A Comparative Analysis of Institutional Perspective in Managing Smart City Initiatives

Fidan Safira[1], Daniar Syarafina[2], Hanna Bayu[3], Hamdi Hamdi[1], Nafiza Samditya Putra[4]*

Abstract: Smart city implementation encourages problem-solving by linking technology, resources, and institutional aspects. The institutional perspective covers the authority in developing smart city initiatives, including funding, collaboration, and decision-making. This research aims to identify institutional authority and map the level of institutional transformation in managing smart cities. It also identifies the procurement patterns of smart city initiatives used. An exploratory method was used with ten cities across the globe through interactive interviews with smart city managers. The results of this study show that the authority of smart city agencies lies mostly with technology and digitalization agencies. However, internal organizational restructuring is necessary to obtain broad smart city management authority and achieve higher organizational transformation. The procurement model of smart city initiatives shows public-private partnership (PPP), followed by conventional procurement and operational contracts. However, minimal funding of smart city initiatives from other sources was found. This research exploration shows the Public Services Agency (PSA) as a form of semi-autonomous agency that enables smart city management and has business schemes as another source of revenue.

Keywords: Institutional, Public Services Agency, Semi-Autonomous Agency, Smart City Financing, Urban Governance

Submitted: July 17, 2024/ Approved: October 24, 2024

Introduction

Building a livable city with good access and quality of public services is the main focus of the government. Addressing various city problems quickly, precise, and effective requires a smart strategy by engaging stakeholders. Nowadays, the concept of smart cities has become a strategy in urban development both in Indonesia and in the world. The Smart City concept prioritizes the implementation of digital technology to minimize the use of resources, improve people's quality of life, and increase regional economic competitiveness in a sustainable manner (Gassman, 2019). Smart cities governance emphasize three main components, which support the creation of a smart city that involves the community in the third generation (Caragliu, 2009). These components are: 1) Technology, which includes hardware and software infrastructure; 2) Human Resources, which are related to creativity, capacity, and competence; and 3) Institutionalization, which is related to governance and policy. There are other uses for the smart city concept besides technology. Nonetheless, the employment of digital infrastructure and technology emphasizes system availability and accessibility. Technology such as data analysis dashboards, monitoring and control rooms, integrated website services, mobile-based services, and virtual environments are some examples of how the smart city concept might be applied.

Institutional contexts can influence smart governance, allowing for deeper understanding and possibly predicting forms of collaboration. Institutions also have relevance in relation to autonomy, resource availability, socio-economic and political orientation of local governments (Taewo, 2021). Smart city institutions along with governance systems, could be managed in either a centralized or decentralized scope by the government. However, the role of the smart city institutional scope is diversified. Meijer and Bolivar (2016) explain that there are four conceptualizations in smart city governance in the institutional aspect: its role as a government of a smart city, smart decision-making, smart government administration, and smart urban collaboration. The lack of coordination within the public sector poses a major obstacle to the development of smart cities (UN-Habitat, 2023).

The research of Samouylov, et.al (2019) discusses the form of institutional support for the digitization of the urban environment in Russia. This is due to the application of the smart city concept that requires the development of a number of objectives that must be accomplished in the process of socio-economic development, while all stakeholders must be included in the design of smart cities. The results of this study show that the form of institutional support can be in the form of community involvement, open data support, research development and business opportunities, collaboration support, business, and governance. Similar research has been conducted by Tomor, et.al (2021) which discusses the institutional context in smart government management in three cities from three countries: Glasgow, Utrecht, and Curitiba. This research shows that institutional factors affect smart governance management. Furthermore, the results of research by Tomor, et.al (2021) show that the institutional mechanism is a multi-layered influence. This is because institutions coexist, interact, and are able to modify (strengthen

(1) Jakarta Smart City, Department of Communication, Information, and Statistics, Jakarta Provincial Government, Indonesia.
(2) Indonesia Stock Exchange, Indonesia
(3) Faculty of Engineering, Seoul National University, South Korea.
(4) Tandon School of Engineering, New York University, United States of America
*Corresponding author: fidan.safira@jsclab.id

or eliminate) each other's impact on smart governance. Meijer and Bolivar (2016) explain that at the end of the day smart city governance is a complex process of institutional change and recognizes the political nature of interesting socio-technical governance visions.

Institutional strengthening through flexibility and adaptability is necessary to collaborate and fund smart city initiatives. This can encourage the planning and development of a smart city innovation climate. In line with this, the United Nation Survey (2022) shows that 51% stated that the biggest challenge in smart cities is limited budget. The study also shows that 66% agree that the main budget comes from the city's revenue and expenditure budget. Then, 34% from the regional revenue and expenditure budget, and 45% from the state revenue and expenditure budget. Only 32% said they received funding from intergovernmental organizations. Another 14% of respondents said they received funding from the private sector(s). This challenge is certainly a consideration in smart city development initiatives and innovations in solving city problems by utilizing information technology. Institutions may have limitations in planning, developing, monitoring and evaluating smart cities.

Based on the problems that have been described, We contend that all cities should employ government financing sources while creating smart city projects. The institutional structure of the organization in charge of smart cities might be modified by the procurement model that is employed. This research aims to (RQ1) What aspect of institutional governance in smart city implementation? This institutional aspect also relates to organizational schemes, interaction patterns with the government, and smart city management mechanisms. This research also maps the level of smart city institutional transformation. (RQ2) How is the procurement and financing of smart city initiatives? Through an exploratory study of smart city entities in several cities, this research is expected to be a lesson learned for smart city implementation in the context of institutional governance and procurement schemes for smart city initiatives in cities. The comparative study is expected to clarify the authority of smart city entities based on their institutional models and underline the similarity of meaning in the term smart city initiative procurement.

Literature Review

Smart City Institutionalization

Institutions are bridging mechanisms that bridge three types of social gaps-institutions connect micro social interaction systems with meso (and macro) levels of organization, institutions connect symbolic systems with material, and institutions connect agent systems with structural (Mohr & White, 2008). A common ideology among many companies is institutional theory. At the center of the analysis are institutions, which are defined as the conglomeration of formal policies, rules, laws, and regulations (regulative); shared norms, habits, roles, and responsibilities (normative); and shared values, beliefs, meanings, and assumptions (cultural-cognitive) (Guenduez, et al., 2024). Dillard et al. (2004) emphasize the institutionalization of a formal organizational structure is influenced by the interorganizational context (organization field) in which organizations are institutionally embedded. The model suggests that the process of institutionalization of a new accounting system encompasses three levels of institutionalization (Harun et al., 2016): (1) economic and political level, (2) organizational field and (3) organizational level.

Furthermore, Meijer and Bolivar (2016) research explains that there are four conceptualizations in smart city governance in the transformation of institutional aspects: smart governance, smart decision-making, smart administration, and smart urban collaboration. Furthermore, these four aspects constitute an institutional conceptual stage from the lowest level to the more complex:

1. Smart governance indicates that the city has the right smart city policies in place and implements them in an effective and efficient manner. This perspective suggests no need for transformation of governmental structures and processes. Furthermore, smart governance is about the promotion of smart city initiatives.
2. Smart decision-making suggests less transformation as it is not about restructuring government organizations or institutions but emphasizes the need for restructuring decision-making regarding whether or not programs are implemented. Smart city decision-making can be innovative by using network technologies. New technologies are used to strengthen government rationality by using more complete and more readily available and accessible information for the government's mental decision-making process and the implementation of these decisions.
3. Smart administration suggests that smart cities are a new form of e-government that uses advanced information technology to connect and integrate information, processes, institutions, and physical infrastructure to deliver better services to citizens and the public. This kind of smart governance is at a higher level of transformation because it requires restructuring the internal organization of government: governments must be innovative to address different policy needs.
4. Smart urban collaboration between different actors in the city. This concept is at the highest level of transformation as it is not only about transforming internal organizations but also external organizations. This model is proactive and open-minded, with all actors involved, to maximize government performance.

