Chapter 25
Conceptual Design of Sustainable Governance by VIDEL (Virtual Dashboard of Environmentally Logistics-Port-City): A Case Study of Jakarta and Tanjung-Priok Port

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Abstract The dimensions of the triple bottom-line approach to sustainable development contain inherent conflicting goals in implementation. In cases of urban development around the world, this is exemplary for settings in major port cities. Here, mostly economically oriented infrastructure requirements of the ports meet more comprehensive concerns of sustainable urban development. There are incoherent governance systems: Ports are often involved in higher-level national planning hierarchies, while urban development is predominantly locally controlled. This is also the case in Jakarta Megapolitan with Tanjung Priok Port, Indonesia, the most prominent and still expanding national seaport. The port expansion is also aimed to be a significant hub in one of the world's maritime axes, which refers to vast urban growth. However, the entire urban economic effects are uncertain, for example, concerning urban diseconomies of scale or rebound effects, such as traffic congestion,

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social segregation, conflicts, or the digital divide. Urbanization and the contemporary patterns of economic growth are drivers of environmental vulnerability of both parties. This study serves to overcome fragmented approaches by using a holistic, sustainable governance transition process for integrating urban and port-industry governance concepts. A novel online platform, VIDEL (Virtual Dashboard of Environmentally Logistics-Port-City), is designed as a smart system that engages all stakeholders. This platform binds the requirements and interests as well as harmonizing actors in the interactions of urban with port and industry to secure innovative and environmental-friendly way. It will become a digital control tower for sustainable governance system in a port-city.

Keywords VIDEL · Environmental governance · Information system · Urban-port-industry interaction · Port planning · Sustainable urban development

25.1 Introduction

Governance is the most important principle in the case of ports, which becomes a critical hub in a national infrastructure for an economy, contributing to the realization of trade and movement. At the same time, port management, operations, and development are capital rigorous, exploit massive public space, produce both negative and positive impacts to the environment, and engage many actors such as port authority, terminal operators, logistics providers, and government. On the other side, existence of a port in a city generates communication between land and maritime networks developing supporting activities and having a strong influence on the spatial organization of the outlying region (Ducruet, 2011).

Therefore, the essence of governance involving a port has two folds, where each has its own interest and agenda. In one side, a port that usually managed by central government is required to have a good collaboration with the local government in the development of port-city/urban governance. While a port plays an important role in global supply chain governance as it is a vital hub that links industries, logistics, and consumers in international networks (see Fig. 25.1).

Although the two folds of governance have different directions, however, they have a similarity in terms of interactions with physical environment. The interaction is reciprocal of each other, where the anthropogenic activities will make some impacts to the environment, while, in turn, dynamics of the environment will also bring several risks to the activities. Hence, a good environmental governance becomes a key element to the sustainability for both contexts of port-city as well as the global supply chain.

However, some opportunities as well as challenges would be raised if both kinds of governance should be combined at the same time and place, such as the case of Tanjung Priok Port in the Special Capital Region (DKI) of Jakarta. This is the

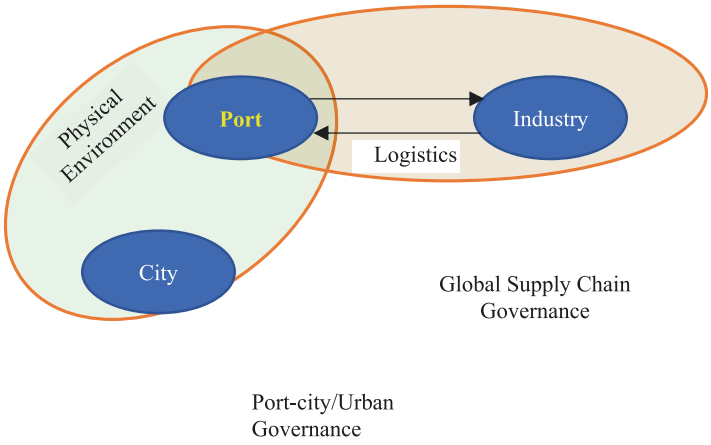

Fig. 25.1 Port and the two folds of governance, as well as their interactions with physical environment

largest and busiest port in Indonesia, with a container cargo productivity level reaching 6.8 million TEUs in 2019 by an average growth of 6% per year as it is a gateway to international trade and a stopover of domestic trade goods. As a result, the port is targeted to become a regional as well as national economic powerhouse, making symbiose mutualism with DKI Jakarta as a central of national politics and economy.

In parallel with the benefits of economic growth, Tanjung Priok Port also harms its urban zone. Based on the OECD synthesis report (Merk & Dang, 2013) of "The Competitiveness of Global Port-Cities" (2013), ports can also give rebound effects, mostly involving environmental issues, land use, and traffic congestion. Moreover, the status of Tanjung Priok Port as a national port also creates a level of operational and strategic complexity that is not in line with the development concept of the city itself.

