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Erasmus University Rotterdam
Making Minds Matter

GITASANTI ANDRIANI DJAIS

GOVERNING SUSTAINABLE CORRIDOR DEVELOPMENT

CASE STUDIES OF GILIMANUK - DENPASAR - PADANGBAI AND YOGYAKARTA - SOLO - SEMARANG CORRIDORS

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CASE STUDIES OF GILIMANUK – DENPASAR – PADANGBAI AND

YOGYAKARTA – SOLO – SEMARANG CORRIDORS

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Governing Sustainable Corridor Development: Case Studies of Gilimanuk - Denpasar - Padangbai and Yogyakarta - Solo - Semarang Corridors

Sturing van duurzame corridorontwikkeling
Casestudies van de Corridors Gilimanuk - Denpasar - Padangbai en
Yogyakarta - Solo - Semarang

Thesis

to obtain the degree of Doctor from the
Erasmus University Rotterdam
by command of the
rector magnificus

Prof. dr. A.L. Bredenoord

and in accordance with the decision of the Doctorate Board.
The public defense shall be held on

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Jakarta, 27 December 2023

Gitasanti Andriani Djais

SUMMARY

In 2015, the Government of Indonesia established Strategic Development Regions Corridors (SDR Corridors). The primary objective behind these corridors was to leverage Indonesia's economic potential while simultaneously addressing pressing sustainability concerns in various regions. In a world where economic growth often takes center stage, the Indonesia case stands out as both promising and challenging. This is because a sustainable (transport) corridor requires broader objectives than the traditional corridor development approach.

Typically, a transport corridor development is designed to boost economic growth by improving transport, trade, and logistics services along its core transportation network. While these objectives make economic sense, they are often biased toward economic interests. Though important, non-economic elements, such as environmental preservation and socio-cultural concerns, seemingly take the back seats as secondary conditions behind economic benefits.

This narrative delves into the realm of regional development theories and practice. Traditionally, regional development has been viewed through a narrow lens that prioritizes economic gains, often at the expense of environmental and social well-being. Economic drivers like GDP growth, trade volume expansion, and infrastructure development tend to overshadow ecological impact and community welfare.

Over time, there has been a significant shift in the way countries approach regional development. This shift is driven by increasing awareness of the need to conserve resources for future generations and commitment to global agreements such as the Paris Agreement on climate change and the United Nations Sustainable Development Goals (SDGs). Corridor development is now viewed as a means to preserve the environment, protect cultural heritage, and enhance the quality of life for local communities, leading to the concept of sustainable (transport) Corridor. This perspective shift is also reflected in the growing recognition within literature in the respective field.

A sustainable (transport) corridor is envisioned as a regional growth catalyst while promoting environmental, social, and economic sustainability. It prioritizes the coexistence of sustainability objectives alongside economic ambitions. However, there are challenges that exist in pursuing sustainable (transport) corridor development.

Not all corridor projects claiming to be environmentally friendly genuinely live up to their sustainability claims. Corridor development's vast scale and complex nature involving regions' environmental, social, and economic aspects present significant challenges in achieving balanced development. This balance requires a complex and iterative process involving multiple stakeholders with unique resources and sustainability knowledge. However, the diversity of actors introduces another layer of complexity, as they have their own perceptions, agendas, objectives, and strategies that influence the decision-making process. This diversity can either facilitate or hinder sustainable corridor development. Meanwhile, an aggressive push in one sustainability dimension, often representing specific actors' interests, can exacerbate problems in other sustainability dimensions. The interactions among these actors need to be facilitated, guided, and coordinated in such a way as to enable strategic alliances that effectively address sustainability concerns. This coordination is achieved with governance.

Furthermore, theories also have inherent issues in the context of sustainable (transport) corridor study. Various corridor development literature focuses on the merits of transport corridors beyond transport and logistic optimization, including soft infrastructure provision, and policy and organizational reforms, while only a subset of the literature concentrates on how to develop a full-fledged sustainable corridor. Another noteworthy concern pertains to the dominant focus of sustainable development theory, which is primarily centered on the multifaceted dimensions of sustainability and what needs to be sustained. Not much attention has been given to the interaction process of multiple sustainability actors in a corridor's network for joint sustainability actions. In addition, the role of governance has been discussed in regional development, sustainable development, as well as corridor development literature. Nevertheless, governance literature itself does not specify under what qualities governance can contribute to steering corridor development into a sustainable direction.

The above circumstance shows that none of these theories have readymade answers when addressing the topic of sustainable (transport) corridors. Therefore, this research integrates them. Through the lens of regional development, corridor development, sustainable development, and governance theories, it explores the specific qualities of governance that can contribute to realizing and optimizing sustainability outcomes.

To navigate these intricate dynamics and arrive at sustainable corridor development, this research analyzes two case studies of Indonesian Corridors: The Gilimanuk - Denpasar - Padangbai, and the Yogyakarta - Solo - Semarang Corridors, both of which are part of the Indonesian Government's large-scale corridors program. Both corridors serve as vital transportation networks,

connecting growth centers, main transportation hubs, and urban and rural areas to support the movement of people, goods, and services in the regions. Thus, they share strategic importance in Indonesia's economy, and have advanced national roads as the corridors' backbones. However, they face unique challenges related to natural disasters, environmental issues, and socioeconomic disparities.

Using those cases, the research highlights the role of governance in positioning actors with specific roles and responsibilities within the decision-making process. It accounts for various stakeholders' diverse interests and concerns, and how they engage in various sustainability discussions and negotiations to reach common sustainability objectives and joint sustainability actions.

A conceptual framework was developed based on the existing literature on the mentioned theories. This framework guides the study in analyzing five governance factors as independent variables, notably a sustainability vision, governance modes, actors' constellation, sustainability knowledge, and the institutional setting. The study also examines the interaction process as intermediate variables in which actors deploy strategies to influence the outcomes of the process. The study then emphasizes how governance and interaction processes influence sustainability outcomes. Since the Indonesian Corridors have not reached their final implementation phase and that outcomes can only be measured after a considerable time, sustainability outcomes as the dependent variable in this study are characterized as the balance of economic, environmental, and social plans and measures decided upon during the corridor development process.

The findings of the study reveal the gradual transition of outcomes from an economic focus to a more holistic consideration of sustainability dimensions, showing how the corridor can function as a sustainability axis. The corridors have evolved to address regional sustainability concerns, incorporating environmental and socio-economic programs tailored to the specific needs of different regions. The study underscores the pivotal role of governance in shaping these outcomes.

The initial vision and planning scope of sustainable corridors set a clear direction for the planning process, directing actors to actively participate within the sustainability framework. Process management and process design, guided by the vision, and complemented by Indonesia's decentralized planning system, played critical roles in fostering collaboration among stakeholders from various backgrounds. The study reveals that a favorable constellation of vision, process management, and process design co-evolved with the development process, contributing significantly to sustainability outcomes, for it allowed the inclusion of diverse actors in sustainability discussions and negotiations, including

regional/local stakeholders with their local, tacit, and codified knowledge. This governance approach emphasizes incorporating diverse perspectives and maintaining a clear sustainability direction.

Nevertheless, it is worth noting that once a corridor is initially conceived with a primary focus on economic interests, the opportunities to fully maximize the regions' potential for sustainability through measures aimed at mitigating negative social and environmental impacts become limited.

The study highlights how the early top-down SDR conception that was conducted with limited local and tacit knowledge, while influenced by economic considerations, led to certain limitations as found in the GDP Corridor delineation. This limited the corridors' ability to comprehensively address issues of disparity and equality, and ecological ones. The study thus underscores the critical importance of adopting a sustainability-oriented vision and the inclusion of regional/local actors right from the outset rather than prioritizing the corridors' economic ambitions.

The predominant top-down element throughout the whole planning process with more involvement of public actors also led to sustainability outcomes that focused on hard infrastructure development, with less attention given to soft infrastructure programs. Both GDP and YSS corridors' networks were not so inclusive as they lacked the involvement of regional/local non-public innovation actors. This overemphasis on physical infrastructure may potentially hinder grassroots movements and innovation in sustainable practices within regions. In addition, the study recognizes the importance of external factors that influence sustainability outcomes, that is, the government's commitment to various international sustainability agendas. These external factors complement and reinforce the sustainability vision, guiding governance processes and enhancing the sustainability focus of both GDP and YSS Corridors.

SAMENVATTING

In 2015 heeft de regering van Indonesië corridors voor strategische ontwikkelingsregio's (SDR-corridors) ingesteld. Het belangrijkste doel achter deze corridors was om het economische potentieel van Indonesië te benutten en tegelijkertijd dringende duurzaamheidsproblemen in verschillende regio's aan te pakken. In een wereld waar economische groei vaak centraal staat, springt het geval Indonesië eruit als zowel veelbelovend als uitdagend. Dit komt omdat een duurzame (transport)corridor bredere doelstellingen vereist dan de traditionele corridorontwikkelingsaanpak.

Gewoonlijk is de ontwikkeling van een transportcorridor bedoeld om economische groei te stimuleren door het verbeteren van transport, handel en logistieke diensten langs het centrale transportnetwerk. Hoewel deze doelstellingen economisch zinvol zijn, zijn ze vaak gericht op economische belangen. Hoewel niet-economische elementen, zoals milieubehoud en sociaal-culturele overwegingen, belangrijk zijn, lijken ze op de tweede plaats te komen als secundaire voorwaarden achter economische voordelen.

Dit verhaal duikt in het rijk van theorieën en praktijken over regionale ontwikkeling. Van oudsher wordt regionale ontwikkeling bekeken door een smalle bril die prioriteit geeft aan economische voordelen, vaak ten koste van het milieu en het sociale welzijn. Economische drijfveren zoals groei van het BBP, uitbreiding van het handelsvolume en ontwikkeling van de infrastructuur overschaduwen vaak de ecologische impact en het welzijn van de gemeenschap.

In de loop der tijd is er een belangrijke verschuiving opgetreden in de manier waarop landen regionale ontwikkeling benaderen. Deze verschuiving wordt gedreven door een toenemend bewustzijn van de noodzaak om hulpbronnen te behouden voor toekomstige generaties en betrokkenheid bij wereldwijde overeenkomsten zoals de Overeenkomst van Parijs over klimaatverandering en de Sustainable Development Goals (SDG's) van de Verenigde Naties. De ontwikkeling van corridors wordt nu gezien als een middel om het milieu te beschermen, cultureel erfgoed te beschermen en de levenskwaliteit voor lokale gemeenschappen te verbeteren, wat heeft geleid tot het concept van duurzame (transport)corridors. Deze verschuiving in perspectief wordt ook weerspiegeld in de groeiende erkenning binnen de literatuur op het betreffende gebied.

Een duurzame (transport)corridor wordt gezien als een regionale groeikatalysator die tegelijkertijd ecologische, sociale en economische

duurzaamheid bevordert. Er wordt prioriteit gegeven aan het naast elkaar bestaan van duurzaamheidsdoelstellingen en economische ambities. De ontwikkeling van duurzame (transport)corridors brengt echter uitdagingen met zich mee.

Niet alle corridorprojecten die beweren milieuvriendelijk te zijn, maken hun duurzaamheidsbeloften ook echt waar. De enorme schaal en complexe aard van de corridorontwikkeling, waarbij zowel milieu-, sociale als economische aspecten van de regio's een rol spelen, vormen een grote uitdaging om tot een evenwichtige ontwikkeling te komen. Dit evenwicht vereist een complex en iteratief proces waarbij meerdere belanghebbenden met unieke middelen en kennis van duurzaamheid betrokken zijn. De diversiteit van actoren zorgt echter voor een extra laag van complexiteit, omdat ze hun eigen percepties, agenda's, doelstellingen en strategieën hebben die het besluitvormingsproces beïnvloeden. Deze diversiteit kan de ontwikkeling van duurzame corridors vergemakkelijken of belemmeren. Ondertussen kan een agressieve push in één duurzaamheidsdimensie, die vaak de belangen van specifieke actoren vertegenwoordigt, problemen in andere duurzaamheidsdimensies verergeren. De interacties tussen deze actoren moeten worden gefaciliteerd, gestuurd en gecoördineerd op een manier die strategische allianties mogelijk maakt die de duurzaamheidsaspecten effectief aanpakken. Deze coördinatie wordt bereikt met governance.