Based on this explanation, the level and focus on each concept can be seen in the following table:

Table 1. Smart City Transformation Level

Perspective	Transformation Level	Focus
Smart Governance	Low	Policy and implementation
Smart Decision-making	Medium-low	Innovative decision-making processes
Smart Administration	Medium-high	Innovative organization and administration
Smart Urban Collaboration	High	Innovative government networks

Sources: Meijer and Bolivar (2016)

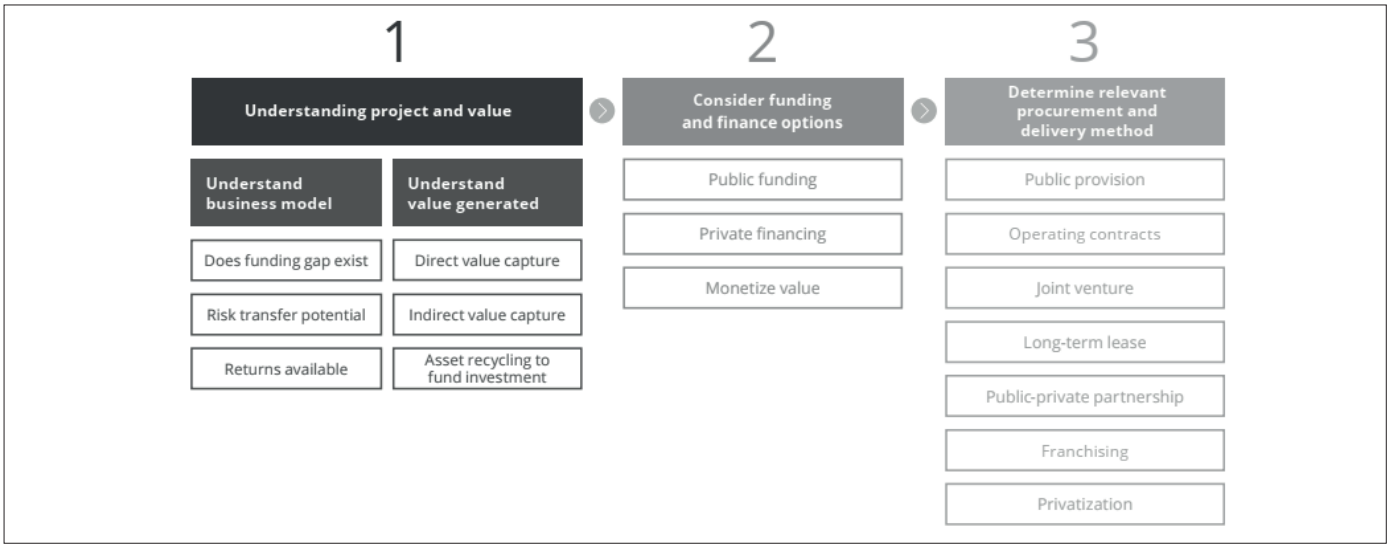
Procurement of Smart City Initiatives

In realizing smart cities, the government needs financing and funding that supports the development of technology infrastructure. This is because, generally, governments have limited budgets. According to Skowron and Flynn (2018), in funding, the government provides a certain amount of money for a specific purpose, for example providing money for a project, usually free or zero interest, without expecting repayment. While in financing, an entity-usually one or more financial institutions, provides a certain amount of capital-debt or equity for a project with the expectation that it will be paid back with interest. Therefore, smart city organizations need to identify business models that can help attract private financing and a viable introduction to financing. There are several factors that make smart city financing difficult such as (Hamilton, 2017):

1. Technology Risk: This risk exists mainly in the first project in technology development (pioneer). This is because stakeholders yet to have a benchmark in the implementation of the technology. Therefore, the risk of technology failure is very high;
2. Decreased Investor Confidence: investor confidence decreases when questioning the usefulness of technology without a proven concept. Therefore, investor confidence needs to be built with a mature concept from the smart city organization;
3. Difficulty monetizing technology projects: Monetization of technology projects requires a very mature concept. This is because generally a project may offer clear positive socio-economic impacts, but there may be no way to assign a value to the benefits, including the potential to generate revenue.
4. Projects that do not have a clear path to fixed revenue: This is caused by the uncertainty of the return on investment (ROI); and/or the unconventional nature of smart city projects based on interconnectivity (from the internet, Wi-Fi, fiber optic cables, etc.).

This condition is also justified by the Smart Cities Council, (2014) in which wisely funding technology investments is critical to the realization of smarter cities. Certainly some technology investments are a one-time event, but most are operationalized in the context of projects. These projects are often complex undertakings, involving longtime horizons, multiple stakeholders and risk. Investing in and financing the development of smart infrastructure through smart city initiatives is essential to advancing equitable social, economic, and environmental circumstances. Moreover, Hedeegard, et al (2024) ensuring intelligent services and solutions, advancing sustainable development objectives, and enhancing urban living quality all depend significantly on cities' financial capacity in conjunction with cutting-edge technical frameworks. Significant capital growth may result from these investments, supporting both environmental and economic sustainability. Thus, it is necessary to identify the procurement model of smart city initiatives in smart city entities.

Figure 1. Model for Delivery of a Successful Project

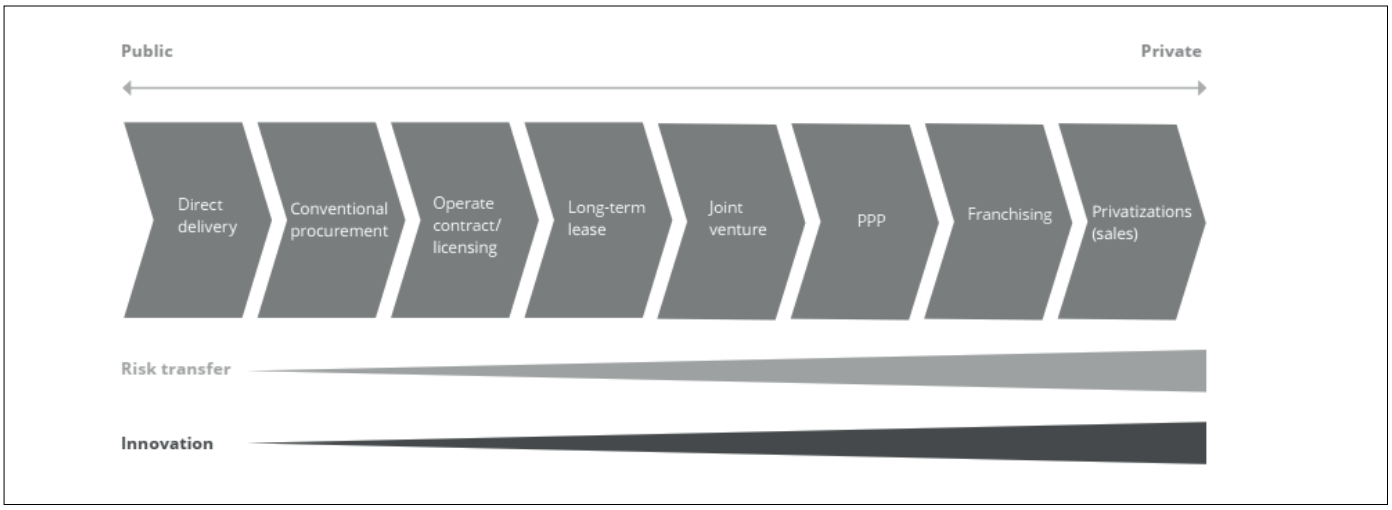


Source: Skowron and Flynn, (2018)

The development of smart city infrastructure needs to be followed with the development of a comprehensive strategic plan and project plan including a mature business model then smart city organizations can consider creative approaches to funding and financing sources (finding new sources of revenue for projects and new business models); as well as innovative financing structures for investors. According to Blanck and Ribeiro (2021), the official funding sources for smart city projects can be divided into three categories: (i) public financing, which is given by regional, national, or international governments through funds allocated to particular public policy initiatives, structural funds, or financial instruments like investment banks; (ii) private financing, which is backed by own funds, external debt, or outside investment; and (iii) PPP financing, which is characterized as partnerships between private and public entities that share costs, benefits, and risks.