The original reasons for port digitalization as specified by the European Transport Research Review are in traditional efficiency optimization and in enhancement of material (cargo) flow. As ports evolved from load and offload points to genuinely intermodal logistical service hubs, the importance of efficient information flow increased. In the case of Tanjung Priok Port, the proposed approach is the implementation of the revolutionary digital technology of "Super-Apps" to balance the development of the port and its related complex urban and environmental problems. This chapter, therefore, discusses these following questions: (1) Which digital technologies can help multistakeholder interests in port-urban communities with the objective of economic, social, and environmental sustainability? (2) What transition process binds the requirements and interests of the port, urban, and industrial areas? (3) What are enabling factors, elements, benefits, and challenges of creating smart sustainable governance in the interactions of port with urban and industry? (4). What is the framework and system design, which can encompass the port and city "Super-Apps" concept?

25.2 Literature Review

25.2.1 Interaction Between City and Port

A port is a center in the logistic field since it encourages collaboration among global supply chains, regional industry, and consumption markets. It is also entailing interactions among transports modes and supply chain actors, land and sea environment, and nodal point of facilities in the development supply chains (SC) port-city interaction. Some papers have addressed these issues and we have summarized them in Table 25.1.

25.2.2 Smart and Sustainable System

Smartness becomes an emerging tool in governance. Smart governance allows technology-enabled cooperation among citizens (including business, public sectors, societies) as well as among port and local governments. E-Government and smart city concepts are very interesting to be implemented on the port to achieve a sustainable system. Based on this issue, we are trying to collect some related studies in Table 25.2.

Table 25.1 Port-city interaction paper highlight

No.	Author(s)	Port-city Interaction	environmental Concern	Introduce smart system	Economic or SC views	Connecting port to the industry
1	Notteboom (2020)	Yes	No	No	Yes	Yes
2	Douaioui et al. (2018)	Yes	Yes	Yes	Yes	Yes
3	D'Amico et al. (2021)	Yes	No	Yes	Yes	Yes
4	Debrie and Raimbault (2016)	Yes	No	No	Yes	Yes
5	Ducret and Lee (2006)	Yes	No	No	Yes	Yes
6	Merk and Dang (2013)	Yes	Yes	No	No	No

Table 25.2 Smart city, e-Gov, and sustainable development selected paper

No.	Author(s)	Port-city interaction	Smart city or e-Gov.	Sustainable development	Economic or SC views
1	Beškovnik and Bajec (2021)	Yes	Yes	Yes	Yes
2	Tomor et al. (2019)	No	Yes	Yes	Yes
3	(Ahvenniemi et al. (2017)	No	Yes	Yes	Yes
4	(Hadi and Nawafleh (2012)	No	Yes	Yes	Yes
5	(Toli and Murtagh (2020)	No	Yes	Yes	Yes
6	(Haarstad (2016)	No	Yes	Yes	No
7	Yigitcanlar et al. (2018a, b)	No	Yes	Yes	Yes

25.2.3 Aspects of the Framework of Smart and Sustainable Urban-Port Interaction

Tables 25.1 and 25.2 present an overview of the aspects that have been studied in the context of sustainable urban port interactions. In Table 25.1, there are considerations of the environment (sustainability), the existence of smart system, discussions of the economy (or SC), and the connection of the Ports to industry. Meanwhile, Table 25.2 reviews how the basic things will be applied to urban-port interactions, for example, smart cities (or e-Gov), sustainable development, and economic growth. Table 25.1 concludes that only Douaiuoi et. al. (2018) considered all aspects, while other studies missed one or two aspects. Likewise, Table 25.2 shows that the overall aspects discussion was only carried out by Beškovnik and Bajec (2021). The following narrative provides an explanation of some of these aspects in the wider views.

Goals and Enabling Factors In principle, objectives of smart and sustainable port-cities contain sustainable development framework and digitalization. The sustainable development in port-cities highlights maritime aspects in considering environmental, social, and economic factors. While digitalization is an innovative opportunity for all related actors to develop coordinated network using mobile information and communication technological devices that provide the circulation of big data and information. To attain these goals, some enabling factors on the emerging smart and sustainable interactions in port-cities should exist, such as port-city ecosystem, internal organization, data and security, finance and funding, policy domain and trust, as well as digital technology. A port-city develops and implements policies and guidelines to state rules for sustainable and smart initiatives development (D'Amico et al., 2021) (Tomor et al., 2019).

Components, Domains, Dimensions Including Sustainability Domains of smart and sustainable interactions in port-cities governance comprise safety and security as well as mobility that require use of technology, environment and sustainability, economy, government, and community (D'Amico et al., 2021). Furthermore, three organizational characteristics are crucial for such smart governance: (1) commitment of local government to participate in the collaboration, (2) responsiveness of the government, and (3) operational management of the port-city. Citizen participation offers helpful recommendations for government agencies to deliver better-informed policy decisions (Tomor et al., 2019).