Verder hebben theorieën ook inherente problemen in de context van duurzame (transport)corridorstudie. Diverse literatuur over de ontwikkeling van corridors richt zich op de verdiensten van transportcorridors die verder gaan dan transport- en logistieke optimalisatie, waaronder het aanbieden van zachte infrastructuur en beleids- en organisatorische hervormingen, terwijl slechts een deel van de literatuur zich concentreert op de vraag hoe een volwaardige duurzame corridor kan worden ontwikkeld. Een ander opmerkelijk punt van zorg heeft te maken met de dominante focus van de theorie over duurzame ontwikkeling, die zich vooral richt op de veelzijdige dimensies van duurzaamheid en op wat duurzaam moet zijn. Er is niet veel aandacht besteed aan het interactieproces van meerdere duurzaamheidsactoren in het netwerk van een corridor voor gezamenlijke duurzaamheidsacties. Daarnaast is de rol van bestuur besproken in de literatuur over regionale ontwikkeling, duurzame ontwikkeling en corridorontwikkeling. Desondanks wordt in de literatuur over governance zelf niet gespecificeerd onder welke voorwaarden governance kan bijdragen aan het sturen van de ontwikkeling van corridors in een duurzame richting.

Het bovenstaande laat zien dat geen van deze theorieën kant-en-klare antwoorden heeft als het gaat om duurzame (transport)corridors. Daarom worden ze in dit onderzoek geïntegreerd. Door de lens van regionale

ontwikkeling, corridorontwikkeling, duurzame ontwikkeling en bestuurstheorieën onderzoekt het de specifieke kwaliteiten van bestuur die kunnen bijdragen aan het realiseren en optimaliseren van duurzaamheidsresultaten.

Om door deze ingewikkelde dynamiek te navigeren en tot duurzame corridorontwikkeling te komen, analyseert dit onderzoek twee casestudies van Indonesische corridors: De corridors Gilimanuk - Denpasar - Padangbai en Yogyakarta - Solo - Semarang, die beide deel uitmaken van het grootschalige corridorprogramma van de Indonesische overheid. Beide corridors fungeren als vitale transportnetwerken die groeicentra, belangrijke transportknooppunten en stedelijke en plattelandsgebieden met elkaar verbinden om het verkeer van mensen, goederen en diensten in de regio's te ondersteunen. Ze zijn dus van strategisch belang voor de Indonesische economie en hebben geavanceerde nationale wegen als ruggengraat van de corridors. Ze worden echter geconfronteerd met unieke uitdagingen in verband met natuurrampen, milieuproblemen en sociaaleconomische ongelijkheden.

Aan de hand van deze cases belicht het onderzoek de rol van governance bij het positioneren van actoren met specifieke rollen en verantwoordelijkheden binnen het besluitvormingsproces. Er wordt rekening gehouden met de verschillende belangen en zorgen van de verschillende belanghebbenden en hoe zij deelnemen aan verschillende duurzaamheidsdiscussies en -onderhandelingen om tot gemeenschappelijke duurzaamheidsdoelen en gezamenlijke duurzaamheidsacties te komen.

Op basis van de bestaande literatuur over de genoemde theorieën is een conceptueel raamwerk ontwikkeld. Dit raamwerk begeleidt het onderzoek bij het analyseren van vijf governancefactoren als onafhankelijke variabelen, met name een duurzaamheidsvisie, governancemodi, de constellatie van actoren, kennis over duurzaamheid en de institutionele setting. De studie onderzoekt ook het interactieproces als intermediaire variabelen waarin actoren strategieën inzetten om de uitkomsten van het proces te beïnvloeden. De studie benadrukt vervolgens hoe governance- en interactieprocessen de duurzaamheidsresultaten beïnvloeden. Aangezien de Indonesische corridors nog niet hun laatste implementatiefase hebben bereikt en de resultaten pas na geruime tijd kunnen worden gemeten, worden de duurzaamheidsresultaten als afhankelijke variabele in dit onderzoek gekarakteriseerd als de balans van economische, ecologische en sociale plannen en maatregelen waartoe tijdens het corridorontwikkelingsproces is besloten.

De bevindingen van het onderzoek laten de geleidelijke overgang zien van een economische focus naar een meer holistische beschouwing van

duurzaamheidsdimensies, wat laat zien hoe de corridor kan functioneren als een duurzaamheidsas. De corridors hebben zich ontwikkeld om in te spelen op regionale duurzaamheidskwesties, waarbij milieu- en sociaaleconomische programma's zijn opgenomen die zijn afgestemd op de specifieke behoeften van de verschillende regio's. Het onderzoek onderstreept de cruciale rol van bestuur bij het vormgeven van deze resultaten.

De initiële visie en het planningsbereik van duurzame corridors geven een duidelijke richting aan voor het planningsproces en sturen actoren aan om actief deel te nemen binnen het duurzaamheidskader. Procesmanagement en procesontwerp, gestuurd door de visie en aangevuld door het gedecentraliseerde planningssysteem van Indonesië, speelden een cruciale rol in het bevorderen van samenwerking tussen belanghebbenden met verschillende achtergronden. Het onderzoek laat zien dat een gunstige constellatie van visie, procesmanagement en procesontwerp samenging met het ontwikkelingsproces en aanzienlijk bijdroeg aan de duurzaamheidsresultaten, omdat het de integratie van diverse actoren in duurzaamheidsdiscussies en -onderhandelingen mogelijk maakte, inclusief regionale/lokale belanghebbenden met hun lokale, stilzwijgende en gecodificeerde kennis. Deze bestuurlijke benadering benadrukt het opnemen van verschillende perspectieven en het handhaven van een duidelijke duurzaamheidsrichting.

Toch is het de moeite waard om op te merken dat als een corridor eenmaal is ontworpen met een primaire focus op economische belangen, de mogelijkheden om het potentieel van de regio's voor duurzaamheid volledig te maximaliseren door middel van maatregelen gericht op het verminderen van negatieve sociale en milieueffecten beperkt worden.

Het onderzoek laat zien hoe het vroege top-down SDR-concept, dat werd uitgevoerd met beperkte lokale en stilzwijgende kennis, terwijl het werd beïnvloed door economische overwegingen, leidde tot bepaalde beperkingen zoals die in de afbakening van de BBP-corridor. Dit beperkte het vermogen van de corridors om kwesties van ongelijkheid en gelijkheid en ecologische kwesties aan te pakken. Het onderzoek onderstreept dus het cruciale belang van een op duurzaamheid gerichte visie en de betrokkenheid van regionale/lokale actoren vanaf het begin in plaats van prioriteit te geven aan de economische ambities van de corridors.

Het overheersende top-down element gedurende het hele planningsproces met meer betrokkenheid van publieke actoren leidde ook tot duurzaamheidsresultaten die gericht waren op de ontwikkeling van harde infrastructuur, met minder aandacht voor zachte infrastructuurprogramma's. De netwerken van zowel de GDP-corridors als de YSS-corridors waren niet zo

inclusief omdat de betrokkenheid van regionale/lokale niet-publieke innovatie-actoren ontbrak. Deze overmatige nadruk op fysieke infrastructuur kan mogelijk een belemmering vormen voor basisbewegingen en innovatie in duurzame praktijken binnen regio's. Daarnaast erkent het onderzoek het belang van externe factoren die de duurzaamheidsresultaten beïnvloeden, namelijk de betrokkenheid van de overheid bij verschillende internationale duurzaamheidsagenda's. Deze externe factoren vullen de duurzaamheidsagenda's aan en versterken deze. Deze externe factoren complementeren en versterken de duurzaamheidsvisie, sturen bestuursprocessen en versterken de duurzaamheidsfocus van zowel de GDP- als de YSS-corridors.

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CHAPTER 1
INTRODUCTION

1.1. Research Background

The McKinsey Global Institute (Oberman et al., 2012) predicted that Indonesia, the world's largest archipelago with 16,056 islands (Setkab.go.id) and the fourth most populous country globally, is on course to become the seventh-largest economy in the world by 2030 based on its recent economic records and prospects. At the same time, Indonesia faces various sustainability challenges. Positioned between the world's most active seismic regions - the Pacific Ring of Fire and the Alpide Belt - Indonesia is prone to numerous natural disasters such as volcanic eruptions, abrasion, tsunamis, flooding, and landslides. Regions in the country also experience sustainability issues commonly found in urbanized areas, including waste management, traffic congestion, air pollution, conversion of the rural areas into settlements or commercial activities, presence of slums, poor access to clean water and sanitation, and lack of access to public housing for low-income households and educational facilities.

Therefore, in 2015, the Government of Indonesia, through the Ministry of Public Works and Housing (MPWH), attempted to harness the country's economic growth while simultaneously addressing those sustainability challenges through the development of sustainable (transport) corridors. These corridors are known as Strategic Development Regions (SDR) corridors. The idea of SDR was elaborated within the MPWH Strategic Plan (MPWH, 2015) as a market-driven development that focuses on the connectivity of economic growth centers at the national, regional, and local levels. These growth centers encompass strategic areas, airports, seaports, and rural and urban areas scattered throughout the regions and are connected to a backbone (the national road network). The approach was expected to generate significant development impacts by integrating investments in the planned areas. Simultaneously, the SDR had additional sustainability objectives to address regions' low environmental carrying and support capacities, disparity issues, and the lack of basic infrastructure access to people (Ibid.).

Transport corridor development exemplifies regional development planning and practice (Susantono, 2015; Brunner, 2013; Athukorala and Narayanan, 2018; Srivastava, 2011). Regional development can be understood as a holistic approach that integrates various sectoral planning of regions at various levels (national, regional, and local) within a common framework (Ahmad and Bajwa, 2005; Susantono, 2015). This approach focuses on growth drivers and emphasizes economic gains (Dawkins, 2013; Popescu, 2016). However, it neglects the broader implications and long-term consequences of unbalanced development, as it

prioritizes development to attract investments, increase trade and productivity, and create job opportunities. As a result, the development of regions becomes narrowly focused on economic indicators such as GDP growth, trade volumes, and infrastructure development while overlooking the environmental impact and social well-being of communities (Flyvbjerg, 2003; Pike et al., 2007; Mahmood et al., 2020).

Consequently, transportation corridors have been inherently designed to foster economic growth by enhancing transport, trade, and logistics services to cater to the activities and movements of regions along the corridor (Nogales, 2014; Srivastava, 2011; Brunner, 2014). Its development focuses on making economic sense to be viable (Nogales, 2014). However, the implications of such development can be far-reaching, leading to a potential bias towards economic interests in which non-economic elements such as environmental protection and socio-cultural aspects are simply attached to the leading economic initiatives (Ibid.). The development of transport corridors often assumes that economic advancements would automatically address social and environmental concerns.

As countries grapple with sustainability challenges, including Indonesia, the development of transport corridors aims for broader goals, which involve striking a delicate balance between economic development and sustainability stewardship (Oberg, 2017; Ali et al., 2021; Aman et al., 2022; Nogales, 2014). Such corridors are expected to accelerate the growth of regions and simultaneously establish environmentally, socially, and economically sustainable systems. They are recognized as sustainable (transport) corridors (Awais, 2019; Hope and Cox, 2015; Dossani, 2016; Oberg, 2017). The development of sustainable (transport) corridors thus aims to set the right footing for sustainability by giving equal importance to sustainability goals alongside economic ambitions to address the region's present and future challenges within environmental, social, and economic dimensions challenges (Hope and Cox, 2015; Oberg, 2017). Development in the environmental dimension focuses on ecological integrity and preserving the human-shaped environment. It includes environmental protection measures necessary to sustain economic activities and maintain a good quality of life. Development in the social dimension involves developing and preserving cultural identity, religion, social values, human rights, equality, local wisdom, and societal norms. Lastly, development in the economic dimension pertains to the development and maintenance of natural resources and social capital needed to enhance income levels and living standards (Klarin, 2018; Tappeser et al., 1997).