Furthermore, Skowron and Flynn (2018) provides a clearer picture of the funding scheme for smart city initiatives:

Figure 2. Smart City Initiative Procurement Model



Source: Skowron, (2018)

From the public source, Direct Delivery: The public sector provides goods or services directly to customers by utilizing public sector staff/ assets. Then, Conventional Procurement: The public sector determines their need for goods and/or services, procuring them through traditional procurement and contracting methods. One example is the procurement of CCTV operated by a third party. Moreover, Operate Contract/Licensing: Public sector contracts with vendors or individuals to provide goods and services. These contracts can include activities ranging from technical assistance to full responsibility for the operation and management of public infrastructure assets, for example, Jakarta developed the Jakarta Super Apps (JAKI) & Public Complaint Management Apps (CRM) using individual experts. Next, there Long-term Lease: Leasing property or equipment provides flexibility and reduces upfront costs.

Joint Venture: In this Private Sector Participation model, the public sector joins forces with the private sector to jointly deliver a service/ asset in an effort to leverage the best of each party. In many cases, this structure is utilized by the public sector to involve itself in the project without providing funding, but it can make assets available for use by the Joint Venture. As Vietnam did, some Japanese companies formed a joint venture consortium to develop smart cities, e.g. Sumitomo Corporation with Vietnamese developer BRG Group, Sumitomo Corporation consortium with NTT Communications Corporation, NEC Corporation, and 3 other companies.

Moreover, Public Private Partnership (PPP) is an agreement between the government and a private entity to provide infrastructure services and is a means of securing additional funding for infrastructure investment. This model is widely recommended in smart city procurement (Quan and Solheim, 2023; Hadeegard, et al., 2024). Franchising: An agreement to operate government-owned assets on a commercial basis to generate returns (e.g., rail operator contracts where government supplies the rail infrastructure). Franchising means acquiring a right from the business franchisor to market the same product or services of the owner, including its trademark, logo, name, and the business model and systems for a fixed price. The last, Privatization: This is where the private sector is fully responsible for the design, delivery, and operation of projects that provide (or previously provided) a public service. The public sector has no direct control over these entities except for legislation and regulation. In certain cases, these project services may have been provided by the government, and the private sector may acquire the project/asset for consideration. One example is Chicago leasing its parking meters to a private concessionaire for a period of 75 years (SSC, 2014).

Methodology

This research uses an exploratory qualitative approach. Exploratory research seeks to discover something new and interesting by working through a research topic. Exploratory studies tend to fall into two

categories: making a tentative analysis of a new topic and proposing new ideas or generating new hypotheses on old topics (Swedberg, 2020). The exploratory case study demonstrates several phenomena that are explained by the limitations of the research findings, particularly the hypotheses that are presented and can be tested, and/or by the research environment that supports the methodological choices. This research seeks to generate new hypotheses regarding the implementation of institutional aspects in implementing the smart city concept in Indonesia through learning from other regions. This method was chosen because it is considered capable of identifying, mapping, and finding ideal smart city implementation and management patterns with the limitations of previous research.

The cities were selected through purposive sampling and desk review. The research team sent requests to some cities from various countries, with 10 cities and 12 institutions willing to serve as references for smart city implementation. The sample illustrates two areas: first, the representation of smart cities/provinces in Indonesia that are included in the 100 smart cities: Surabaya, West Java, and Makassar. Second, the representation of other countries that are included in the 60 Cities in Smart City Index, Jakarta, Seoul, Zurich, Taipei, Kuala Lumpur, Hong Kong, and Taiwan. The interview schedule for data collection can be seen in table 2.

Table 2. Data Collection Interview Schedule

No	Region	Institution/Informant	Time	Description
1.	Jakarta, Indonesia	Jakarta Smart City, Department of Communication, Informatics and Statistics	Thursday, 4 May 2023 10.00 WIB	Jakarta Smart City Office
2.	West Java, Indonesia	Jabar Digital Services, Department of Communication and Informatics	Tuesday, 9 May 2023 10.00 WIB	Zoom Meeting
		Regional Development Planning Agency		
3.	Surabaya, Indonesia	Department of Communication and Informatics Kota Surabaya	Thursday, 4 May 2023 10.00 WIB	Zoom Meeting
4.	Makassar, Indonesia	Department of Communication and Informatics Makassar City	Tuesday, 16 May 2023 10.00 WIB	Zoom Meeting
5.	Zurich, Swiss	Smart City Zurich	Thursday, 22 June 2023 14.00 WIB	Zoom Meeting
6.	Taiwan	Institute of the Information Industry	Friday, 30 June 2023 14.00 WIB	Zoom Meeting
		The Ministry of Digital Affair	Tuesday, 11 July 2023 14.00 WIB	Zoom Meeting
7.	Taipei, Taiwan	Department of Technology, Taipei City Government	Thursday, 13 July 2023 09.00 WIB	Zoom Meeting
8.	Seoul, South Korea	Digital Policy Bureau	Saturday, 15 July 2023	Written Response (Doc)
9.	Kuala Lumpur, Malaysia	The Malaysian Administrative Medernisation and Management Planning Unit	Friday, 21 July 2023	Written Response (Doc)
10.	Hong Kong, China	Government Chief Information Officer (OGCIO) Hong Kong	Tuesday, 22 August 2023	Written Response (Doc)

Source: Authors, (2023)

This research utilized primary data collection techniques derived from online interviews with stakeholders from the smart city entities. Interviews were conducted in a semi-structured manner with question points around people, processes, technology, and regulations in implementing the smart city concept. This research was conducted after informant approval by prioritizing the confidentiality of informant data and avoiding conflicts of interest between researchers and informants. Furthermore, secondary data was used to support and strengthen the analysis and findings.

Data analysis for this study used qualitative analysis with stages such as category collection, interpretation, pattern determination, and generalization analysis. Interview results were mapped based on the categories of institutions, resources, collaboration and funding, which were then interpreted with relevant context and theory. Furthermore, the data was mapped into three themes: institutional aspects, institutional level, and procurement of smart city initiatives. Finally, the data was presented and generalized for meaningful results and findings.

Results

Lessons Learned from Cities: An Interview with Smart City Entity

Looking further into the development of smart cities from the institutional model and procurement model of smart city initiatives, it is necessary to learn from various regions. This section describes the results of interviews with each region, covering smart city objectives and authorized institutional models.