On the other side, a smart port consists of two pillars that include interconnection of the overall port-logistics chain and port automation as a mixture of hardware, software, and mechanics. The domains entail of operation, safety-security, sustainability, and energy (Douaioui et al., 2018) (Makkawan & Muangpan, 2021) (Sekhar, 2015). This paradigm offers a green port concept for implementation of sustainability dimension of port governance. The greening of port management is implemented through green initiatives and organized actions in a broader port community. In international context, there are some initiatives related to the green or sustainability of ports such as Ecoport of the European Sea Ports Organization (ESPO) since 2011 (Wooldridg, 2021), World Ports Sustainability Program (WPSPS, 2020), and Smart Port Index (SPI; Molavi et al., 2019).

Benefits Development of smart governance offers some benefits for both government and business in general, where effectiveness and efficiency become keys for all the aspects (D'Amico et al., 2021). It enables to provide a necessary foundation for both e-commerce services and e-government, for example, government could purchase services provided by private companies/consumers (Hadi & Nawafleh, 2012). In procurement, the online system of both public and private sectors influences e-commerce transactions (Blakeley & Matsuura, 2001). As regulator, the government provides a legal validity recognition for transactions, signatures, as well as appropriate safeguards that relates to trust in e-government (Myeong et al., 2014). Government enables to provide expenditures on e-government or e-commerce infrastructure that will support development of private businesses. The private sector will be benefited from electronic access to these services for their investment concerns and extending the communication infrastructure to the remotest parts of the country. Utilization of digitalization on existing processes in ports, logistic, and industry, as well as on their innovation efforts have positive impacts on port competitiveness and customer satisfaction both in direct and indirect ways. (Hadi & Nawafleh, 2012) (Lee et al., 2015).

25.3 Current Conditions in Port-City of Jakarta-Tanjung Priok Community

25.3.1 Area of Study: Relation Port, City, and Industry

Tanjung Priok Port is Indonesia's most significant port, along with the position of Tanjung Priok port as a global supply chain connectivity gateway and a center for cargo integration from several hinterland locations in Indonesia, the fact is that this port is located in the waterfront area of Jakarta. In the concept of port-city, the port of Tanjung Priok and the city of Jakarta form a function of intermediacy for cargo trajectory and centrality for human activity (Ducret & Lee, 2006). The term of port-city can be assigned to cities in coastal areas that have direct access to ports and have land that overlaps between urban administrative areas and port areas.

Moreover, the relationship between ports and industry is closely associated, where industry requires ports as an intermediary point of cargo transshipments. The port is equal to a logistics service provider node; there are goods handling services, consolidation and storage of goods, freight forwarding, bonded areas (customs), and a gathering point for various modes of transportation of goods. The utilization of ports for industrial needs opens up trade access more broadly; this creates a global supply chain, where the trajectory of cargo in the form of raw materials (commodities) and finished goods can occur between countries. In addition, the port itself needs an industrial area as a massive cargo turnover generator to continue producing a positive impact on the port's growth.

The existence of city, port, and industry has a relationship with the port-city community in the research conducted. As explained in the previous paragraph, the city and the port are two separate parts but share the same land, raising the complexity of each system's governance. The concept of port-city management shows the opportunity to establish mutual fulfillment of needs; the two divided systems will be used as a single management point of view. However, the single point of view creation of the port-city community at the same time does not eliminate the fact that industrial areas are another system that needs attention. Figure 25.2 shows the research area using the port-city community concept to reconcile interests between Jakarta and Tanjung Priok Port stakeholders. The figure explains that Tanjung Priok port has several domestic and international cargo terminals for O/D (Origin/Destination) nodes of cargo trajectory. The O/D nodes can be described as an industry (logistics user) that produces material and finished goods; it can also be interpreted as an industry (logistics user) that requires material and finished goods. At the same time, transshipment points likewise Dry Port, other Port, and Logistics Depot can also be included as O/D nodes. In more detail, the picture also shows the flow of cargo that can access inner-city lanes and toll roads within the corridor of Jakarta's urban areas by several hinterlands and transshipment points. It can be underlined that the case study of the Jakarta-Tanjung Priok port-city community has close ties among port, cities, and industries.