Numerous scholarly works have explored the concept of a sustainable transport corridor in conjunction with a green corridor, as proposed by various authors (Nogales, 2014; Prause, 2015; Aman et al., 2022). Both of these concepts aim to foster the development of transportation networks that meet the socio-economic needs of communities while mitigating the adverse effects of human activities on

the environment (Ibid.). However, the primary focus of this research centers on the notion of a sustainable transport corridor, as opposed to a green corridor. This choice is driven by the distinct emphasis placed on the two concepts: the green corridor primarily concentrates on enhancing the sustainability of the logistics chain through technological innovations (Prause and Schroder, 2015; Prause, 2015; Kurapati et al., 2018) without taking into account the broader environmental impacts in the corridor's vicinity (Nogales, 2014; Purvis et al., 2018).

There are two challenges when developing a sustainable corridor. First, not all corridor projects claiming to be green necessarily live up to their claims in practice. These projects can face legitimate criticism for their failure to prioritize sustainability. One common criticism of such corridor projects is the lack of proper planning and implementation that prioritizes growth over ecological considerations, leading to habitat destruction, fragmentation, and disruption of natural ecosystems, not fully considering the long-term ecological and socioeconomic consequences. The concept of sustainable corridors can also be misused for greenwashing, where companies, organizations, and governments present a sustainability-friendly image to the public without implementing sustainable practices (Lashitew, 2021; Harlan, 2020). Projects that promote sustainability but fail to address underlying issues like deforestation, pollution, or unsustainable land use practices may be greenwashing their activities, diverting attention away from their negative impacts. Thus, whether a corridor is considered greenwashing depends on the specific project and how it is promoted and implemented. If a corridor development project prioritizes sustainability, environmental responsibility, and community well-being, and these claims are backed by transparent and measurable actions that align with these goals, it would not be considered greenwashing. However, if a corridor project claims to be eco-friendly, sustainable, or in alignment with environmental goals, but it fails to meet those claims in practice or has a negative impact on the environment and/or community, then it could be considered an example of greenwashing.

Secondly, corridor development encompasses vast landscapes and extensive activities and movements (Srivastava, 2011) that can impact regions' ecological, social, and economic aspects (Quium, 2019). Realizing balanced development of environmental, social, and economic sustainability dimensions is not easily achieved at once. It requires a process (Liu, 2017) involving multiple stakeholders with unique resources and knowledge within a strategic alliance (Oberg, 2017; Nogales, 2017; Athukorala and Narayanan, 2018). At the same time, actors have their perceptions, agendas, and strategies that influence the decision-making process and outcomes (Hope and Cox, 2015; Klijn and Koppenjan, 2016; Jovovic et al., 2017; OECD, 2011a). Such influence poses a risk in which the push of one dimension (representing certain actors' interests, typically emphasizing transport

and economic objectives) may reveal or create problems in the other dimensions (Dossani, 2016; Quium, 2019). Therefore, to arrive at sustainable corridor development, actors' behaviors need to be coordinated, done with governance (Oberg, 2018).

Governance can position actors into specific roles and responsibilities and account for the interests/concerns of various stakeholders within a decision-making process. It is achieved through an interaction process of actors that allows them to balance their interests, mediate different strategies, devise solutions, and come up with joint actions. This process leads to the sharing of experiences and mutual learning (Li, 2016; Termeer et al., 2013; Ouden, 2015; Ansell and Gash, 2008; Romein et al., 2003; OECD, 2009). Therefore, this study does not only examine the extent of sustainability of Indonesian corridors, but also the intricate dynamics of decision-making processes among actors within their interaction process, and how governance influences the coordination of actors within their interaction process to result in sustainability outcomes, ensuring that the development of the corridor is well on its way toward sustainability.

1.2. Problem Statement

From the earlier section, we can observe the issue surrounding the development of (transport) corridors. These corridors are seen as regional development initiatives that utilize a geographically linear infrastructure system to stimulate economic development and catalyze investment (Athukorala and Narayanan, 2018; Srivastava, 2011; Priemus and Zonneveld, 2003). Such corridors tend to prioritize economic benefits at the expense of sustainability considerations (Quium, 2019). Nevertheless, exploration of a corridor's ability to respond to regions' sustainability issues and preconditions for such outcomes remains understudied.

Sustainable (transport) corridor development entails a comprehensive planning approach to provide efficient and reliable transportation while promoting environmental protection, social inclusivity, and economic viability (Awais, 2019; Quium, 2019; Stevens and Buksh, 2012). Such development emphasizes the necessity to accommodate a balance among the environmental, social, and economic dimensions, ensuring that an exclusive focus on economic development does not overshadow sustainability (Taisarinova et al., 2020). Furthermore, collaboration among actors is crucial for realizing a sustainable transport corridor (Oberg, 2017). However, actors may impede sustainable solutions due to differences in interests or subjective beliefs, values, or principles (Campbell and Floyd, 1996; Mahmood et al., 2020). Therefore, governance is needed to provide favorable organizational and steering conditions to coordinate the interactions of actors and their different resources (Klijn and Koppenjan, 2016; Oberg, 2017; OECD, 2009).

Nevertheless, theories surrounding sustainable (transport) corridor development fall short. Most corridor development studies have been focused on the economic gains a corridor can have from its integrated development nature (Rodrigue, 2003; Brunner, 2013; Susantono, 2015; Carruthers and Kunaka, 2014; De and Iyengar, 2014; Mitra, 2016; Srivastava, 2011). At the same time, only a few have addressed the extent of a corridor's ability to address the environmental, social, and economic sustainability challenges faced by regions (Ali et al., 2021; Gannon, 2020; Nogales, 2014; Awais, 2019; Hope and Cox, 2015; Dossani, 2016). In order to fill the gap in the sustainable (transport) corridors theory, this study delves into the four theories of regional development: corridor development, sustainable development, and governance. None of these theories individually have readymade answers. Sustainable development theory prominently focuses on defining the multidimensional nature of sustainability and what needs to be sustained (Marshall and Toffell, 2005); it pays little attention to the development process required to achieve sustainability. Furthermore, while governance can establish or enhance favorable scenes, rules, and procedures that promote coordination and collaboration among actors (Milagres et al., 2019; Gjaltema et al., 2019), it does not specifically account for sustainability. Thus, further research is needed to clarify how governance can design and manage the corridor direction so as to allow the process to promote balance between sustainability dimensions.

The above circumstance led the author to further conduct research that integrates the mentioned literature, to examine the intricate interactions between governance, the governance process, and sustainability outcomes within a clear, theoretically grounded framework, that is currently missing in the sustainable corridor development study.

1.3. Research Objective

As explained in the earlier sections, the study of sustainable (transport) corridors is crucial due to the limitations of corridor development projects traditionally designed to prioritize efficient transportation without adequately considering the aspects of social welfare and environmental protection. A sustainable (transport) corridor aims to achieve long-term viability and balance multiple sustainability dimensions. However, the relationship between governance and sustainable development in these corridors still needs to be well defined both in practice and theories, especially when it involves the need for coordination of actors from different disciplines with diverse agendas and resources.

To explore such relationship, the study focuses on two Indonesian SDR corridors, the GDP Corridor in Bali and the Yogyakarta - Solo - Semarang Corridor in Java. These corridors are parts of the large-scale corridors program of the Indonesian Government. The program was initiated to tap economic opportunities in tourism,

agriculture, trade, and services and synergize environmental, social, and economic sustainability (MPWH, 2015: 50-53). With its economic and sustainability ambitions, this study aims to assess the extent to which corridor development embraced a sustainable trajectory and investigate how governance influenced sustainability outcomes. Thus, this study not only amends the traditional corridor approach, but it especially contributes to the new approach so that the corridor can strengthen its potential towards sustainability. There are four aspects that this study underlines.

First and foremost, the study underscores the necessity to measure sustainability outcomes, despite the challenges posed by the multidimensional nature of sustainability and the ongoing nature of the two corridor cases. To address the issue, the study employs context-specific indicators to encompass the wide array of programs in environmental, social, and economic dimensions. The programs shed light on the specific dimension(s) in corridors at each development stage, the allocation of funding to the programs, and to which dimension the funding is predominantly made available. These indicators present the nuance of a particular sustainability dimension (environmental/social/economic) that dominates certain phases of corridor development.

Second, the study focuses on the dynamic interaction process among corridor actors. While sustainable development and regional development research often focus on outcomes and impacts, the process underlying how sustainability is achieved is often overlooked. By exploring how stakeholders engage, coordinate, and align their interests, the study seeks to uncover the complexities and challenges of sustainable corridor planning, providing insights for effective collaboration in a sustainability context.

Third, the study aims to identify governance factors that influence the interaction process of corridor actors. Governance plays a crucial role in coordinating actors and resources for sustainable corridor development. By examining the governance mechanisms and stakeholder engagement strategies, the study zooms into factors that enable and facilitate the collaboration of multiple actors toward sustainability.

Fourth, the study integrates the key concepts of governance factors, interaction process, and sustainability outcomes into a theoretical framework and explores their relationship through empirical analysis. By studying the Indonesian case studies, the research aims to bridge the gap between theory and practice in sustainable (transport) corridor development.

Overall, the study explores the potential of corridor development to achieve long-term viability, social welfare, and environmental protection beyond the conventional infrastructure development initiatives, through governance. By examining the Indonesian corridors and focusing on governance, interaction processes, and sustainability outcomes, the study can provide valuable insights to

policymakers, decision-makers, and corridor actors, fostering more inclusive and effective collaboration toward sustainable development. Ultimately, this study is meant to bring the theory of sustainable corridor development further to effectively address the pressing environmental, social, and economic challenges to benefit both present and future generations.

1.4. Research Questions

The main research question of this research is: "How does the governance of the GDP and YSS Corridors development process contribute to the realization of their sustainability outcomes?"

To answer the question, five sub-questions are raised as follows:

1) To what extent did the development of the GDP and the YSS Corridors result in sustainability outcomes?

   This sub-question analyzes the sustainability outcomes of the GDP and the YSS case studies throughout the corridor development processes. It seeks to examine the extent to which measures delivered by actors address regions' environmental, social, and economic issues and strike a sustainability balance.

2) How did the GDP and the YSS Corridor interaction processes evolve throughout the corridor development process?

   This sub-question focuses on reconstructing the interaction process of both corridor cases that mediate the governance factors and sustainability outcomes. The response to this inquiry entails the identification of the successive rounds within the interaction process, the actors participating in each round along with their strategies, and the intermediate outcomes that emerge as a result of the interaction process in each round.

3) What governance factors were present in the various rounds of the corridor development process?

   This sub-question aims to measure the values of governance factors in the different rounds of the corridors' development process. The answers to this question entail identifying the corridors' visions and their nuances towards sustainability dimensions, the types of governance mechanisms employed, the diverse actors representing different agendas and resources, the types of knowledge used to influence the decision-making process, and the presence of rules, procedures, and platforms that set the scene of the corridors' planning process.

4) What are the similarities and differences between the sustainable nature of outcomes, the interaction process, the governance factors, and their relationships within the GDP and the YSS Corridors?

   This sub-question draws the similarities and differences in the variables of the key concepts of the study throughout the GDP and YSS Corridors development process. The goal is to examine patterns in the relationship among these key concepts, ultimately confirming the contribution of governance to sustainable directions.

1.5. Methods

In this study, a conceptual framework is developed and presented as a set of interconnected key concepts based on theoretical foundations. The framework is formulated to conceptualize the research questions, and guide the research process in sustainable corridor development as it explores the logical connections between governance factors, interaction processes, and sustainability outcomes.

The case study method is chosen to explore the key concepts and their variables, as it allows in-depth analysis and a broad exploration of real-life cases based on empirical evidence. It does so by involving rich data collection and comprehensive analysis from different perspectives. Thus, the method allows a researcher to explore the intricacies and contextual factors that holistically influence the case (Yin, 2009; Creswell, 2013; Gustafsson,2017; Baxter & Jack, 2008; Stake, 1995; Vannoni, 2014). Two Indonesian corridor cases were selected to generalize the findings beyond a single case. Due to the goal of conducting an in-depth analysis within a restricted timeframe and managing a substantial dataset with numerous variables, the comparison will focus on just two cases(Baxter & Jack, 2008).