Table 3. Goals of Smart City Implementation

City	Smart City Goals
Zurich	Technology development and rapid increase in demand, as well as the development of digital infrastructure needs.
West Java	Realizing digital inclusion, education, collaboration, dynamic government
Makassar	Digital transformation, revolutionizing the city's superior human resources, economic, social and cultural fields, and smart city space restoration.
Taipei	Create a reliable and sustainable city with the main scope of work of managing smart cooperation and innovation in the city.
Taiwan	To increase capability to industry digital for service providers and to enhance digital transformation.
Jakarta	Acceleration of Digital Transformation and Development of Smart City Ecosystem, with leading orientation indicator Electronic Based Government System Index
Seoul	Using digital technology to improve the quality of life of citizens and to make the city and citizens smarter,
Hong Kong	A smart city is to embrace innovation and technology (I&T) to build a world-famous Smart Hong Kong characterized by a strong economy and high quality of living.
Kuala Lumpur	The main goal is to address urban challenges to improve the quality of life, promote economic growth, develop a sustainable and safe environment and encourage urban management practices.
Taipei	The concept of a smart city aims to enhance the quality of life for residents while stimulating economic growth.
Surabaya	The development and management of cities to connect, monitor and control various existing resources to be more effective and efficient in maximizing services to citizens.

Source: Authors, (2023)

This objective relates to the institutional model authorized to run the smart city program. There are differences in the institutional model and its authority from each city that runs a smart city. The results of this study found four institutional models in managing smart cities: in the office of technology and digitalization, under the city leadership, and in the city's internal affairs office, and specific entities.

Table 4. Institutional Model and Authority

Institutional Model	City	Authority
City Leaders	Surabaya	Responsibility for **c**oordinating the planning, implementation and monitoring of smart city initiatives.
Office of technology and digitalisation	Makassar Seoul Hongkong Jawa Barat	Responsibility for formulating information technology (IT) strategies, programs and measures, not limited to smart city implementation.
Office of home affairs	Kuala Lumpur	Responsibility for **c**oordinating the planning, implementation and monitoring of smart city initiatives.
Specific Entity	Zurich Taipei Jakarta Taiwan	Responsibility to help create a reliable and sustainable city with the main scope of work managing cooperation and smart innovation in the city.

Source: Authors, (2023)

The model of a smart city management institution in the field of technology, information, and digitalization tends to be in charge of formulating IT strategies for the smart city program. However, this institutional model combines smart city entities with entities for other authorities. For example, Makassar City whose authority is under the field of Applications and Informatics, West Java with Jabar Digital Services, Seoul managed by Digital Policy Bureau, and Hong Kong with the Office of the Government Chief Information Officer (OGCIO). This condition makes the institution have more authority and overburdened human resources (interview with Makassar and West Java).

The model of smart city institutions under the city leadership tends to be coordinative. Smart City in Surabaya is under the responsibility of the Regional Secretary of Surabaya City based on the Decree of the Mayor of Surabaya No. 100.3.3.3/47/4361.1.2/2023 concerning the Smart City Implementation Team of Surabaya City, with the scope of duties such as: 1). Conducting data inventory related to the development of Smart City Surabaya City; 2). Developing Smart City Masterplan for Surabaya; 3). Carrying out coordination across Regional Government and stakeholders for the development of Smart City Surabaya; 4). Organizing a Forum Group Discussion (FGD) for the development of Smart City Surabaya City at least once per year; and 5). Documenting data and information related to the development of Smart City Surabaya City. In order to support this, Surabaya City also established a Smart City Council through Surabaya Mayor Decree No. 100.3.3.3/46/4361.1.2/2023 concerning the Smart City Council of Surabaya City, with the following scope of duties: 1). Formulating general policies and strategic guidelines for the development of Smart City Surabaya City to collaborate the resources of all stakeholders; 2). Giving consideration and determining strategic steps in determining the direction of Smart City development policy of Surabaya City; 3). Conducting cross-sectoral coordination and cooperation with the Central Government, Local Government and business actors for the development of Smart City Surabaya City; 4). Organizing Smart City Forum of Surabaya City at least once a year; and 5). Monitoring and evaluating the implementation of Smart City development of Surabaya City.

Model smart city institutions such as Kuala Lumpur, which is under home affairs, have a ladder from the state to the city. There are three institutions responsible for managing smart cities in Kuala Lumpur, Malaysia, the federal government, state government and local government combined with the participation of the private sector and industry players in the smart city ecosystem. Smart city development is led by The Ministry of Local Government Department Malaysia (MLGD), and the creation of smart city development action plans is done both internally and through one of the ministry's departments, The Federal Department of Town and Country Planning (PLANMalaysia), which also oversees smart city planning at the federal, state and local levels. To ensure comprehensive coordination in smart city implementation, The Ministry of Local Government Department Malaysia (MLGD) established two committees, the National Smart City Council, which is chaired by the Minister of Local Government.

This specific entity is an organization that is formed specifically in order to carry out the implementation of smart cities. Institutionally, this model is still under a larger entity, such as Zurich has a smart city unit that is responsible to Urban Development Zurich (UDZ), under the Department of Municipality, and responsible to the Mayor of Zurich. Then, Taipei has the Taipei Smart City Project Management Office (TPMO) which is under the Department of Information Technology of Taipei City Government. Furthermore, Taiwan Smart City is currently under The Ministry of Digital Affairs, a new ministry formed in August 2022. The Ministry of Digital Affairs moved the management of smart city development to The Ministry of Digital Affairs because it wanted to improve digital transformation and also raise the capability of becoming a service provider in Taiwan.

So is Jakarta with Jakarta Smart City (JSC) as a Management Unit under the Department of Communication, Informatics and Statistics Jakarta Province which was inaugurated on December 26, 2014. Its establishment stated in Governor Regulation No. 280 of 2014 concerning the Establishment, Organization and Work Procedures of the Jakarta Smart City Management Unit and in 2022 there was a change in regulations where the Department of Communication, Informatics and Statistics DKI Jakarta and JSC were under the same regulation in Governor Regulation No. 57 of 2022 concerning the Organization and Work Procedures of the Department of Communication, Informatics and Statistics Jakarta. Furthermore, in 2020, Jakarta Smart City made an institutional innovation by implementing the Regional Public Service Agency Financial Management Pattern with the vision of realizing an advanced Jakarta city and IT-based public services that solve various city and citizen problems effectively.

Level of Transformation in Institutional Perspective

Based on the lessons learned from the implementation of smart cities in various regions, the following mapping can be done:

Table 5. The Institutional Transformation of the Smart City Perspective

Perspective	Level of Transformation	City
Smart Governance	Low	Surabaya, Indonesia Makassar, Indonesia Zurich, Switzerland Taipei, Taiwan Seoul, South Korea Kuala Lumpur, Malaysia Hong Kong, China Jakarta, Indonesia West Java, Indonesia Taiwan
Smart Decision-Making	Medium-low	Surabaya, Indonesia Makassar, Indonesia Zurich, Switzerland Taipei, Taiwan Kuala Lumpur, Malaysia Hong Kong, China Jakarta, Indonesia West Java, Indonesia Taiwan
Smart Administration	Medium-high	Taipei City, Taiwan Zurich, Switzerland Jakarta, Indonesia Taiwan
Smart Collaboration	High	Taipei City, Taiwan Zurich, Switzerland Jakarta, Indonesia Taiwan

Source: Authors, (2023)

The four levels according to Meijer & Bolivar, (2016) are interrelated, where each level has a focus and the level can increase if the focus on each level is completed. The study of the results indicates that the smart governance perspective has the lowest level of transformation, in reference to the transformation levels of smart governance. From this vantage point, the city already has the appropriate smart city policies in place and effectively and efficiently puts them into practice. According to this viewpoint, cities can also consistently support smart city efforts and prioritize and concentrate policy on a number of topics. Surabaya, Makassar, Zurich, Switzerland, Taipei, Taiwan, Seoul, South Korea, Kuala Lumpur, Malaysia, Hong Kong, Jakarta, West Java, and Taiwan are among the cities listed in this level. This is in line with the objectives of each city in implementing smart cities in Table 3.