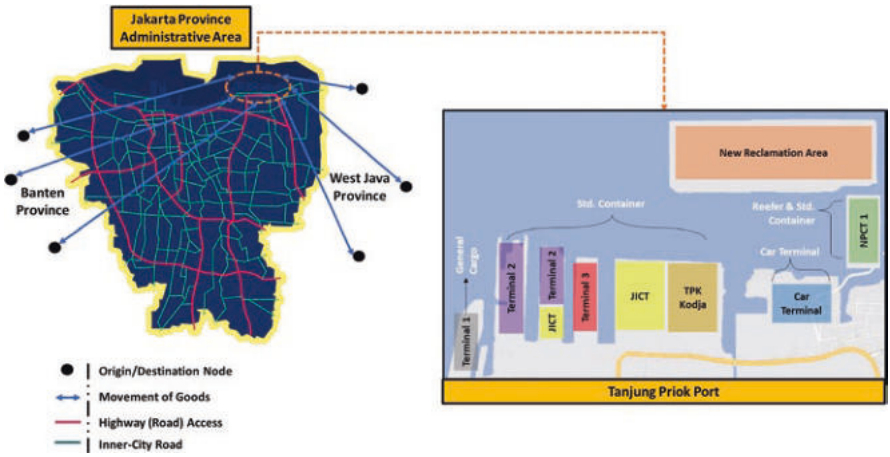

Fig. 25.2 Area of study

25.3.2 Gap Analysis on Smart Environmental Governance

In the development of smart governance in the urban network, the Jakarta Provincial Government has set a Super-Apps named JAKI (Jakarta Kini). The development of smart governance called JAKI has the concept of making Jakarta a smart city through six missions. This mission is derived from the expectations of the SDGs, so the city of Jakarta has initiated sustainability through JAKI. In JAKI, cocreation is created from a living lab agenda that invites the surrounding community to collaborate with the Jakarta government to carry out urban development.

Unfortunately, Jakarta and the Tanjung Priok port area have not yet initiated joint efforts to realize Jakarta as a comprehensive urban area, because they do not empower port stakeholders as a joint development. However, there are several groups of stakeholders who contribute to the development of digitalization governance on ports, logistics, and industry (see Table 25.3).

Those various stakeholder groups will send requests to decide or solve some problems on their fields (see Fig. 25.3). The advisory panel will guide the VIDEL development and implementation, while setting the system frames, defining the problems to be solved, gathering the requests of various stakeholder groups, translating them into solving algorithms, and then coming up with synchronically adjusting recommendations to dynamically changing conditions (such as new physical logistics infrastructure, emerging new technologies) providing an updated white paper and new tool sets each year. The decision scientists will be in charge of the development of a protocol for theory-based, evidence-based, and sustainability-oriented development of urban/logistics planning decision aids. Further, together with decision counselors and other actors, they will form guidelines for quality criteria of decision aids, being related to the content of a decision aid, to its development process, and to the evaluation of its effectiveness. The informaticians will develop and describe methods for identifying users' needs and for improving the

Table 25.3 Groups of stakeholders who contribute to the development of digitalization governance on ports, logistics, and industry

Stakeholder name	Group/type
Presidential staff office	Government nonstructural institutions
DKI Jakarta provincial Government (governor, major of North Jakarta, planning agency, Transport agency, logistics agency)	Governmental Policy makers
The Indonesia coordinating Ministry for Maritime Affairs and Investment	Governmental Policy makers
The Indonesia Ministry of Transport (directorate general of sea transportation)	Governmental Policy makers
Shipping agents Container terminals Non container terminals PT. Jakarta international container PT. Graha Segara PT. Bogasari flour Mills PT. PBM Adipurusa PT. Mustika Alam Lestari	Commercials & industrial partners
Tanjung Priok Main port authority office	Port authority
PT. IPC Tanjung Priok	Port operator
The Indonesian logistic and forwarder association (ILFA)	Logistic service providers
PT Telkom Indonesia – Jakarta	Technology provider (informatics dept.)
Institute of Supply Chain and Logistics Indonesia (ISLI)	Academia
Vulnerable groups	Beneficiaries
Terminal users in North Jakarta	Beneficiaries
General public	Beneficiaries

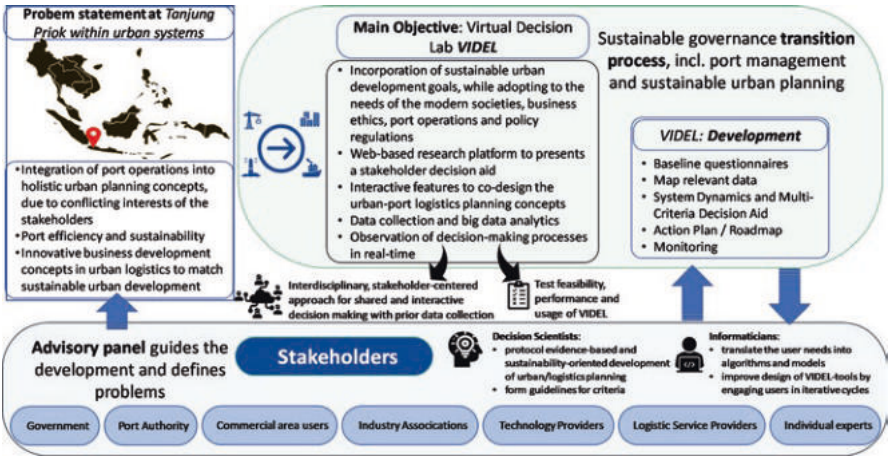

Fig. 25.3 The mechanism of stakeholders' contribution on the VIDEL

design of web-based tools by engaging users in rapid iterative cycles of design, evaluation, and redesign of these tools and features.