The Gilimanuk-Denpasar-Padangbai Corridor and the Yogyakarta-Solo-Semarang Corridor are parts of the 35 SDR Corridors (see Fig.1). The SDR Corridors are classified into five categories, represented by different colors in Figure 1. These categories are: 1. Integrated Growth Centers, 2. Emerging Growth Centers, 3. Newly Growth Centers, 4. Land Borders, and 5. Outermost Small Islands. The first category represents the most advanced corridors, characterized by a relatively stable backbone condition, vibrant and steady growth centers, and good connectivity between growth centers and the corridor's backbone. The second category represents corridors with emerging growth centers with less advanced backbone compared to the first category. The third category comprises underdeveloped regions that require major interventions to boost their economic growth.

The last two categories represent corridors with similar conditions to the third category but situated within Indonesia's borders (fourth category) and the small outer islands of Indonesia (fifth category) (MPWH, 2017). Figure 1 also illustrates

that the most advanced Indonesian corridors, belonging to the first category (in shades of red, orange, and pink), are predominantly located in the western parts of Indonesia (in the Islands of Sumatera, Java, and Bali). The emerging corridors, categorized as the second category (shades of green), are dispersed throughout various islands. The new growth centers as the third category (represented by shades of yellow) are mostly situated in the eastern parts of Indonesia, where most of the lagging regions are.

Fig. 1. Strategic Development Regions (SDR) Corridors in Indonesia
Source: MPWH (2015)

The GDP and YSS Corridors fall within the same SDR category of Integrated Growth Centers due to their economic viability, robust economic linkages, and advanced condition of national roads, connecting important nodes along the corridors. The corridors play significant roles from a national perspective, with the abundant presence of growth nodes, international hubs, strategic sectoral nodes (tourism, agriculture, and fisheries), and metropolitan regions. The corridors are also strategically situated, with the GDP Corridor linking the western and the eastern parts of Indonesia, and the YSS Corridor connecting the primary metropolitan regions in Java Island.

Despite these similarities, the GDP and YSS Corridors have their own ecological and socio-economic characteristics and sustainability challenges. Their planning process also involves different sets of regional/local actors that would influence the interaction process of each corridor differently. These distinctions in process and

governance can account for differences in outcomes, while similarities in governance approaches might result in homogeneous outcomes despite distinctions in processes and conditions. By examining these cases, the author can delve into the complexities and nuances of how these corridors were planned and governed, which gives an understanding of the real-world challenges and the potential of governance associated with sustainable (transport) corridor planning.

This study relies on a comprehensive collection of qualitative data to achieve the aforementioned objectives to identify the variables' values within the framework. Such data is required to measure the extent of sustainability of the two corridors (dependent variables) by examining the balance between environmental, social, and economic dimensions. The balance is assessed by considering the proportions of environmental, social, and economic measures, the types of sustainability issues addressed in each dimension, and the availability of funding for programs. These variables are analyzed using government data, including the MPWH Strategic Plan 2015-2019, the GDP and YSS Integrated Infrastructure Development Plan final report, and Pre-RC's baseline programs implemented and funded in specific years.

Qualitative data is also necessary to analyze the evolution of the interaction process (intermediate variables) and governance factors that co-evolve with the process. Therefore, the analysis employs process tracing to map sequential events and identify the configurations of the key concepts in various rounds of the process (Bennet, 2010; Beach and Pedersen, 2013; Blatter and Haverland, 2014). Process tracing is applied using the rounds model. The rounds model is commonly adopted for analyzing prolonged and complex interaction processes between different types of actors addressing specific issues or aiming for specific solutions (Teisman, 2000; Klijn and Koppenjan, 2016; Beach and Pedersen, 2013; Blatter and Haverland, 2014). Each round concludes when significant decisions are reached.

As the study deals with process tracing of the different stages of corridor development, it needs to explore primary data related to actors' perceptions and experiences during their involvement in the corridors' planning process. This primary data is then triangulated with secondary data, predominantly government data, that helps verify actors' statements. The primary data comprises semi-structured interviews conducted with the central Government (Regional Infrastructure Development Agency), Provincial Governments, Local governments, consultants/experts, academics, NGOs, the Chamber of Commerce (for the GDP Corridor only), and the private sector (for the YSS Corridor only). The secondary data consists of government documents such as the MPWH Strategic Plan, reports, PowerPoint presentations related to the corridors' development, institution magazines, minutes of meetings, provincial mid-term development plans), data from the Indonesian Statistics (BPS), and other information gathered online in RIDA's website.

These data selections demonstrate that the author had unique access to data related to the GDP and the YSS corridors that other researchers would usually find difficult to access. This was made possible since the author was formerly an employee of RIDA. The circumstance facilitated arrangements for interviews with key persons in RIDA and access to government documents, as well as obtaining a letter of recommendation from the Head of RIDA (see Annex 1) to conduct interviews with regional and local actors, especially provincial and local governments.

1.6. Theoretical And Practical Relevance

The current discussion surrounding corridor development primarily focuses on the need to combine hard infrastructure development, with trade facilitation (logistic) reforms and improvement in a business climate that promotes entrepreneurship and innovation (Athukorala and Narayanan, 2018; Srivastava, 2011; Brunner, 2013; De and Iyengar, 2014; Hope and Cox, 2015). However, such attempts lead to trade-offs between the economy and sustainability, including the uneven distribution of the corridor's impact (Quium, 2019; Nogales, 2014). Therefore, corridor development has an economic focus (Dawkins, 2013; Popescu, 2016); hence, it is not enough to engage in development that envisions sustainability. Consequently, little is known about how to govern corridor development that functions as a sustainability axis.

To contribute to the sustainable transport corridor development discussion, this study constructs a conceptual framework that intersects various theories. This integration, which had not been previously undertaken in studies of sustainable corridor development, highlights the pivotal role of governance in harmonizing regional development practices with sustainability considerations. The role of governance itself has been discussed intensively in regional development literature (OED, 2009; Bruzt and Palestini, 2015; Breatnach, 2013; OECD, 2009; OECD, 2010), likewise in sustainable development literature (OECD, 2001a; Strange and Bailey, 2008: Rozema et al., 2007; Bello and Dola, 2014); those that link governance, regional development, and sustainable development all at one (Thierstein and Walser, 1999; Jovovic, 2017). Nevertheless, studies that specifically investigate the interplay between governance, regional development, and sustainability within the context of (transport) corridor development remain conspicuously scarce despite the widespread adoption of sustainable principles in corridor initiatives, as found in the Trans-European Network (Oberg, 2018), Maputo Corridor in Mozambique, and the Northern Corridor in East and Central Africa (Hope and Cox, 2015); China-Pakistan Corridor (Awais, 2019), and One Belt One-Road initiatives (Dossani et al., 2016).

In addition, the framework allows the study to zoom further into the evolution of the governance process and the dynamics of governance to influence the governance process in a sustainable direction. This aspect is notably absent in both sustainable development theory and governance theory.

Furthermore, this study offers practical knowledge for policymakers and practitioners involved in corridor planning on the presence of favorable constellations of factors: combining top-down steering with bottom-up contributions from regional and local sustainability actors in a collaborative setting (Crescenzi and Pose, 2011; Oberg, 2017). These actors contribute their scientific, local, and tacit knowledge as well as implementation capacities throughout the development process (OECD, 1997). However, extending a corridor's network to different actors also poses challenges, as the corridor's goals and strategies need to accommodate their diverse interests (Carruthers and Kanaka, 2014; Athukorala and Narayanan, 2017). Thus, this study provides insights on how to address such challenges by governing the interaction process of actors, promoting inclusion, aligning perceptions, establishing shared objectives, sharing strategies, circulating sustainability knowledge/information, and facilitating discussions/negotiations (interaction process) to foster joint actions for sustainability (Friend et al., 1974; Klijn, Stein, and Edelenbos, 2010)

Moreover, this study informs researchers, practitioners, and decision-makers related to corridor development that a corridor delineated using a predominant exogenous regional development approach (Srivastava, 2011; Susantono, 2015) has limitations in optimizing its sustainability potential. As a practical implication, the study argues that incorporating local sustainability contexts, including environmental and social characteristics and cultural relationships, can be considered from the outset of the corridor planning process, which would result in a different form of corridor delineation.

Lastly, the study discusses how, in many corridor cases, including the GDP and YSS Corridors, it is challenging for all parties to have more horizontal relations since actors often do not have equal roles and positions in the decision-making process, as suggested by theory. However, such issues can be addressed through process management, process design, and the development of favorable institutional settings (Koppenjan and Klijn, 2013; Klijn and Edelenboos, 2007; Paim and Flexa, 2011; Gjaltema et al., 2019) that allow the inclusion of regional/local actors with their local and tacit knowledge. The study argues that these governance factors can steer the hard infrastructure focus of corridor development towards incorporating intangible local factors of a region (local entrepreneurship, innovation, and collaboration) that foster endogenous growth as more regional/local actors join the decision-making process of the corridor outcomes.

1.7. Structure of the Manuscript

The report is structured as follows. Chapter 2 offers an in-depth exploration of key subjects, including regional development, corridor development, sustainable development, and governance theories. The initial section provides an insight into regional development, tracing the evolution of relevant theories. Following this, we delve into the specifics of transport corridor development, which serves as a specimen of regional development theories and implementation. Moving on to the second section, this study examines the concept of sustainability and its multidimensional nature, encompassing environmental, social, and economic aspects. It also investigates theories that integrate sustainability with regional development, and they are used in the planning of sustainable transport corridors. The third section delves into governance theory, emphasizing the importance of the interaction process of actors and how governance is applied in the regional development context. This section also introduces the study's conceptual framework, which revolves around key concepts such as governance factors, interaction processes, and sustainability outcomes. These concepts will serve as the foundation for the analysis presented in this study.

Chapter 3 describes the research methodology used in the study. This chapter includes the rationale for selecting the two case studies, the data collection and analysis methods employed, the operationalization of the study, and the measures taken to ensure reliability and validity.

Chapters 4, 5, 6, and 7 analyze the two case studies. Chapter 4 presents the extent of the sustainability outcome of the GDP case study across different planning rounds. Chapter 5 explains the relationships between governance and sustainability outcomes of the GDP Corridor. Chapter 6 examines sustainability outcomes resulting from the planning process of the YSS case study throughout rounds. This chapter is followed by Chapter 7, which elaborates on the governance of the YSS Corridor and its influences on sustainability outcomes.

Lastly, Chapter 8 provides answers to the study's research questions, its theoretical and practical contributions, its strengths and limitations, and recommendations for future research based on the analysis and findings of the study.

CHAPTER 2
LITERATURE REVIEW

This literature review explores the intersection between regional development, corridor development, sustainable development, and governance literature to analyze how these topics are related and how they can be leveraged to study (transport) corridor development that aims for sustainability. This literature review discusses how various strands of literature can contribute to the study of this phenomenon, and how these strands, by themselves, fall short. By combining ideas and concepts of the various theories in this chapter, a theoretical framework is developed that will guide this study in aiming to overcome the various theoretical gaps identified in this chapter.

The four strands of theories in this section provide different insights and concepts. Literature on regional development shows how certain exogenous or endogenous factors influence the economic growth of regions. Subsequently, literature on corridor development explains the role of a corridor as a specific specimen that uses regional development theories and practices, with the potential to be directed into sustainability when its planning incorporates sustainability principles and local sustainability contexts of regions. Nevertheless, the extensive development of a sustainable corridor involves the interaction process of actors with their different capacities, objectives, agendas, and strategies that need to be guided and facilitated by governance, as not all actors have sustainability in mind. Moreover, while sustainable development theory informs us about sustainability goals, it does not zoom into the interaction process of actors; at the same time, governance theory does not primarily address sustainability. Thus, in this study, those four theories are combined to allow this study to identify the governance factors that can influence the interaction process in which actors can coordinate and collaborate toward a common sustainability goal.