The Smart Decision-Making perspective has a fairly low level of transformation (medium-low), this perspective is focused more on expanding decision making. New technologies are used to strengthen government rationality by providing more complete and accessible information for the decision-making process and its implementation. Organizations in this perspective tend to be those who are authorized in the field of technology and digitalization. Cities included in this level are Surabaya, Makassar, Zurich, Switzerland, Taipei, Taiwan, Kuala Lumpur, Malaysia, Hong Kong, Jakarta, West Java, and Taiwan. These cities reach this level with the decision-making authority related to the implementation of smart cities as the concept of decentralization in government.

Then, the Smart Administration perspective has a fairly high level of transformation because it requires restructuring the internal government organization for smart city management. These cities have governance that uses advanced information technology to integrate information, processes, institutions, and physical infrastructure to better serve citizens. Smart government management can support smart city implementation to coordinate different components and structures. Currently, the institutional aspect is considered a need for better governance to manage initiatives or projects towards smart cities. Some cities have established dedicated organizational units focused on planning and implementing Smart City projects, led by Smart City Managers. Cities included in this level are Taipei City, Taiwan, Zurich City, Switzerland, and Jakarta. These cities have reached this level of perspective by focusing on developing institutional entities authorized to manage smart cities. These cities have institutional forms that focus on handling smart city implementation and are not incorporated with other specialized authorities. This shows a strong commitment to implementing smart cities and having broader authority to manage smart city initiatives.

Furthermore, the Smart Collaboration perspective has the highest level of transformation as it is not only about transforming internal organizations but also external organizations. By enabling collaboration between departments and with the community, this perspective helps drive economic growth. Also, it can lead to services that truly focus on the needs of citizens. Cities included in this level are Taipei City, Taiwan, Zurich City, Switzerland, and Jakarta. These cities are all cities that have reached level 3, where with the flexibility of the institutional form, they can cooperate with various parties to implement the smart city concept. Broccardo, (2019) confirms that the smart city collaborative governance model has deep institutional work by several key actors. The existence of broad dynamics can make governance fragmented. Yet, this shared responsibility.

The Institutional Strategy in Managing Procurement of Smart City Initiatives

The institutional context has relevance in relation to autonomy, resource availability, and the socio-economic and political orientation of local governments, which can lead to variations in smart governance configurations (Tomor et al., 2021). Technological infrastructures and services associated with smart city initiatives cannot be created or exist without adequate capital expenditures (Jonek-Kowalska & Wolniak, 2021). However, local government budgets are only able, at most, to fund ongoing tasks, not the type of strategic investment, over a period of several years, that is required by most smart city initiatives. This section identifies the procurement model of smart city initiatives and how it relates to the institutional perspective.

Table 6. Procurement Model of Smart City Initiatives

City	Entity	Funding Source	Procurement Model
Surabaya, Indonesia	Regional Secretary of Surabaya City	Government	Conventional Procurement
Makassar, Indonesia	Department of Communication and Informatics	Government	Conventional Procurement
Zurich, Swiss	Urban Development Zurich	Government	Public Private Partnership
Taipei, Taiwan	Taipei Smart City Management Office	Government	Public Private Partnership
Seoul, South Korea	Digital Policy Bureau	Government	Public Private Partnership
Kuala Lumpur, Malaysia	The Ministry of Local Government Department Malaysia (MLGD)	Government	Conventional Procurement & Operational Contract
Hong kong, China	Office of the Government Chief Information Officer	Government	Conventional Procurement & Operational Contract
Jakarta, Indonesia	Jakarta Smart City, Department of Communication, Informatics and Statistics	Government; Tariff Service	Conventional Procurement & Operational Contract
West Java, Indonesia	Department of Communication and Informatics	Government	Conventional Procurement & Operational Contract
Taiwan	The Ministry of Digital Affairs	Government	Public Private Partnership

Source: Authors, (2023)

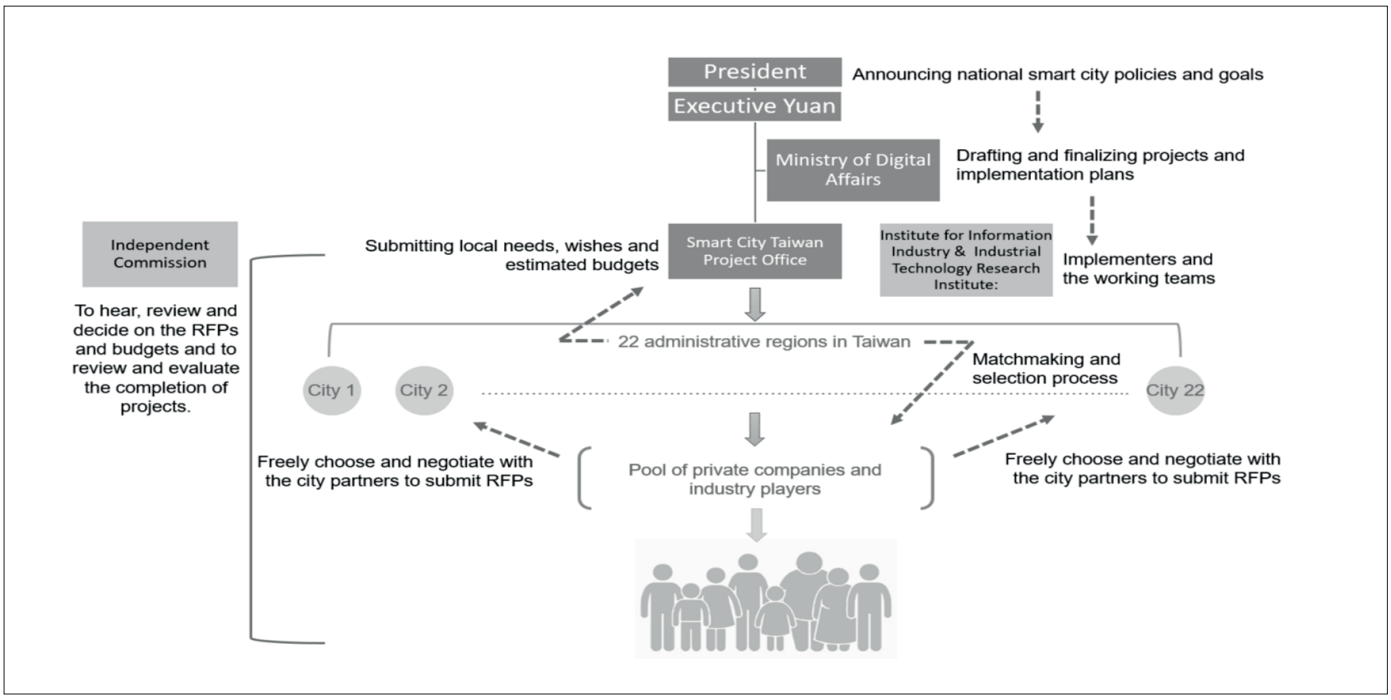
The findings of this study's analysis demonstrate that the institutional model and structure of authority do not directly influence how smart city projects are procured. Conventional procurement, operational contracts, and public-private partnerships (PPPs) are common procurement tactics utilized in smart city initiatives. A few others mentioned that the private sector offers alternate financing, but they did not elaborate on why.

Most cities demonstrated the importance of PPPs and self-management for the procurement of smart city initiatives. The implementation was found to involve various actors, including private organizations, experts, and communities. The concept of Public Private Partnership (PPP) provides efficiency and effectiveness in providing public services to the community, as well as helping the government sector deal with limited budgets and resources in developing infrastructure (Djabbari,

2021). Through cooperation, the expertise and assets of the government and private sector in providing services to the community and cooperation so that the risks and potential benefits of providing services and facilities are shared.