It is observed that a little of Jakarta's waterfront areas which the port and logistic buffer zone are included, do not share the modern city concept that JAKI is trying to realize. We found some facts that port and logistical buffers zone generate several issues for urban areas. Noise, water and air pollution, congestion, and flood are examples of the environmental problems generated by port's activities and logistics. In case of periodic flooding due to heavy rain and/or storm surge in the ocean, several cargo terminals in Tanjung Priok do not experience such hazards at all due to raising their surfaces. However, the flooding is paradoxically experienced in the back-end area of the port, including the route used for trucking mode in the trajectory of cargo in/out of the area and several container depots.

In developing smart governance for the logistics network, port stakeholders have tried to improve services by developing digital-based services. Digital services that have been carried out, such as Digital Container Freight Station for ordering and payment processes, Automated Gate System is assisting in the identification process of cargo trucks in and out, Automated Vessel Traffic and Vessel Management for supervising ship turnaround time traffic condition, also Automated Tally System for measuring container weight and reporting to charge holder. The services digitalization provides transparency of the port activity process for the port service users. The integration of logistics activities also complements digitizing and automating the activity system at the port, through the subsidiary PT. ILCS (Perseroan Terbatas Integrasi Logistik Cipta Solusi) develops integrated supply chain services via Web-Apps based technology. However, their approaches didn't touch the environmental side yet.

Jakarta has experienced slow political actions amid the complexity of context and policy responses in mitigating the hazard. The situation suggests the importance of considering sustainable governance, for example, coastal transformations anticipating urban building densification, land use policy, forced relocation, land reclamation, and the complexity of upscaling modern real estate development. On top of that, land subsidence is the main factor that will threaten the stability of the land area of DKI Jakarta, which is located near the sea waters of Jakarta Bay. The threat is predicted to sink several areas in North Jakarta (see Fig. 25.4).

25.4 Results and Discussions

25.4.1 Framework

Port domination can secure complete logistics services into the integrated treatment of physical and nonphysical goods distribution. Multiple objectives occur as port can be seen as an intermodal connector, resulting in the growth of potential business

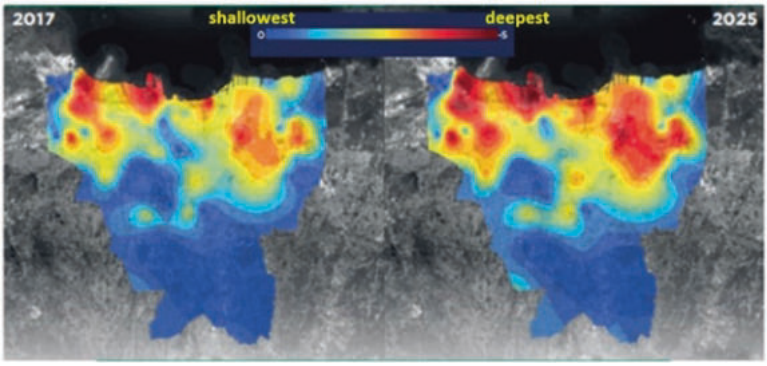

Fig. 25.4 Land subsidence projection map (2017 and 2025) in North Jakarta (Pemprov DKI Jakarta, 2019)

of the supply chain services sector. Furthermore, the position of port, which encompasses many supply chain businesses, could generate impact at the national, regional, and local levels. Nowadays, the new generation port has sophisticated technology to enhance its operational activities and to monitor environmental aspects. Port as a logistics node must contribute more significantly to eco-control performance to minimize environmental impact because of its dense operational activities. Air pollution, water pollution, untreated water, and waste disposal are notable examples of the environmental impacts generated by port activities. The aspects that need to be considered in port development and construction are water quality, coastal hydrology, soil contamination, marine and coastal ecology, air quality, noise and vibration, waste management, and visual intrusion, including the sociocultural impacts such as relocation of communities.

A port's governance model significantly influences its environmental initiatives (Faulin et al., 2018; Munim & Schramm, 2018). Parties that are critical in the governance model are government authorities (at the ministerial level or other relevant policy actors), the entities responsible for the management and operation of the port, and the involved private actors offering services. Urban and port-industry interaction and coordination can be strengthened through sustainable port governance, at the same time considering a broader stakeholders' engagement to address environmental variables linked with port expansion agenda and daily activities. Specifically for Tanjung Priok Port, in order to integrate the different interests and organizations among entities involved in the sustainable port's governance, as well as to align the various supply chain actors, a system called VIDEL (Virtual Dashboard of Environmentally Logistics-Port-City) is designed by the authors to facilitate interactivity between DKI Jakarta Provincial Government as the urban element with key stakeholders in Port and Industry.