This literature review is based on a comprehensive search to identify relevant literature on the topic. The attempt includes generating relatable keywords in subscription-access scientific literature databases (Scopus, Science Direct, and the web search engine of Google Scholar) for related journals and conference proceedings, searching for books in the library, and browsing for institutional publications online. These literature materials were then evaluated and synthesized to identify the common ideas and theories that emerged. Subsequently, since a literature review involves a critical analysis of existing scholarly literature on a specific topic or research area, this study identifies theoretical limitations in the existing theories of regional development, corridor development, sustainable development, and governance in the context of sustainable transport corridor development, which this study aims to bridge and contribute.

There are four main sections presented in this literature review. Section 2.1 introduces the evolution of regional development theories from exogenous to endogenous approaches. This section continues with theories of transport corridor development and the identification of regional models that can guide the development of corridors. Section 2.2 discusses the meaning and ideas of sustainable development and how it is adopted in regional development and sustainable transport corridor development. Section 2.3 presents core concepts and ideas of theories on governance, followed by a discussion on the governance of regional development. The section is then followed up by literature related to sustainable transport corridor governance in which all four key theories are combined to identify the governance factors that are likely to influence the development of transport corridors toward sustainability. Lastly, section 2.4 shows the initial conceptual framework of the study.

2.1. Overview of Regional Development

Before this chapter starts with the literature review of regional development theories, it first presents a brief overview of the term regions and how it is used in the development of transport corridors.

2.1.1 Understanding regions

Dawkins (2013) mentioned that scholars have a growing interest in regional development theories as they try to understand the process of growth and decline of regions. Hence, few agreements on how the term region should be defined were found.

Svetikas (2014) explained that regions could be seen as geographic and economic entities (Ibid.) or as open areas of a larger territory that can be created for various purposes. However, Blair and Carroll (2009) described regions as a Chameleon word in which its meaning needs to be adapted to the context of its use. Dawkins (2013) provided different perspectives of regions according to the objectives of the inquiry or the question under study, as presented within a few prominent approaches.

To begin with, regions can be seen as hierarchical systems of cities. This approach was introduced early by Christaller in 1933 and then modified by Losch in 1954. In this theory, regions are seen as hierarchical systems of cities. Each region has a few prominent or higher-order cities and large numbers of smaller or lower-order cities. These orders, as explained by Baadom and Livinus (2016), are seen as the means to distinguish the relative size of market areas for different goods in the city. This theory analyzes how cities import goods from higher-order cities and export goods from lower-order cities, without any interaction among cities within the same order.

Another perspective is to see regions as homogeneous regions. Such term was defined by its homogeneous structure. For instance, municipalities distinguish regions based on their factors of unemployment level, GDP level, spoken language, and natural conditions (Svetikas, 2013). The delineation of homogeneous regions varies according to the propensity of those conducting the delineation. However, its concept relies on the criterion/criteria used to recognize their regional characteristics. Thus, regions are identified based on their internal homogeneity and external heterogeneity (Parr, 2008).

Another concept that has gained popularity among recent scholars is the nodal regions, in which they view as the opposite of homogeneous regions, since their internal structure is anything but uniform (Nystuen and Dacey, 1961 as cited in Parr, 2008). Nodal regions are considered functionally integrated internal regions where labor, capital, or commodities flow within instead of among other external regions. They consist of a single/independent/dominant node that governs the other subordinate nodes, directly connected to the dominant node through the flows of people, goods, services, commodities, information, and communication. This type of region is defined by spatial and functional interactions of a heterogenous city and the surrounding areas (such as labor markets, transport, and market interrelations) rather than its homogeneity (Zivanovic, 2017; Panchal and Bhagat, 2020). Contrary to the homogeneous region, the nodal regions are internally heterogeneous.

The term nodal regions was extended by Richardson in 1979 with the term polycentric regions. The term is projected as several nodes and peripheries with high degrees of internal functional integration. Fox and Kumar introduced another variation of nodal regions in 1994. They defined nodal regions as functional economic areas where the puissance of the central node over the surrounding periphery is ascribed to the spatial dependence of workers on adjacent employment centers. Using labor as its unit of measurement, many theorists favor this concept, for it allows a social welfare analysis within a particular region. However, due to the advancements in communication and transportation technology, this theory became immaterial as in irrelevant, as people can now live and conduct their activities virtually in any location and engage with others virtually. Likewise, due to the advanced transportation network and the decline in flight costs, it costs next to nothing for workers to commute to work, even when they live far from work. These weakened the centripetal forces that tied suburban labor markets to central business districts for employment needs when workers preferred to migrate to rural areas or commercial centers that offered service and/or quality-of-life benefits (Dawkins, 2003).

Regions can also be viewed as programming or planning regions from a political perspective. Programming regions can be defined as spatial establishments from an administrative or planning point of view. Such regions correspond straightforwardly

to the boundaries set up by planning authorities and politicians to help with decision-making, goal formulation, and policy implementation. This type of region is identified to analyze particular problems as they are defined by law and state policy instruments. Programming regions may encompass one or more political or administrative districts such as countries or states or a geophysical region such as a river basin or floodplain.

Lastly, regions can be seen as the interdependencies between natural resource systems and human populations. This term uses a different perspective to define regions, seen from the presence of natural resources, ecosystem, or other geographic boundaries as a "historically evolved, contiguous territorial society that possesses a physical environment, a socioeconomic, political, and cultural milieu, and a spatial structure distinct from other regions and the other major territorial units, city, and nation" (Markusen, 1987, p.16-17 cited in Dawkins, 2013).

Looking at the various definitions of regions above, we can see that the term regions is employed in various spheres, such as politics, economy, or the public sphere. Sometimes, a region can also be a territory of a supranational entity (Svetikas, 2013). In this corridor study, the term regions are seen as nodal regions and programming regions.

Regions within a corridor are seen as nodal regions (Tošić, 2000; Tošić and Nevenic, 2007) because a corridor development itself, in general, can be seen as a linear stretch development using a backbone (typically transportation infrastructure such as roadways, railways, and waterways) that connects two or more nodes that are seen as centers of economic activity or transportation hubs with its predominant multisectoral nature (Escap, 2020). Thus, in a corridor development, the corridor's backbone caters to the inter-regional relationships (of people, goods, services, commodities, information, and communication) between the dominant nodes clustered along a corridor (Srivastava, 2011). Regions in the corridor also have different development levels, as represented by the nodal regions' idea (Friedmann, 1956; Boudeville, 1968; Camagni, 1993; Dawkins, 2003; Parr, 2004). According to Zivanovic (2017), nodal regions can be organized into a hierarchical structure, reflecting the relative importance of different nodes within a region. The highest hierarchy, known as the nodal center, has surrounding activities that gravitate toward the center. This nodal center is commonly formed as an urban center characterized by a large population, concentration of infrastructure investments, and resources.

On the other hand, regions in a corridor development can also be seen as programming regions because they are planned and designed with a specific program or set of programs in mind as a certain actor's planning instrument. A Corridor development involves delineating certain regions that are seen as units of interventions for actors to fulfill their ambitions/goals. Thus, regions seen as

programming regions enable actors to set up a more targeted and efficient allocation of resources and a more focused and coordinated approach.

2.1.2 Regional development

The observation about how regions grow has led to attempts by scholars to explain the nature of regional development. Hence, within decades, regional development theories evolved, highlighting localization and the different issues of regions (Daniela, 2012; Nijkamp and Abreau, 2009). Regional development theories have been perceived differently over time, following the shift from exogenous to endogenous models of development (Svetikas, 2014; Sook Lee, 2009). Both exogenous and endogenous theories, however, have an economic and planning focus. Therefore, this study will later bring in the sustainability angle within a sustainable corridor development practice.

The exogenous model highlights exogenous factors, including investments from external sources, as the main cause of regional growth (Hall 2002, as cited in Sook Lee 2009). This model focuses on the dominant role and expansion of big cities and regional agglomerations to allow the less developed regions to grow with them. Meanwhile, the endogenous model stresses the investment in a knowledge-based economy and the internal capacities of regions as the natural means for regional growth (Daniela, 2015). This includes entrepreneurial skills, local productions, quality of local actors/institutions, innovations, knowledge, learning networks, and the advantages of physical proximity (Romer, 1994; Daniela, 2015).

Svetikas (2014) classified ten prominent theories into exogenous and endogenous models according to the theories' key ideas. Six theories (evolved throughout the 1950s to 1970s) were categorized as exogenous; four theories (evolved throughout the 1970s to 1990s) were identified as endogenous.

Six regional development theories are categorized into the exogenous model. They are 1) the neoclassical growth theory, which draws its particular focus on the progress of technology and innovations as regions' engine of growth; 2) the export-base theory, which highlights the contribution of the export sector toward the economy of regions; 3) the location theory, that stresses upon the importance of firms' choices for concerning the transportation cost and the spatial distribution of activities; 4) the circular cumulative causation theory, that zooms into the potentials of spread/trickle down and the backwash effects between regions; 5) the growth pole theory, that explains the non-uniform growth of regions and the existence of poles of growth with different intensities; and 6) the new economic geography theory that highlights the firms' choice of locations based on the transport cost, agglomeration, and the geographic concentration of firms. These six theories are further elaborated in the following paragraphs.

The first theory is the neoclassical growth theory. This theory investigates how production within regions is determined by physical capital and labor. In this theory, the progress of technology is perceived as an exogenous factor that spreads with the capital flow, which is expected to be distributed equally in every region. In this theory, the interregional mobility of laborers and capital is highly supported by investments in infrastructure development.

The second theory is the export-based theory. This theory highlights the development of the export sector for its ability to stimulate the development of regions (multiplier role), while other fields in the region are subject to the export field while securing its activities. In this theory, the growth of the economy is dictated by its success in export-based activities. Its basic assumption is that only changes in an export sector can induce growth in the local supplementary sector.

The third theory is the location theory. As suggested by its name, the location theory zooms into the location choices of firms and households to minimize cost and maximize profit. For this, the theory explores how activities are distributed geographically and how they impact the transportation cost, production cost, and spatial distribution of activities.

The fourth theory is the circular cumulative causation theory. The theory was introduced by Myrdal (1956), who came up with the concept that economic development results in a circular cumulative causation process (CCC). The CCC idea is built on the spread and backwash effects. Backwash or polarization means that if one area starts growing or expanding, the people, human capital, and physical capital (infrastructure, finance, machines) from other areas begin gravitating toward the growing center. It encourages the growth of poles at the expense of other surrounding regions (negative impact). Meanwhile, the trickle-down or spread effect is the dispersal of growth away from the poles toward the hinterlands, should there be the growth of demands in more advanced regions for resources and agricultural products produced in underdeveloped regions. Myrdal believes that growth in one area can adversely affect growth in the other, leaving the latter in a worse-off state than before because their best brains and capital moved to the growing center. To prevent this, he addresses the need for active policy interventions that push innovation diffusion from developed to lagging regions.

The fifth theory is the growth pole theory. The theory was introduced by Perroux (1995). The idea is that economic growth is not uniform in an entire region, nor does it happen everywhere simultaneously. It manifests itself in specific points or poles of growth with different intensities characterized by the region's key industries. The growth pole theory exhibits a more spatial context than the circular cumulative causation theory, where Perroux describes the relationship between growth poles and its hinterland as a centripetal force. It assumes that growth in the economy is stimulated by the most developed sectors, run by advanced firms

through their inter-industry linkage, which forms the growth poles and generates the region's economy while having multiplier effects for overall regional development and other weaker enterprises depending on them.

The sixth theory is Krugman's new economic geography (NEG) theory (1991). The NEG explains why labor and capital tend to concentrate in certain regions. The theory highlights the role of agglomeration in achieving economies of scale. Agglomerations lead to a geographic concentration of wealth. It benefits firms with large talent pools, lower transportation costs, and opportunities for knowledge sharing. In reality, many regions are trading the same goods at different prices, which encourages industries to deliver a variety of products produced in the location where labor is concentrated to lower the production cost. As new industries enter the market with more innovations of products, consumers have more choices in the diversity of goods and services. In this theory, the locational movement of productive factors and consumers are the key factors for agglomeration.