Taiwan has two approaches: cooperation with the private sector and cooperation with the local government. Cooperation with the private sector is done by making proposals related to the idea plan, such as artificial intelligence. Then, the proposal will be selected by the central government to be used as a solution to urban problems. The city government also has a consortium of 10 organizations from various sectors to evaluate the proposals. Furthermore, cooperation with local governments is based on the needs of each local government. For example, Taipei City needs solutions related to education, while the southern part of Taiwan needs solutions for agriculture.

Fig 3. Taiwan Cooperation Scheme



Source: Interviews with Taiwan, (2023)

Quan and Solhiem, (2023) have identified four essential cross-cutting themes for PPP in smart cities. As mentioned above, the themes are localness, stakeholder complexity, tension among actors, and trust-building. PPP in smart cities is embedded in a complex, volatile network involving various actors with divergent opinions. Critical considerations in the creation of PPP (Global Infrastructure Hub, 2019) are summarized below: 1). Ensure clarity of PPP objectives, scope of operation, and interface with Government Contract Authority; 2). Support PPP with effective governance, institutional capacity and sustainable financing; 3). Institutionalise project preparation financing support for sub-national governments; and 4). Develop allied mechanisms, standards and processes for effective operationalisation. One important consideration is the project's ability to return on investment within a certain timeframe. This suggests consideration and analysis of maturity in the scope of ideas, execution, technology, and also budget before smart city initiatives are implemented in a sustainable manner. However, there are many variations around the world in PPP rules or regulations, the legal boundaries within which contracts can be made (The Economist, 2018).

However, in Indonesia, the acquisition of smart city projects is still carried out through operational contracts, as demonstrated by the provision of skilled human resources for smart city projects in Jakarta and West Java. Flexibility is also related to funding constraints. Classic financing models, with traditional annual budget cycles, can limit the flexibility of project management, especially when unexpected business or technological opportunities arise (Jose & Rodrigues, 2024). Furthermore, the procurement of smart city initiatives through conventional procurement with an initiative budget of less than 100 million and indirect procurement through tenders or auctions as stated in presidential regulation no 12 of 2021 concerning amendments to presidential regulation number 16 of 2018 concerning government procurement of goods/services. However, Jakarta didn't just get that, where service fees under the public services agency model provide another source of income. Jakarta also makes use of sister city collaboration with Berlin to further smart city development through the Jakarta Future City Hub and possible source of future income.

Smart City Council (2014) says that there are 10 characteristics that should help decision makers see how different types of projects in different types of communities demand different types of financing: 1). Sources of capital; 2). Number of parties; 3). Ease of securing financing; 4). Duration of financing; 5). Risk to investors; 6). Risk to borrowers; 7). Tax implications; 8). Source of repayment; 9). Advantages; and 10). Disadvantages. Taipei, Taiwan, and Zurich chose to use PPPs because they included the provision of smart infrastructure for cities. The project has a high value of benefits for the long term. Meanwhile, for cities in Indonesia, this condition can be accommodated with conventional procurement models or operational contracts based on applicable regulations.

The main source of funding for smart city initiatives is the government, which comes from tax revenue. Some cities mentioned private funding sources, but these were not specific to the program initiatives and were only temporary. City governments tend to rely on financial models that have been used for infrastructure, such as conventional procurement, operational contracts, and public-private partnerships (PPPs). However, the demand for technology that can transform cities and their citizens, and has the potential for long-term returns, should make smart cities worthy of investor consideration. City governments may have limited ability to select and fund smart city initiatives. Alternatively, governments can exert influence by fostering an enabling environment for private sector growth through legislation, subsidies and other means (The Economist, 2018).

Discussion

This situation is consistent with findings from a study conducted by the United Nations. In 2022, the majority of cities (65%) designate personnel to oversee smart cities inside already-existing organizations, while just 22% of cities establish new organizations specifically dedicated to managing smart cities. This has to do with organizational structure, rules and guidelines, and other strategic goals (Mora et al., 2023; UN Habitat, 2023). According to Jose and Rodrigues (2024) organizational misalignments, different types of internal opposition, and unfulfilled expectations concerning administrative limitations, human resources, and funding smart city efforts are common. UN-Habitat (2023) emphasizes that, more importantly, institutional entities must have enough discretion in making decisions, enough funding, and defined roles in order to effectively lead city initiatives carried out by different partners, both inside and outside the public sector. Gupta et al. (2023), however, demonstrated that local leaders have a greater impact on the development of smart city ecosystem capabilities than does the organizational architecture itself. These power dynamics impact the makeup of local political leadership and the structure of the local government system, which may have an impact on how smart governance is set up in a city (Tomor et al., 2021).

Planning smart city frameworks and implementing policies are aided by improved institutional arrangements and sound governance (Hyatt, 2023). But when it comes to the social, political, and cultural aspects of the environment, internal change is difficult (Soe et al., 2021; Beurden et al., 2023). Because of the public consequences and the complexity of the resources required, smart cities' organizational capacities are more complex than those of ordinary companies (Gupta, et al., 2023). Power dynamics exist between actors, even within local government agencies, and the intended course of change is frequently contentious (Beurden et al., 2023).

Depending on the power and standing of the institution, the institutional perspective of cities in administering smart cities is wholly distinct. The formal aspects of smart city projects, such as their integration into local, regional, national, or even international policy initiatives for urban development, will be delineated by an institutional analysis of these initiatives (Raven, et al., 2017). A rating system that ranges from institutional change (smart city governance) to institutional conservation (conventional smart city governance) can be used to evaluate smart city governance. To ensure the success of a smart city effort, it is imperative to dismantle current silos and establish collaborative cross-disciplinary communities (UN Habitat, 2023). As this research found, the smart city institutional ranking scale shows the highest level of smart urban collaboration obtained by Taipei, Zurich, Jakarta, and Taiwan. These four cities also have specific entities in managing smart cities through institutional transformation.

Institutions can have limitations in planning, developing, monitoring, and evaluating smart cities. Institutional strengthening needs to be done through flexibility and adaptation. Christensen, (2016) stated that flexibility is the extent to which an organization has a variety of managerial capabilities and speed to increase management control capacity and improve organizational control. Institutional strengthening through flexibility and adaptive capabilities is needed to collaborate and fund alternatives. This can drive the planning and development of a smart city innovation climate (Mora, et al, 2023). In fact, the power of agency status can drive strong decision-making by leveraging data for city policies. The status of the institution becomes urgent to step up, develop innovation, and use sustainable data for urban development.
Meijer and Bolivar (2016) believe that governance transformation is desirable and necessary for smart cities. A different institutional model from others is found in Jakarta as a specific smart city entity under the department of communication and informatics by applying the Public Services Agency (PSA) financial management pattern. PSA is better known as "Badan Layanan Umum (BLU)" in Indonesian or "semi-autonomous agencies" in English and "Badan Layanan Umum Daerah" for regional level. PSA is considered a new organizational form that will increase productivity, efficiency and effectiveness influenced by New Public Management (NPM). Furthermore, PSAs are required to be more accountable to the government and the public in terms of PSA performance and results by gaining autonomy and flexibility in managing their financial and personnel affairs (Choi, 2015).

Van Thiel (2012) argues that semi-autonomous organizations function independently of government and handle responsibilities related to the public interest, including service delivery, policy implementation, and regulation. Semi-autonomous agencies are more managerial and have less political influence and hierarchy than government bureaucracies.

Three types of agencies can be distinguished based on their formal legal characteristics (Verhoest, 2021). Type 1 agencies have managerial autonomy but no separate legal identity from the parent state or ministry. Type 2 agencies are organizations and bodies with managerial autonomy that have their own legal identity separate from the parent state or ministry. Type 3 organizations have their own legal identity attached to, and determined by, private law and are established by, or on behalf of, the government in the form of a private legal entity, company, or foundation, but are largely controlled by the government and at least partially engaged in the performance of public tasks. Although the degree of financial, personnel and management autonomy varies by (type of) organization, for example with regard to different personnel and financial policies (Verhoest et al., 2010).