The VIDEL that we propose is currently still a concept that constructed as an open platform. It can be embedded with mini applications, where such functions as the main hub to stimulate interchangeable data flow (see Fig. 25.5). The platform

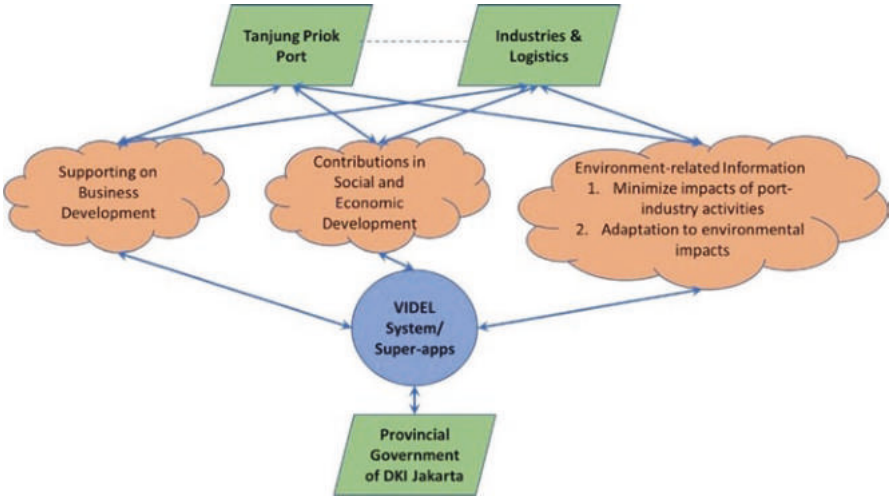

Fig. 25.5 Framework of Tanjung Priok Port-City–industry–environment interactions

creates the so-called "smart society" evolution, satisfying every actor in the stakeholder groups in terms of multiagent engagement. This concept will assure sustainability of the platform. In the implementation level, this platform will be managed by the Jakarta Provincial Government as their expansion of current Super-Apps named JAKI (see subchapter Gap Analysis on Smart Environmental Governance).

25.4.2 Context Diagram (System Design)

Context diagram (Fig. 25.6) sets the context and system constraints in a modeling. This includes relationships with entities outside the system itself, such as systems, organizational groups, and other external data stores in VIDEL.

The whole VIDEL system is controlled by VIDEL Main Controller and supported by Database system, Accounting system and Customer Service system and is in charge of 9 other subsystems: (1) Login Authentication System; (2) VIDEL Mobile App; (3) Payment Gateway; (4) E-Commerce System; (5) Decision Support System Module; (6) Environment Monitoring Module; (7) Urban Monitoring Module; (8) Port Operational Monitoring Module; and (9) Logistics Monitoring Module. VIDEL (Virtual Dashboard of Environmentally Logistics-Port-City) is designed to be a virtual ecosystem that facilitates an interactivity between Port – City – Industry. Further explanation about this system is provided at this link: https://link.untirta.ac.id/VIDELcomplete.