Moreover, four regional development theories are categorized into the endogenous model. They are: 1) the neoclassical endogenous growth and development theory, which sees technological change as the outcome of investment in research and development, human capital, and innovations; 2) the competitive cluster, which highlights the significance of cluster to boost the competitiveness of regions, particularly in innovations; 3) the national system of innovation, that emphasizes the role of institutions and the learning process to push innovations; 4) the regional innovation system, that emphasizes in the interactions between firms and the role of institutions, specialized business services or industries, and entrepreneurship to promote growth. The elaboration of each of these theories is presented as follows.

The first theory explored in this study is the neoclassical exogenous growth theory, which perceives technological change and investment in research and development as an internal outcome of public and private investment in human capital. It underlines the importance of investment in human capital (quality of the labor force), innovation, and knowledge as intangible qualities that boost progress in technology, which then improves the economy of regions (Svetikas, 2011; Daniela, 2015).

Competitive cluster, as the second theory, investigates the presence of clusters as 'sets of companies, as well as institutions, which are co-located in a defined geographic region and connected by interdependencies in delivering a related group of products and/or services (Porter, 1990; Porter, 1998a; Porter, 1998b). This theory stresses that growth can be obtained when businesses are competitive and can push their innovation. The competition of businesses itself depends on their productivity; productivity relies on the industries'/businesses' ability to provide

their products and services. Additionally, in the cluster-based economy, by propelling innovations in clusters, each industry can identify its competitors, thus driving businesses to keep evolving their innovations, which boosts firms' competitiveness further, which explains why this theory stresses how the development of businesses within clusters can grow faster than those outside clusters.

While competitive cluster theory focuses on the presence of industry clusters and how they drive innovation and economic growth in specific geographic regions, the third theory, the national innovation system (NIS) theory, was introduced by Freeman (1987) as "the network of institutions in public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies" (p. 1), and Nelson (1993) as "a set of institutions whose interactions determine the innovative performance of national firms, especially institutions which support R&D activities" (p.4). These terms highlight the interaction of actors for innovations at a national level, particularly the role of firms, industries, institutions, and private sectors with the support from the public sector towards the research and development (R&D) activities that elevate the advancement in technology, making a significant contribution to the growth performance of a nation and its competitiveness (Fagerberg and Verspagen, 2009).

The fourth theory, known as the regional system of innovation (RIS), also recognizes the importance of innovation. It zooms into firms' ability to stimulate innovation to intensify the region's growth. This model emerged from an understanding that innovation is higher in regions with more knowledge generation, e.g., research and development by firms and institutions (Acs and Varga, 2002). The statement was strengthened by Agrawal et al. (2014) that due to the presence of a sizeable population involving small and big firms, innovation output is higher in regions. Asheim et al. (2012b) explained that RIS emphasizes its core on economic interactions and the importance of the social interaction of public and private agents. Its main elements are the knowledge economy and products of innovations; the inter-firm relationship of network economics, clusters, and supplier chains as a source of innovation; their cooperation; and trust (Acs, 2002). It is why, in RIS theory, universities, regional institutions, research laboratories, specialized business services, related industries, and entrepreneurship are vital in promoting regional growth. Such local spillover emphasizes the significance of personal connection, direct communication in conveying scientific progress into jobs and products, and face-to-face Interaction between internal and external actors related to innovations (Maskell and Malmberg, 1999).

The exogenous and endogenous theories mentioned above postulate the different engines of regional development focus and their ideas behind the growth of regions (Svetikas, 2014; Daniela, 2015). They involve a complex process to prioritize the development of regions using multidisciplinary approaches (Sabic and Vujadinovic,

2017). This led to the definition of regional development by Capello and Nijkamp (2009) as the geography of welfare and its evolutions, for it is discussed within the disciplines of economic geography, regional economics, regional science, and economic growth theory, and has become a topic of interest to economists, geographers, sociologists, political scientists, and researchers from other social science disciplines (Dawkins, 2013).

From a macro planning perspective, the term regional development can disaggregate national plans to look into sectorial components, to be then knitted comprehensively. Regional development can also combine the existing regional/local plans into one integrated plan. (Ahmad and Bajwa, 2005; Susantono, 2015). Regional development is not a static concept in nature. Instead, it belongs to complex space-time dynamics of regions (Capello and Nijkamp, 2009). Thus, implementing regional development cannot be done by imitating one successful case to another. From a more micro-planning perspective, regional development can also be seen as a process of tailoring development according to the unique characteristics of regions, including their geographical, institutional, organizational, and cultural contexts (Ibid, Thierstein and Walser, 1997; Sabic and Vujadinovic, 2017). This strategy aims to address specific challenges and opportunities faced by a particular region, taking into account its unique economic, social, and environmental conditions. However, regions with similar characteristics can still learn from each other's experiences by looking at the underlying principles and approaches used in successful cases to be adapted to other cases according to their context. Regions with similar characteristics, for example, those with common economic structures, types of natural resources, or demographic profiles, may face similar potential and challenges.

As we conclude this section, it can be said that both exogenous and endogenous theories are closely associated with economic growth because they offer different explanations for the underlying drivers of economic growth and policies that promote it. These theories identify various factors that contribute to accelerating the regional economy, such as infrastructure investment, entrepreneurship and innovation promotion, attracting new businesses and industries, and support for workforce development. It is why Dawkins (2013) refers to them as "regional economic development theories." In light of this, this study recognizes the need to link regional development theories with sustainability and governance theories to examine how sustainable corridor development can be approached and assessed in a comprehensive and integrated manner. Such analysis includes studying how a corridor can address the region's economic, social, and environmental aspects through effective decision-making processes and stakeholder collaboration. Thus, further research is needed.

2.1.3 (Transport) corridor as a specimen of regional development theories and practice

In recent years, the corridor approach to regional development has gained popularity due to its ability to enhance regional integration across different administrative and physical boundaries (Hope and Cox, 2015; Nogales, 2014). The development of a corridor is guided by regional development principles that recognize the different potentials of regions and the necessity to integrate various sectoral plans into comprehensive planning. This integration aims to create an effective system where all economic, social, and cultural activities can take place (Keser, 2015; Athukorala and Narayan, 2017; Susantono, 2015). Srivastava (2011) mentioned that a corridor development channels, focuses, and amplifies the potential for growth by linking centers of economic activities or growth centers with transport connectivity. Hence, a corridor that links areas with no potential for growth, such as those with adverse geographies like extremely rugged terrain or desert, is of limited interest. Similarly, a corridor from nowhere to nowhere, through nowhere, would not be meaningful (Ibid.).

Scholars and practitioners interpret a corridor's function from different perspectives. Priemus and Zonneveld (2003) distinguished the differences into three categories. First, it is seen as an infrastructure axis with the objective of interconnecting different modes of infrastructure along a specific route. Second, it is viewed as an economic development axis that connects economic growth opportunities with the development of major traffic axes, where these traffic axes shape the spatial form of functional economic activities. Third, it serves as an urbanization axis that guides the direction of future urbanization (Priemus and Zonneveld, 2003). Looking at those different ideas, a corridor can be seen as part of a spatial development initiative that focuses on establishing a physical and functional connection between two or more nodes, often economic hubs. It functions as a passage for the movement of goods and people (Mitra et al., 2016; Escap, 2020). The general objectives of a corridor include reducing average transportation times and costs, reducing variability in transportation time and costs of transport, and increasing trade and other aspects of the national economy (Kunaka and Carruthers, 2014).

A defining feature of a corridor is the linear agglomeration of economic activities and people along the physical backbone of transport infrastructure (Healey, 2004; Escap, 2020; Nogales, 2014; Hope and Cox, 2015). A similar statement was shared by Srivastava (2011), who specified a corridor development approach as a way of "using transport corridors to provide a backbone or spatial focus for regional cooperation projects and activities, clustering them along corridors or at nodal centers on the corridors" (p. 4). The linearity of a corridor, with its backbone, differentiates its development from clusters. While both are parts of spatial development initiatives (Nogales, 2014), clusters are more concentrated

geographically, as they are commonly circumscribed to provinces, municipalities, and smaller administrative units. (Ibid.).

Various countries adopted the approach for its potential to improve access to markets, stimulate trade and investment, and boost productivity and efficiency (Mitra et al., 2016; Prabi De and Iyengar, 2014). According to Nogales (2014), a corridor became a phenomenon because it can be used as a smart tool that integrates territorial planning, combining infrastructure interventions (and related services) with specific actions to boost key sectors. A corridor can be distinguished into five types: transport corridor, transportation and trade corridor, logistic corridor, urban corridor, and economic corridor. Each type of corridor can transform into its subsequent types with more advanced development facilitation (Srivastava, 2011; De and Iyengar, 2014; Hope and Cox, 2015). This study focuses on transport corridors as the basic phase of corridor development and the most common one in practice.

A transport corridor requires the provision of efficient transport services to reduce transport costs, sustain the rapid expansion of trade, and facilitate integration within the country or supranational region and into global markets. (Nogales, 2014). The next phases of corridors do not have clear-cut distinctions, as frequently, there are overlaps in how these corridors are envisioned (Srivastava, 2011). However, there is a nuance. A transportation and trade corridor involves more advanced programs and policies that improve trade facilities and simplify trade/customs procedures. A logistic corridor focuses on harmonizing the institutional framework related to logistics-related services, technological development, and organizational and legal conditions for logistic transportation. An urban corridor provides more programs that improve the quality of the urban environment. Lastly, for a corridor to be called an economic corridor, there needs to be a broad intervention that enables efficiencies across multiple commodity types, transport services, and logistics services. It requires investment in the soft infrastructure aspect, such as the relevant rules, regulations, and standards, apart from hard infrastructure investment (De and Iyengar, 2014).

Despite their differences in focus, all these corridors are inherently designed to foster spatial economic growth through the improvement of primarily transport and logistics services (Nogales, 2014). What is more, a corridor can evolve and optimize its performance once it no longer focuses solely on hard infrastructure development, but also on soft infrastructure (Athukorala and Narayan, 2018; Nogales, 2014; Brunner, 2013; Carruthers and Kanaka, 2014). This includes the need for education and training programs, research and development initiatives, and institutional reforms. These factors are critical for supporting entrepreneurship, innovation, and productivity as the key drivers of growth. The extensive coverage of a corridor's development and its vast interventions make it one of the most challenging schemes for regional development (Nogales, 2014) and difficult to

realize in solitary by one actor. Nogales (Ibid) added that a corridor development needs to encompass a set of coordinated actions of actors to ensure that a critical mass of investments can transform spaces, making a corridor intrinsically conducive to generating multistakeholder strategic coordination for development.

The types and roles of different actors in corridor development are elaborated by Nogales (Ibid). The most common leading actor is the central Government within the host country, either for its role as a promoter, a supporter of the corridor's initiatives, or an aid recipient. The central Government remains an essential actor that coordinates the development in the public sector as well as ensures the coordination between the line of ministries involving various sectors (e.g., agriculture, transport, energy, and trade). Regional government actors are also essential. Their involvement, he added, cannot be separated from the realization of corridor planning, particularly when regional actors hold different resources, particularly the local environmental, social, and economic knowledge of the regions, and authorities to make spatial policies and physical interventions of the regions including permits for certain activities.

Two categories of private actors' involvement in corridor development are identified by Nogales (Ibid.) They are companies with expertise in infrastructure development undertaking partnerships with the public sector to build, co-finance, and operate infrastructure works; or logistics and trade companies that became vital partners within the design and deployment of transport and trade facilitation activities (the core area of work in regional corridor programs). Multinational and domestic corporations can also play a significant role through multistakeholder partnerships or private-donor collaborations. In addition, various literature has identified a wider range of corridor actors, including universities, research institutes, and specialized NGOs, local communities (Oberg, 2017; Hope and Cox, 2015), as these actors possess the capacities and expertise needed to identify the local potential of regions, and have become important in the development of innovations. As an example, these actors have the capacity to deliver positive outcomes in regard to emergency preparedness and disaster response planning for regions that are vulnerable to natural disasters (ICMA, 2006; Somers and Svara, 2009; Andrew and Kendra, 2012, as cited in Andrew and Carr, 2012).