In the context of Indonesia and Jakarta, PSA is a new government financial management model in Indonesia that leads to modern practices in government financial management. Based on the Regulation of the Minister of Home Affairs No. 79 of 2018 concerning Regional Public Service Agencies explains that PSA aims to provide public services more effectively, efficiently, economically, transparently and responsibly by taking into account the principles of justice, appropriateness and benefits in line with Healthy Business Practices, to help achieve the objectives of local governments whose management is carried out based on the authority delegated by the regional head. PSA has a structure consisting of leaders, financial management officials, and technical officials and has technical supervisors and financial supervisors, as well as supervisors included in the Supervisory Board and Internal Supervisory Unit. PSAs can be categorized into five sectors based on the goods or services provided, consisting of education, health, fund management, facility management, and other goods/services sectors, such as technology and marketing (Waluyo, 2016). Furthermore, PSA allows to get revenue sourced from services, grants (bound/unbound), cooperation with other parties, regional revenue, expenditure budget, and other legitimate opinions. As Jakarta regulates some of these revenues in Governor Regulation No. 44 of 2021 concerning Service Tariffs for the Jakarta Smart City Management Unit. Moreover, PSA also demonstrates a commitment to human resource development, through performance-based remuneration.

Skowron and Flynn, (2018) revealed that an alternative scenario for revenue to support smart city projects could come from selling the value generated to other third parties. Project sponsors might, for example, sell advertising space on an asset, monetize data collected by services or form affiliate or strategic partnerships, and use this revenue to pay for assets or services for the city/public. Although, monetization of smart city initiatives is still a matter of debate among experts (Mcbride, 2018). It is possible to realize this with the application of the semi-autonomous agency model. Also, smart city organizations are faced with technological dynamics, cooperation flexibility, and agility (Jose & Rodrigues, 2024).

This research has limitations in the selection of case study samples presented. The participation of cities and smart city entities is very limited. Exploration of institutional forms, including authority, as well as procurement models for smart city initiatives needs to be studied more broadly. This allows for the discovery of other colors in the management of smart city initiatives. Furthermore, the potential and socio-political conditions of the city are certainly factors that influence the institutional form and procurement model of the initiative. Smart city managers can adjust the model and authority of the institution to gain more flexibility and revenue potential for initiative management. This is due to the fact that creating the technology infrastructure needed for smart cities is never inexpensive.

Conclusion

Supporting the realization of smart cities, institutional perspectives and procurement models of smart city initiatives are important at the planning and implementation stages. Smart city authorities tend to be under the government through units that are mostly authorized in the field of information technology, others take the form of working groups that coordinate directly with the head of government and internal affairs. Specific entities were found to be established in some cities to support smart city innovation. The findings of this study show that the institutional perspectives of smart cities are comparable at the low level and the highest level. Limited cities have smart city policies and operations, some have considered smart decision-making through technology and digitalization institutions. However, four cities have done internal restructuring for smart city management, Taipei, Taiwan, Zurich, and Jakarta. All four have also reached the highest level through collaboration with external parties. The institutional strategy for managing smart city initiatives relates to the size of the smart city initiative. PPP procurement methods are widely used for initiatives in various cities. Meanwhile, Indonesian cities are limited to conventional procurement and operational contract procurement models.

The implication of this research is that the institutional model has a significant scope of authority over access to funding sources for the management of smart city initiatives. Furthermore, smart cities are not only centered on the development of sophisticated technology and services to the community, but also flexible entity governance. This is not only the realization of data-driven policy, but also the full authority of the institution in collaboration. The existence of regulatory, normative, and cultural institutions can be a reinforcement. In order to increase flexibility and revenue potential for initiative management, smart city administrators and managers can consider the institution's model and authority for managing smart city initiatives. A smart administrative level with dedicated organizational units for smart cities can be a good practice.

Further research is needed to understand the different procurement procedures and regulations for smart city initiatives in different regions. This research shows that the semi-autonomous agency that Jakarta has implemented is a unique finding among other smart city agency models. PSA is feasible as a smart city management agency, which has been internally restructured and has flexibility in terms of collaboration, resource management, and has other sources of revenue of a business nature. However, further research is needed to find out the agencification procedures of the institution in each different region. Furthermore, an in-depth study on the monetization of smart city initiatives is needed to strengthen the authority of the PSA.

Acknowledgements

Our gratitude is extended to Mr. Yudhistira Nugraha, D.Phil., and colleagues from Jakarta Smart City, Department of Communication, Information, and Statistics, the Jakarta Provincial Government (Andini, Bastian, Ferena, Alya, Reisa, dan Lisa), for the indispensable help for our research.

References

Beurden, Judith Borsboom-van., Bisello, Adriano., Vettorato, Daniele., Vacha, Tomas. (2023). Systemic Changes in Governance Equipping local governments for realising climate-neutral and smart cities. Brussels: EUROPEAN COMMISSION-European Climate, Infrastructure and Environment Executive Agency Established by the European Commission CINEA DOI: 10.2926/919981

Blanck, M., & Ribeiro, J. L. (2021). Smart Cities Financing System: An empirical modelling from the European context. Cities, 116, 103268. https://doi.org/10.1016/j.cities.2021.103268

Broccardo, Laura, Francesca Culasso, Sara Giovanna Mauro, (2019). "Smart city governance: exploring the institutional work of multiple actors towards collaboration", International Journal of Public Sector Management, https://doi.org/10.1108/IJPSM-05-2018-0126

Caragliu, A., Del Bo, C., & Nijkamp, P. (2009). Smart cities in Europe. In Proceedings of the 3rd Central European Conference in Regional Science (Košice, Slovak Republic, Oct 7- 9). DOI:10.1080/10630732.2011.601117

Chang, I.-C. C., Jou, S.-C., & Chung, M.-K. (2021). Provincialising smart urbanism in Taipei: The smart city as a strategy for urban regime transition. Urban Studies, 58(3), 559-580. https://doi.org/10.1177/0042098020947908

Christensen, L. (2016). Quality of Information: The Role of Internal Controls and Materiality. Copenhagen Business School [Phd]. PhD series No. 30.2016 Online ISBN: 978-87-93483-25-5

Choi, Jin-Wook. (2015). New Public Management or Mismanagement? The Case of the Public Service Agency of Indonesia. Jurnal Studi Pemerintahan Vol 7, No 1 (2016): February 2016 http://dx.doi.org/10.18196/jgp.2016.0024 104-127

Dillard J. F & Ruchala, L. (2005). The rules are no game: from instrumental rationality to administrative evil. Accounting, Auditing and Accountability Journal, 18 (5), 608-30 DOI:10.1108/09513570510620475

Djabbari, Muhammad Hidayat., Alwi, Alwi., Thamrin, Saddam Husain. (2021). Implementasi Public Private Partnership dalam Pengembangan Pariwisata di Kabupaten Toraja Utara. Jurnal Analisis Kebijakan dan Pelayanan Publik Volume 7 No 1, Juni 2021 https://doi.org/10.31947/jakpp.v7i1.13203

Gassman, O., Bohm, J., & Palmie, M. (2019). Smart Cities: Introducing Digital Innovation to Cities. Emerald Publishing Limited. DOI:10.1108/9781787696136

Global Infrastructure Hub. (2019). Leading Practices in Governmental Processes Facilitating Infrastructure Project Preparation A practical guide for governments, informed by a country-lens review of leading practices. CRISIL https://ppp.worldbank.org/public-private-partnership/sites/ppp.worldbank.org/files/2022-03/gih_project-preparation_full-document_final_art_web-2.pdf

Guenduez, Ali Asker., Mergel, Ines., Schedler, Kuno., Fuchs, Saskia., Douillet, Christopher. (2024). Institutional work in smart cities: Interviews with smart city managers. Urban Governance 4 (2024) 80-90 https://doi.org/10.1016/j.ugj.2024.01.003

Gupta, Anushri., Panagiotopoulos, Panos., Bowen, Frances. (2023). Developing Capabilities in Smart City Ecosystems: A multi-level approach. Organization Studies 1–22. Special Issue on Boosting Urban Sustainability through Organizing Collaborative Ecosystems for Smart City Development. https://doi.org/10.1177/01708406231164114

Hedegaard, M., Kuzior, A., Tverezovska, O., Hrytsenko, Kolomiiets, S. (2024). Smart City Projects Financing. SocioEconomic Challenges, 8(1), 286-309. https://doi.org/10.61093/sec.8(1).286-309.2024.

