realize the integration, several features as the result of this study are recommended to be applied. Those are:

1. The SDI Coordinator serves automatically as Coordinator of the JIGD as well.
2. The supervisor of statistical data does not need to be included in the JIGD structure even though the position is included in SDI.
3. The data producers in the SDI system act as the production units in the JIGD. The difference is in the type of data produced, whereas the JIGD system only deals with spatial data and information.
4. The data guardian of SDI does the role of management and dissemination unit in the JIGD. The supportive data guardians still do their task of assisting the data guardian.
5. Geoportal is part of open data where the inside of the open data system still consists of the SDI portal, and PPID web with the addition of geoportal.

The concept of the mechanism of the work of the JIGD and the SDI thoroughly can be seen in the organizational structure as shown in the diagram in Figure 3 below.

The box with the dotted line represents the SDI system and its mechanism within the scope of the one data forum. It is coordinated by a forum coordinator who is the Head of the Regional Development Planning Agency. The process in this mechanism is like a continuous loop, where there are data producers who generate data, and the data is forwarded to the supportive data guardians and the data guardian to be verified. Verified data is uploaded to the portal. The data supervisors in this mechanism guides data collection, processing, and utilization.

The dotted line covers the grey area is the JIGD system. Data producers of SDI act as spatial data production units of JIGD. Data guardian of SDI act as the management and dissemination unit of JIGD. Here, the verified spatial data is uploaded to the geoportal which is part of an open data system which is formed together by geoportal, SDI portal, and PPID web.

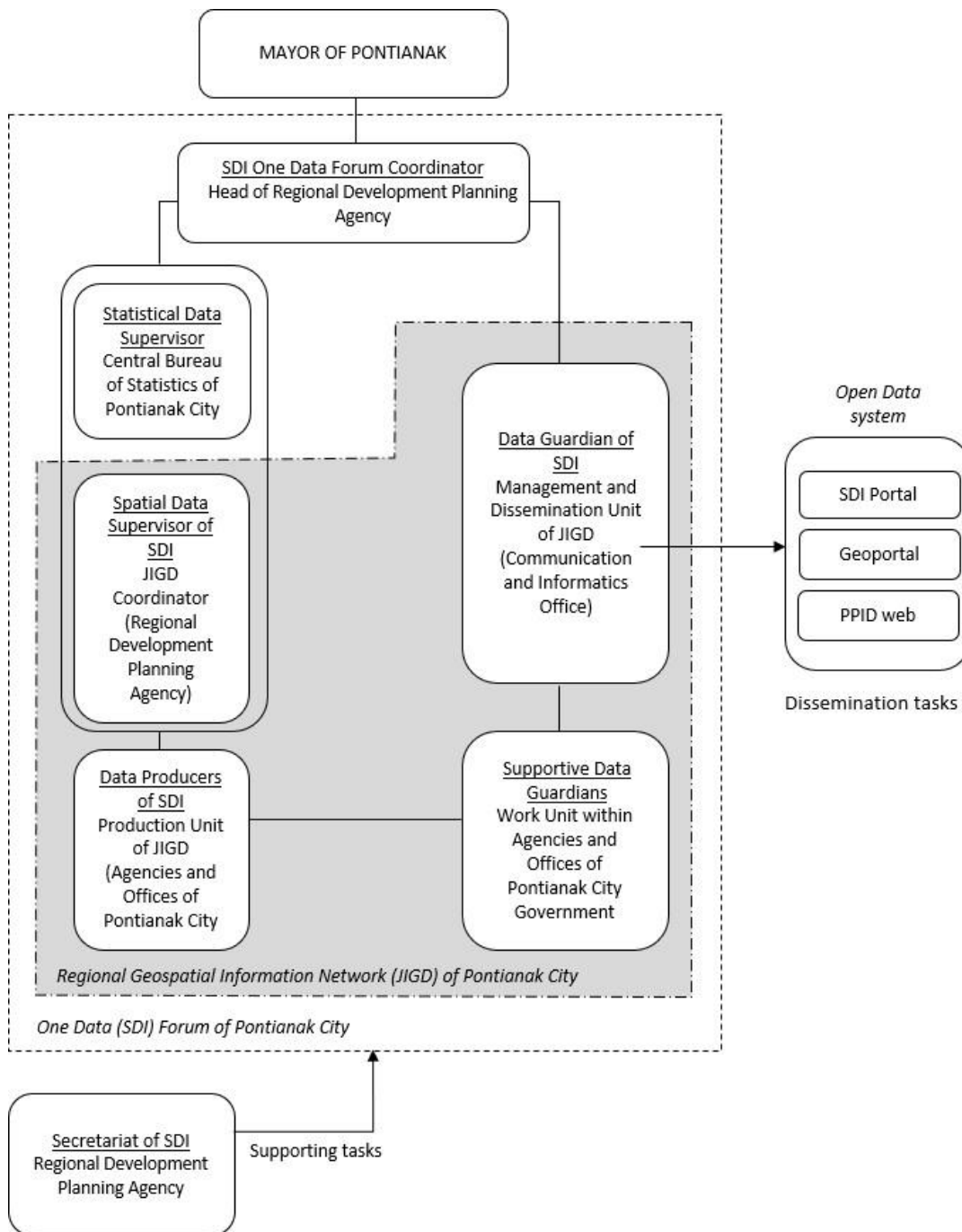


Figure 3. Organizational Structure of JIGD as a Sub System Inside SDI (Author’s analysis, 2023)

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