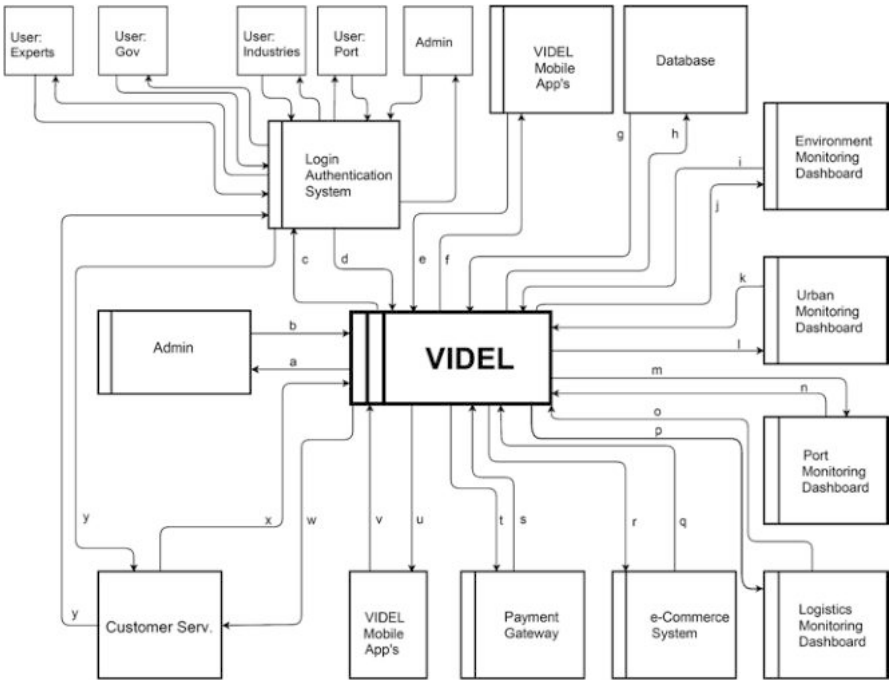

Fig. 25.6 Context Diagram of VIDEL

25.4.3 Transition Process

Transition is a needed action for VIDEL implementation. An advisory panel consisting of stakeholder groups' actors will be the key in guiding VIDEL development. The board will manage the interests of many stakeholders in order to align the directions of city and port development. Furthermore, they will be able to capture potential business models that evolve amidst the society's needs toward the development of digital platforms for businesses. The transition process is basically a synchronization of interests to find mutual goals in the context of changing conditions (such as new physical logistics infrastructure, emerging new technologies, fluctuate society demands, global environmental concerns) in the port-city community. It aims to provide an updated white paper and new tool-sets each year.

To convince stakeholders of the VIDEL reliability, the developer has to build a web-application-based platform with an interactive feature as a center vessel to encourage achievement of the primary goal of collaborative ecosystems. As the main body of the platform, monitoring dashboard as a tool to aid stakeholders to make informed decisions is equipped with data collection and stocktaking analysis. This will play as the principal interactive feature to attract more engagement in the stakeholders' groups, leading to "super apps" progression to secure mini-platforms development, which is the answer to future potential businesses. To guarantee the

success of the system, managing different scenarios and developing an integrative urban-logistics plan are high, variable, and useful. The transition process, which requires involvement of multiple actors and resources, will consist of the following activities respectively: (1) Synchronization; (2) Questionnaire; (3) Mapping; (4) System Dynamics Method; (5) Action Plan; (6) Advisory Board Monitoring. Detailed explanation of this process can be found on this link: https://link.untirta.ac.id/VIDELtransition.

25.4.4 Implementation Strategy

Development Phase Implementation of the VIDEL consists of the stage of application and testing for the system based on the results. Therefore, we propose the following phases of development: (1) Preliminary & Data Integration; (2) Development of Algorithms & Models (experimentation). (3) Software process/platform development (prototyping), (4) Stakeholders' feedback: (prototype testing), (5) Sustainability of the VIDEL; (6) Capacity Building/Training; (7) Finalization. Click this link for detailed description about these phases: https://link.untirta.ac.id/VIDELdev.

Interoperability Super app system is developed with technology that depends on various vendors, all of which are closed technologies. Many of the applications inside the super app are developed without using a database system (RDBMS/Relational Database Management System), which makes it very difficult to integrate with other systems.

The ability of a system or product to cooperate with another system or product is called interoperability, where one application can communicate with other applications. Super app also needs interoperability, because one information system is interrelated with other information systems even though the system is built with different platforms and databases. All applications and information islands that exist throughout the super app are assets that must be considered together to become an integrated system so that it can improve the quality of services delivered to users in the long term.

Security Super app is attractive to users because of its ability to provide various services without installing many applications, thus bringing convenience to their daily lives. However, one concern that comes with all this efficiency and comfort is data privacy. A super app collects personal data and financial accounts in the provision of its various services where those valuable and valuable data can be misused.

All applications and services hosting data will always be vulnerable to cybercrime threats and attempts. The more "super" an app is, the more valuable its data will be. Millions of new users and more transactions mean more personal data is being collected. Therefore, it is essential to design a super app with an

application-centric security strategy to find and recognize unusual data traffic patterns amid increasing data traffic by automated bots. An effective bot mitigation strategy should classify and prioritize data traffic from bots versus human-generated data traffic based on their identity and reputation.

In addition, it is necessary to carry out threat intelligence activities that can be followed up to find out how much chance an application will be attacked and determine the company's priority response. Super app providers can ensure the security of applications and the data stored on them by installing a full-featured yet flexible web application firewall (WAF). Its goal is to reduce and block unwanted data traffic through capabilities such as proactive bot protection, headless browser detection, form, and field-level encryption, layer 7 DoS mitigation, input sanitization, and behavioral analysis. Bots have indeed changed our lives in cyberspace. Therefore, maintaining consumer data security must be a priority for super app providers so that their super apps can certainly continue to grow. Otherwise, it's not just customer data that's at risk. But also, the business and reputation of the super app provider itself.

25.4.5 Transformation Impacts

VIDEL will promote smart system of the port-city-industry interaction in an evidence-based, structured, and integrated manner. This program will also encourage sustainability through environmental governance framework. On the other hand, VIDEL will be an integrated system platform as an innovation that unites environmental-friendly industries, ports, and cities.