Hamilton, S., & Zhu, X. (2017). Funding and financing smart cities. The Journal of Government Financial Management, 66(1), 26-33.

Harun, Harun., Peursem, Karen A. Van., Eggleton, Ian R.C., Locke, Stuart M. (2016). An Integrated Model of Institution and Its Application in Understanding the Adoption of IPSAS in Indonesian Local Governments. Comparative International Governmental Accounting Research NetworkAt: Victoria University of Wellington, NEW ZEALANDVolume: 7-9 July, 2016

Hyatt, Justin. (2023). An Overview of the Smart City Prime considerations for building smart cities. [Online]. https://uncrd.un.org/sites/uncrd.un.org//files/2023sctw_s2_p1.pdf

Jonek-Kowalska, I.; Wolniak, R. (2021). Economic opportunities for creating smart cities in Poland. Does wealth matter? *Cities* 2021, *114*, 103222 https://doi.org/10.1016/j.cities.2021.103222

Jose, Rui., Rodrigues, Helena. (2024). A Review on Key Innovation Challenges for Smart City Initiatives. *Smart Cities* 2024, *7*(1), 141-162; https://doi.org/10.3390/smartcities7010006

Mcbride, K. (2018). Data Governance, Platform Governance: Monetizing Smart Cities: Framing The Debate. [Online] https://www.cigionline.org/articles/monetizing-smart-city-data/

Meijer, A., Bolívar, M. P. R. (2016). Governing the smart city: a review of the literature on smart urban governance. International Review of Administrative Sciences, 82(2), 392-408. https://doi.org/10.1177/0020852314564308

Mohr, John W., White, Harrison C. (2008). How to Model an Institution. Theory and Society 37(5):485-512 October 200837(5) DOI:10.1007/s11186-008-9066-0

Mora, Luca., Gerli, Paolo., Ardito, Lorenzo., Petruzzelli, Antonio Messeni. (2023). Smart city governance from an innovation management perspective: Theoretical framing, review of current practices, and future research agenda, Technovation Volume 123 - 2023, 102717, ISSN 0166-4972, https://doi.org/10.1016/j.technovation.2023.102717

Pemerintah Kota Surabaya. (2023). Surat Keputusan Walikota Kota Surabaya Nomor 46 Tahun 2023 Tentang Dewan Smart City Kota Surabaya Walikota Surabaya. Surabaya: Pemerintah Kota Surabaya

Pemerintah Kota Surabaya. (2023). Surat Keputusan Walikota Surabaya No 100.3.3.3/46/4361.1.2/2023 Tentang Dewan Smart City Kota Surabaya. Surabaya: Pemerintah Kota Surabaya

Quan, Xiangyu., Solheim, Marte C.W. (2023). Public-private partnerships in smart cities: A critical survey and research agenda. City, Culture and Society 32 (2023) 100491 https://doi.org/10.1016/j.ccs.2022.100491

Raven, R., Sengers, F., Spaeth, P., Cheshmehzangi, A., Xie, L. (2017). An Institutional Perspective on Smart City Experimentation: Comparing Ningbo, Hamburg and Amsterdam. Presentation for the ECOCITY World Summit, 12-16 July 2017, Melbourne. [Online]. https://www.smart-eco-cities.org/wp-content/uploads/2017/03/Ecocity-World-Summit-presentation.pdf

Samouylov, K. S., Evgeny , P., & Semyachkov, K. (2019). Institutional Support of a Smart City. Montenegrin Journal of Economics, 4(15), 87-98. https://doi.org/10.14254/1800-5845/2019.15-4.7

Skowron, J., & Flynn, M. (2018). The challenge of paying for smart cities projects. Deloitte. Available at https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Public-Sector/gx-ps-the-challenge-of-paying-for-smart-cities-projects1.pdf

Smart City Council. (2014). SMART CITIES FINANCING GUIDE Expert analysis of 28 municipal finance tools for city leaders investing in the future. [Online]. https://urbaninnovation.asu.edu/sites/default/files/smartcitiescouncil_-_financing_guide-3_31_14.pdf

Soe, Ralf-Martin., Azambuja, Luiza Schuch de., Toiskallio, Kalle., Nieminen, Marko., Batty, Michael. (2021): Institutionalising smart city research and innovation: from fuzzy definitions to real-life experiments, Urban Research & Practice, DOI: 10.1080/17535069.2021.199859

Swedberg, Richard. (2020). The Production of Knowledge: Enhancing Progress in Social Science. [Online]. Published online by Cambridge University Press DOI: 10.1017/9781108762519.002

Taewo, Nam., Pardo, T A. (2021). Conceptualizing Smart City with Dimensions of Technology, People, and Institutions. The Proceedings of the 12th Annual International Conference on Digital Government Research. DOI:10.1145/2037556.2037602

The Economist. (2018). SMART CITIES: INVESTING IN THE FUTURE. The Economist Intelligence Unit Limited. Available at https://impact.economist.com/perspectives/sites/default/files/EIU%20Invesco%20report_V3.pdf

Tomor, Zsuzsanna., Przeybilovicz, Erico., Leleux, Charles. (2021). Smart governance in institutional context: An in-depth analysis of Glasgow, Utrecht, and Curitiba. Cities 114 (2021) 103195. https://doi.org/10.1016/j.cities.2021.103195

UN Habitat. (2023). Managing Smart City Governance: A Playbook for Local and Regional Governments. United Nations Human Settlements Programme (UN-Habitat). Available at https://unhabitat.org/sites/default/files/2023/11/managingsmartcitygvnce_playbook.pdf

United Nations. (2022). Global Review of Smart City Governance Practices. United Nations Human Settlements Programme (UN-Habitat). Available at https://unhabitat.org/global-review-of-smart-city-governance-practices

Van Thiel, S. (2012). *Comparing Agencies across Countries. Government Agencies, 18–26.* doi:10.1057/9780230359512_2

Verhoest, K., Roness, P. G., Verschuere, B., Rubecksen, K., & MacCarthaigh, M. (2010). Autonomy and control of state agencies: comparing states and agencies. Basingstoke: Palgrave Macmillan. DOI:10.1057/9780230277274

Verhoest, K., Van Thiel, S., De Vadder, S. (2021, March 25). Agencification in Public Administration. *Oxford Research Encyclopedia of Politics*. Retrieved 29 May. 2024, from https://oxfordre.com/politics/view/10.1093/acrefore/9780190228637.001.0001/acrefore-9780190228637-e-1466.

Waluyo, Budi. (2016). Agencification in the Indonesian Public Service: Cases of Higher Education. Conference: International Research Society for Public Management (IRSPM) At: Hong Kong Volume: 2016 Annual Conference