The identification of actors above shows that the thriving development of a (transport) corridor can not be done in solitary by one actor, despite them being the leading driver/principal supporter of the corridor. This is especially true as the implementation of corridors is complex and often multi-sectoral. Thus, corridor development requires the coordinated behavior of the various actors that can affect and are affected by this development within collaborative coordination (Oberg, 2017; UNDP and CCIEE, 2017). The discussion on the need for coordination in transport corridor development will be further elaborated in section 2.2.3, in

which the chapter zooms into the literature on sustainable (transport) corridor development.

2.1.4 The use of regional development theories in a corridor development

While no specific literature presents the prescriptive use of specific regional development theories to guide the development of transport corridors, the literature review of the exogenous and endogenous theories presented in section 2.1.2 shows the different factors that can influence the growth of regions that are relevant in a (transport) corridor development idea. This study identifies four exogenous theories that are relevant to transport corridor development.

The four exogenous theories are the growth pole, new economic geography, circular cumulative causation, and export-based. The four endogenous theories are the neoclassical endogenous growth and development, competitive cluster, the national system of innovation, and the regional system of innovation. In the section that follows, the study elaborates on how these eight theories fit into the development of corridors.

The growth pole theory suggests that economic growth is not evenly distributed. Rather, it is concentrated in certain areas or growth poles that stimulate the development of the surrounding regions. In a corridor development, these poles can be identified as key nodes along the backbone where economic activities are concentrated, linked by effective and sufficient transport connectivity that caters to various economic activities.

The next theory is the new economic geography, which emphasizes the benefits when firms and industries are located close to one another, with a pool of laborers to support the firm's activities. This situation is known as agglomeration benefit. In the context of (transport) corridor development, the theory can help direct the mapping and planning of different sizes of firms' locations and their suppliers within proximity to push down their production costs with the possibility for the diffusion of knowledge among firms.

According to circular cumulative causation theory, economic activity generates positive feedback loops that impact regions' development. These loops are known as the backwash/polarization effect (negative) and the spread/trickle-down effect (positive). In the context of transport corridor development, transport infrastructure investment can improve access to regional and international markets, open up the secluded areas for easier access of the locals to socio-economic facilities in advanced regions, and create new job opportunities such as in construction and logistics. As businesses grow and expand, they may also create new opportunities for collaboration and knowledge-sharing, which can have a trickle-down effect on other regions.

Lastly, the export-based theory emphasizes the importance of international trade as the engine of growth. Its core idea is that regions specializing in producing goods and services for exports will likely experience higher economic growth rates than those focusing on domestic markets. In corridor development planning, the theory can be used to identify the unique potential of each region for export markets and the facilities needed to support export activities. These facilities are not only limited to an efficient transportation and logistics system but also promote incentives for export-oriented industries and establish partnerships between private and Government actors for trade shows/exhibitions.

On the other hand, endogenous theories influence the planning of (transport) corridor development by emphasizing knowledge for innovation and local creativity. These two factors enable individuals, entrepreneurs, and businesses to be connected to global markets (Capello and Nijkamp, 2011). The neoclassical endogenous growth theory focuses on the importance of human capital, research and development, and technological innovations of regions. Thus, in the planning of a corridor, this theory can be used to plan investments in education/training activities that support the growth of human capital, R&D activities, and related regional development policies such as favorable tax treatment and direct subsidies.

To further drive innovation of regions of the corridor, a theory of competitive clusters is also beneficial. This theory can be used to identify the presence of existing/planned small-medium enterprises, firms, corporates, industries, research institutions, and universities that are geographically concentrated and interconnected in a specific field, and how they can be strategically allocated as clusters to foster the agglomeration of firms that connects different people, skills, and knowledge at the regional level (Porter, 1998; Porter, 2000; OECD, 2007).

Additionally, the OECD (1997) describes the complex set of relationships among actors, including enterprises and universities, as essential to the innovation process and technological development. The interaction of such a wide range of actors within the economic system enables the creation, diffusion, and use of scientific and technological knowledge, leading to new ideas for products and services that enter the market. This condition is expected to enhance the competitiveness of regions within the corridor. Such Interaction can be managed within the national innovation system (NIS) and regional innovation system (RIS). The basic premise of the NIS and RIS theories is that innovation is not just the result of individual actions or isolated organizations, but rather a complex and dynamic process that involves a range of actors and institutions working together. NIS and RIS frameworks can design the interactions and relationships of innovation actors and policies within and across sectors, intertemporal (across time), and interterritorial (nationally and locally) with measured milestones and their commitments. The activities involve identifying and mapping the different innovation actors and institutions on national and regional scales, understanding the nature and intensity of their interactions,

the key challenges, and opportunities for collaboration. Hence, the NIS and RIS theories can leverage the innovation potentials of regions in the corridor.

As an overview, it can be concluded that over the years, scholars have developed theoretical frameworks of exogenous and endogenous regional development that explain how and why regions grow (Dawkins, 2013). This study identifies how these theories can guide and influence the development of a (transport) corridor.

The four exogenous theories emphasize the role of external factors, such as trade, infrastructure investment, and technology transfers, as the driving forces of economic development. Exogenous theories highlight hard infrastructure development as a critical component to support the growth of its ability to improve access to markets, reduce transport costs, increase productivity, and support the development of new industries. Exogenous theories also recognize the different intensities of nodes. The idea is used to guide the planning at a larger scale, particularly to identify growth centers/core/main nodes and the main transportation hubs in the region that need to be linked with transport infrastructure to allow the trickle-down scenario effect or the spread effect between regions.

Endogenous theories, on the other hand, argue that the development of a region is mainly due to the initiative of local actors, and that the developmental process is viewed as an organic process guided by the actions of local individuals and communities to achieve innovation and entrepreneurship. This theory can be applied in a (transport) corridor development through investment in human capital, such as education and training programs to promote local entrepreneurship and innovation, or by establishing a policy that promotes social capital and community participation in corridor development activities.

While both exogenous and endogenous regional development theories offer valuable insights into the development of transport corridors, it is important to consider both approaches in a balanced and integrated manner. A purely exogenous approach that focuses only on external factors may neglect the importance of local entrepreneurship and innovation, hindering the long-term sustainability of regions. Similarly, a purely endogenous approach that ignores external factors may limit the potential economic benefits derived from improved transport links and other global factors. The use of the two contrasting theories can fill the gap of each theory's weakness and be used to guide the planning of regions within different scales (national-regional-local) and sectors (multisectoral and multi-level policies and programs) in a common framework, helping corridor actors to tailor a corridor development according to the needs and the potentials of regions. On another note, Dawkins (2013) underlines how these development theories are one-sided toward the economy without considering sustainability. This study addresses this theoretical gap, which seeks a solution by looking into

additional theories. Therefore, in the next section, we will explore sustainable development theory to discuss its implications in the context of (transport) corridor development.

2.2. Sustainable Development

2.2.1 Sustainable development concepts and ideas

Over the last few decades, sustainable development has garnered more attention. Tappeser et al. (1997) mentioned that sustainability is an elusive concept between politics and science, simultaneously involving old and new discussions. With its broad perspective and wide acceptance, the concept has been used in various discussions, functioning not only as a scientific term, but also as a political one. Nevertheless, for this term to be fruitful, its meaning and relevance need to be defined.

With more than three hundred definitions of "sustainable development" taking place within the field of environmental management and its related disciplines (Johnston et al., 2007), the term first gained widespread recognition through the Brundtland Report (World Commission on Environment and Development, 1987) of the United Nations. The report defined sustainability as "…development that meets the needs of the present without compromising the ability of future generations to meet their own needs". The definition in the Brundtland Commission's Report has significantly influenced global environmental policy, as it is the most established and widely referenced, popularized in international policy discourse (Johnston et al., 2007; Redclift, 2005). The definition gained recognition because it signifies a meaningful switch that views sustainability as a preservation and conservation effort into an attempt to link the environment with development (Kajikawa, 2008). It does so by imposing the imperatives for rational and controlled use of resources focused on renewable and long-term usage, protection, and conservation of nature; increasing ecological awareness through national regulation and international cooperation; controlling the population growth; aligning the industry and technology with environmental requirements; and developing technological innovations to minimize the impact on environmental (WCED, 1987 as cited in Klarin, 2018).

Building upon the definition within the Brundtland Report, the term sustainable development became more institutionalized, and the literature on sustainable development grew exponentially to define and redefine the term that reflects certain environmental, social, and economic perspectives (OECD, 2001a). One prominent institutionalization of sustainable development took place at the Rio Summit in 1992, resulting in the Rio Declaration, which consists of principles intended to guide future sustainable development. The declaration is commonly

regarded as a solid foundation for reaching a wide consensus on the meaning of sustainability (Tapesser et al., 1997; Jovovic, 2017). The declaration emphasizes the importance of linking social and economic development with environmental protection (Ibid.). Over time, sustainable development ideas continued to evolve, stressing the idea of Elkington's triple bottom line framework (1994), which gained prominence as it is suitably adapted to different fields of human activities.

The triple-bottom-line framework comprises three pillars of sustainability: environmental, social, and economic dimensions. The framework underscores the interconnected and interdependence of these three sustainability pillars, aiming for balanced development that combines economic growth with social inclusiveness and environmental protection (Sachs, 2015; Purvis et al., 2018; Tappeser et al., 1997; Rogers et al., 2008; Jovovic, 2017; Klarin, 2018). According to Purvis et al. (2018), alternative terms such as dimensions, aspects, perspectives, components, factors, or goals are used to represent the same meaning.

In the Triple Bottom Line framework, the environmental pillar regards a profound respect for the ecological integrity and the heritage of the man-shaped environment (environmental dimension). Simultaneously, it aims to maintain the quality of the environment needed for economic activities and quality of life (environmental protection, reduced emissions of pollutants, rational use of resources). The inclusion of a man-shaped environment in this context is due to the presence of built cultural landscapes within regions developed throughout an extended period that are inseparable as features of the natural environment. On the other hand, the social aspect involves preserving society and cultural identity, respecting cultural diversity, race, and religion, preserving social values, rules, and norms, and protecting human rights and equality. The economic aspect focuses on the satisfaction of human needs through the efficient use of resources and maintaining the natural and social capital necessary to achieve income and living standards (Klarin, 2018; Tappeser et al., 1997).

Regarding the economic pillar, development is seen as one that is economically viable. Camdessus (1995) stated that economic viability needs more than sustained economic growth, including profitability, job creation, innovation, and investment. Even though economic growth is an important condition for poverty reduction, it cannot address the issue on its own. Poverty reduction is difficult to obtain when wealth distribution is highly uneven. A strategy is needed for poverty alleviation that focuses on both growth and reduction of income inequality (Ibid.). Income distribution, in addition, is closely linked to social sustainability (Ibid.). It is why, countries with the most stable income distribution have more success in social and economic spheres, particularly in the human development index, protection of basic rights, GDP growth, possibilities for taxation, and budgeting of social programs (Bilan et al., 2020).

Lastly, in the social pillar, sustainable development needs to be socially equitable. This means that development should aim to promote social justice and fairness. This involves ensuring that all members of society have access to basic needs, such as food, water, shelter, and healthcare. It also involves promoting equality and human rights, as well as providing opportunities for education and employment (Klarin, 2018).

The triple-bottom-line framework for sustainable development has been discussed and implemented in various global summits and meetings. Some significant events that adopted the framework were: 1) the World Summit on Sustainable Development (WSSD) in Johannesburg, South Africa (2002). The WSSD was a follow-up to the Earth Summit that assessed the progress of sustainable development goals. The triple bottom line was a critical theme in the summit and was highlighted in the Johannesburg Declaration on Sustainable Development; 2) the 2002's Earth Summit, which continued to be used in the 2012 World Summit; and 3) the Sustainable Development Goals (SDGs) Summit in New York, USA (2015). The United Nations General Assembly adopted the SDGs in 2015 as a blueprint for global sustainable development following the 2012 summit. The triple bottom line concept is an essential theme in the SDGs, which aims to balance economic, social, and environmental sustainability (Purvis et al., 2018).