In the national and regional development, the VIDEL system is expected to mainly contribute to the achievements of three of the Indonesia's Sustainable Development Goals (SDGs). As a contribution to the Goal 9 or SDG 9. The smart system will foster innovation in developing resilient virtual infrastructure and promoting sustainable industrialization that is supported by the Tanjung-Priok Port. In other side, VIDEL will meet to the Goal 11 or SDG 11. The proposed system will encourage inclusiveness, resilience, and sustainability of the DKI Jakarta Province.

This system will also support the climate action of the 13th goal, which is backing the Indonesia's commitment to the Paris Agreement through the Nationally Determined Contribution (NDC), especially to keeping "1.5 degrees alive" because of the 26th UN Climate Change Conference in Glasgow. Some actions can be endorsed by the system, not only reducing GHG emission from the port-city-industry activities but also lowering risks of climate change impacts on the activities. Smartness of the system will also be developed to support an early warning system of some environmental hazards.

In other side, the smart system will also commit to other goals as it provides positive impacts on national and local economics (SDG 8 on Decent Work and Economic Growth), social and governance (SDG 16 on Peace, Justice, and Strong Institutions), as well as overall goals (SDG 17 on Partnerships for the Goals).

25.5 Conclusion

This chapter has explored smart and sustainable governance in the interactions of urban with port and industry. Concepts, enabling factors, elements or dimensions, benefits and challenges have been described in terms of development the framework and system design of VIDEL. Framework of Tanjung Priok Port – City – Industry – Environment Interactions has been constructed that employs a system design, which can encompass the port-city "Super-apps" concept. This system consists of (1) Main server VIDEL, (2) Mobile App's Server, (3) Payment Gateway, (4) E-Commerce System, (5) Decision Support System (DSS), (6) Environment Monitoring Module, (7) Urban Monitoring Module, (8) Port Operations Monitoring Module, (9) Logistics Monitoring Module.

The opportunity to initiate smart governance with a proenvironmental nuance is no longer just a utopia for the global community. Technological development based on digitalization open the access of multistakeholder interest reconciliation, using data integration and machine learning process to solidify the determination of global problems. Besides, the urge of collaborative design is well accepted in every community background. Incorporated the sophisticated technology development, cocreation management, and international concern of sustainability creates the possibility of balanced output (in economic, social, and environmental goals). This study shows super system governance, which contains issues of Port-City–Industry–Environment that can be applied to the Jakarta-Tanjung Priok port-city community. Port and city will become an urban-governance-chain to compile future integrated spatial initiatives. Moreover, port and industry also construct a logistics network establishing global supply agendas. VIDEL have a role as sustainable system that will be built using intelligent management based on Super-Apps. The involvement of all stakeholders in the Jakarta-Tanjung Priok community aims to produce a reliable digital ecosystem, where all actors in the industrial system, logistics service providers, and port operators can be part of the development of Super-Apps business features. Port Authority can be a collaborator in the development of environmental monitoring features.

VIDEL will help to answer such complex urban governance problems and underlying issues related to the city and port such as poverty, lack of capacity, diverse sociocultural contexts, inequality, and power asymmetry. Those problems will be addressed by the advisory panel of VIDEL and then translating them into solving algorithms and then coming up with synchronically adjusting recommendations to dynamically changing conditions (such as new physical logistics infrastructure, emerging new technologies) providing an updated white paper and new tool sets each year. The decision scientists will be in charge for the development of a protocol for theory-based, evidence-based, and sustainability-oriented development of urban/logistics planning decision aids. Further, together with decision counselors and other actors, they will form guidelines for quality criteria of decision aids, being

related to the content of a decision aid, to its development process, and to the evaluation of its effectiveness.

VIDEL is proposed as an interface that bridges the interaction between JAKI and existing smart-port applications. It is designed as a sustainability included smart-platform to facilitate interactions of urban with port and industry.

The following systematic development phases and activities are recommended for transition process: Synchronization; Questionnaire; Mapping; System Dynamics Method; Action Plan and Advisory Board Monitoring. We also complete the concept with some action plans: (1) Development Phase (Preliminary & Data Integration; Development of Algorithms & Models; Software process/platform; development (prototyping): Stakeholders' feedback: (prototype testing); Sustainability of the VIDEL; Capacity Building/Training; Finalization), (2) The attention to the Super-Apps interoperability and (3) Security.

In this disruption and VUCA (Volatility, Uncertainty, Complexity & Ambiguity) era, the VIDEL will become a "Super-apps" that binds interactions of urban, port and industry. It is also indispensable for national and regional development as well as contributes to the Sustainable Development Goals (SDGs). Major contributions are promoted by VIDEL to the goals related to the port-city–industry–environment interactions that are Industry, Innovation, and Infrastructure (9th), Sustainable Cities and Communities (11th), and Climate Action (13th). In addition, the smart system will also contribute to other goals, especially Decent Work and Economic Growth (8th), Peace, Justice, and Strong Institutions (16th), and Partnerships for the Goals (17th).

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