2.2.2 Sustainable regional development

Jovovic (2017) stated that the development of regions should be based on their optimal expansion constituents, comprising the environmental, social, and economic development aspects aimed at improving the quality of life. Nevertheless, regional development in today's context is at a critical point due to financial, food, and energy crises, which requires us to re-assess and evaluate the economic paradigm in relation to access to employment, social progress, quality of life, and respect for nature. The sustainable definition in the Brundtland Report brought a realization that natural resources are not limitless (Tappeser et al., 1997). The definition raised questions about who should be allowed to use the resources and to what extent. With this in mind, Tappeser et al. (Ibid.) proposed three questions that sustainable development at the regional level needs to address. They are: 1) what do we want to sustain?; 2) how do we deal with the different interests, needs, and opportunities of individuals/groups?; and 3) what systemic approaches are needed to address matters of the first and second questions? These questions are debated among scholars to push the implementation of sustainable development at a regional level (Patterson and Theobald, 1995).

Answers to the first question regarding what to sustain in regional development are closely related to how sustainable regional development is envisioned to promote economic growth, social well-being, and environmental protection at the regional level (Jovovic, 2017). Hence, the answer involves the three interconnected and

interdependent dimensions of sustainability that need to be pursued in a balanced and integrated way.

To sustain the environmental dimension, development needs to include the protection and restoration of ecosystems and biodiversity. It must also ensure that the development does not harm the natural environment, but rather, preserves it for future generations. To sustain the social dimension, development needs to cater to the needs and aspirations of people, particularly the most vulnerable and marginalized. In this context, development should create jobs and improve access to education, training opportunities, healthcare, housing, and other essential services. It should also promote social inclusion, diversity, and equality, ensuring no one is left behind. To sustain the economic dimension, there needs to be economic growth that is both sustainable and inclusive. This includes prioritizing investment in innovative and sustainable industries that create high-quality jobs and promote local entrepreneurship. Such development should also foster the development of local supply chains, support small and medium-sized enterprises, and promote international trade and investment.

A study by Marshall and Toffel (2005) has highlighted what needs to be sustained in a sustainability framework, which answers the first question. They developed a sustainability hierarchy that identifies the widespread use of the label 'unsustainable' by scholars, policymakers, companies, and NGOs categorized into four levels. Level 1 is for actions that endanger human survival, such as those that disrupt nature's ability to filter waste and provide food, water, and air. Level 2 encompasses activities that threaten life expectancy and humans' basic health indicators, those that impact global warming and lead to the global incidence of infectious disease. Level 3 highlights the violation of human rights and species extinction, such as the livelihoods of people living in low-lying areas threatened by the rise of the sea level due to climate change. Level 4 covers actions that decrease the quality of life or are inconsistent with other values, beliefs, or aesthetic preferences (those that are not covered by the three other levels within the hierarchy), for example, attempts to preserve open space for aesthetic reasons. By taking this framework into account, related actors can explicitly address the hierarchy level they want to prioritize in sustaining certain sustainability dimensions. This depends on the likelihood of how certain actions can lead to adverse consequences, the scope and prevalence of these consequences, and the delay between action and consequences (Ibid.).

Moreover, the answer to the second question regarding the means to deal with the different interests, needs, and opportunities is closely related to governance. Thierstein and Walser (1997b) stated that sustainable development involves consciousness in addressing regions' social, ecological, and economic problems by considering the different needs of the regions. At the same time, sustainable development needs to cater to various sustainability interests of actors ranging

from the top to the lower level to allow their cooperation (Thierstein and Walser, 1997 b; Klarin 2018). All these attempts require the coordination of multiple actors with different capacities and objectives, which governance can facilitate. This is in line with a statement by the OECD (2001a) that to realize sustainable development, there needs to be recognition of the importance of governance, for it provides room for coordination and negotiations among actors to address the challenges of sustainable development.

The importance of coordination in sustainable development literature has also been highlighted by Jovovic et al. (2017), who stated that "integration of the environmental, economic, and social dimensions of sustainable development on the regional level implies the implementation of complementary and coordinated actions in different areas which results in economic growth that is also supposed to achieve social objectives, without endangerment of the rare resources of the planet "(p.257). This statement provides reasoning for governance in a sustainable development context to do more than coordinate different actors with different objectives and strategies for collective actions in different sustainability dimensions. It also allows actors to manage and negotiate the possibility of trade-offs along the regions' development process, eventually leading to a balanced sustainable development (OECD, 2001a).

The third question regarding the kind of systemic approach needed to sustain the different aspects of sustainability and deal with the varied objectives of sustainability actors, according to Tapesser et al. (2018), can be answered by incorporating four principles of diversity, subsidiarity, partnership, and participation within sustainable development. Diversity and subsidiarity emphasize the importance of the unique characteristics of different regions and communities. Diversity refers to recognizing the different environmental, social, cultural, and economic identities and values within and between regions, leading to regions' unique challenges and opportunities. Thus, a one-size-fits-all approach to sustainable development is not effective. By embracing diversity, sustainable regional development can be tailored to each region's specific needs and aspirations, and support the preservation and enhancement of local ecosystems, cultures, and traditions. Subsidiarity, on the other hand, recognizes that local communities and stakeholders often have a better understanding of their own needs and priorities, and should therefore be involved in decision-making processes that affect them. By decentralizing decision-making and empowering local actors, sustainable regional development can be more responsive, efficient, and equitable.

Moreover, partnership, as one of the principles, refers to a complementary and interdependent cooperative relationship between actors in a horizontal dimension who work together within a common framework toward a shared goal of sustainability. Partnership often involves formal agreements, joint planning, shared resources and responsibilities, and coordinated actions to address specific issues

and challenges. On the other hand, participation refers to the active involvement of stakeholders in a decision-making process and activities that affect their future in a vertical dimension of societal relationships. Participation can take various forms, including consultation, negotiations, and co-creation among actors.

By now, we can see how the interpretation of sustainable development has the necessity of governance at its core. According to Rozema et al. (2007), this is because sustainable development involves wicked problems and a plurality of parties characterized by social complexities in the sense of dissent (different opinions, beliefs, or viewpoints), distributed control, and intelligence.

At the same time, most sustainability initiatives are confronted by weak institutionalization. Therefore, governance is seen as an approach that can deal with these sustainable development issues. Nevertheless, governance is not a straightforward concept. Therefore, in section 2.3, this study will further discuss the concept of governance and how it can be linked with the theories of regional development and sustainable development to study the development of sustainable (transport) corridors. Nevertheless, beforehand, in the following section, this study first delves into the topic of sustainable (transport) corridor, because in a world grappling with complex and multifaceted challenges, sustainable development embodies wicked problems and myriad stakeholders. It is in this context that the discussion of sustainable (transport) corridors takes the stage, offering a practical avenue to integrate environmental, social, and economic dimensions, address diverse interests, and implement systemic approaches for sustainable regional development.

2.2.3 Sustainable (transport) corridor development

The development of (transport) corridors as specimens of regional development theories and practices (Susantono, 2015; Athukorala and Narayanan, 2018; Srivastava, 2011) conventionally focuses on investments in areas and sectors with favorable growth nodes, guided by the expectation that investments within and outside the nodes will stimulate private and societal investments, thus creating a multiplier effect (Srivastava, 2011). To do so, corridor development adopts regional growth theories that argue improved local access and connectivities stimulate and diversify the economic activities of regions and boost their competitiveness at macro and micro levels (Susantono, 2015; Quium, 2019). At a macro level, the linked transportation infrastructures increase the national output, employment, and income. At a micro level, they raise production and wages, stimulate new jobs, and support lower input and higher output prices (Quium, 2019). Hence, it explains why a corridor development emphasizes efficiency in the transport and logistics processes in the corridor and capitalizes on improved connectivity and transport networks (Ibid.).

As presented in section 2.1.4, exogenous regional development theories provide insight into global trends, infrastructure development, and the external development of technology that can guide the planning of sustainable corridor development. An example of such a global trend can be seen in the United Nations Sustainable Development Goals framework that can be adopted in a corridor to reduce greenhouse gas emissions, promote renewable energy, or fight climate change. Exogenous theory can also direct the corridor development focus into green infrastructure investments such as seawalls, waste-to-energy plants, green buildings, climate-resilient infrastructure development, and more. On the other hand, endogenous regional growth theory is relevant because innovation plays a crucial role in enabling new technologies and techniques that can reduce the environmental impact of economic activity or promote investments in renewable energy resources, as well as programs and training related to sustainability awareness of the local communities.

The combination of both theories is needed in developing a sustainable corridor, for it maximizes the benefits of improved transport links and includes training and education programs that can enhance the skills and knowledge of local communities/business pro-ecology, and improve their welfare. This, in turn, can lead to long-term economic growth and enhance the environmental and social quality of life for people.

Nevertheless, regional development theories have an economic bias (Dawkins, 2013). It is reflected in how Nogales (2014) and Quium (2019) pointed out how a corridor development often emphasizes its economic benefits but has a risk of trade-offs between economy and sustainability. Transport corridor development encompasses vast landscapes (such as urban, rural, industrial, sectoral nodes, and conservation areas) with a wide range of economic activities and movements that are likely to impact the ecological, social, and economic sustainability states of regions. Such large infrastructure projects can cause deforestation, soil erosion, air and water pollution, fragmentation of ecosystems, loss of biodiversity, and displacement of local communities (Pingali, 2001; Nogales, 2015; MPWH, 2017). Therefore, a corridor developed primarily for its economic objective is often problematic, for it sidelines sustainability.

The issue raises a call for action among scholars and practitioners to examine how certain corridors can be specifically developed toward sustainability (Quium, 2019; Hope and Cox, 2015; Awais, 2019; Oberg, 2017). Nogales (2014) supported this idea by stating that corridor development has the potential to stimulate strategic thinking on how to spur inclusive and sustainable growth for balanced development, especially in a developing world. The idea is projected on the objectives of a corridor development that are not only toward economic growth but also address the environmental degradation issues in regions (Awais et al., 2019; Dossani, 2016) and regional disparity of regions (Athukorala and Narayan,

2017; Hope and Cox, 2015). Examples of corridors with those ambitions can be found in the Maputo Development Corridor (comprising five provinces in South Africa with Maputo and the capital of Mozambique), Northern Corridor (East and Central Africa, which connects Kenya seaport of Mombasa with Uganda, Rwanda, Burundi, the Democratic Republic of Congo and Southern Sudan), Nacala Corridor (which connects the coal mines in western Mozambique east to the port of Nacala via Malawi) and Greater Mekong Subregion Corridor which connects Cambodia, the People's Republic of China, Lao People's Democratic Republic, Myanmar, Thailand, and Vietnam (Hope and Cox, 2015; Nogales, 2014).

This area of study is growing as sustainability becomes a more pressing issue globally, which means more research exploring literature beyond regional development and corridor development is needed, not only literature that links theories of regional development with sustainable development (Tappeser, 1997; Clement et al., 2003), or theories of regional development with governance (Lafferty, 2006; Jovovic, 2017). However, a study that links all those theories is missing. Therefore, there is a need to link those bodies of literature because, in regional development literature, the ideas on what sustainability is about are mostly presented in a content-like manner (including what sustainability is and its goals are). Little attention is given to the process and the governance: how sustainability can be realized. Meanwhile, planning a sustainable (transport) corridor is complex as multiple actors with various interests, goals, and strategies must be aligned for joint actions (Athukorala and Narayanan, 2017). Its development is not a matter of decision-making by a single primary actor. Corridor actors need to arrive at sustainable corridor outcomes, given their resources (including knowledge) and considering the impact of the corridor planning itself. This is why managing the trade-offs and balancing the three sustainability dimensions is difficult, particularly when a dominant actor pushes for economic benefits.

Therefore, actors need coordination within interaction processes, and governance is the way to accomplish that. Thus, in the next section, the study incorporates the theory of governance with sustainable development, and transport corridor development to further identify governance factors that will be needed to assess the sustainability of corridor development.

2.3. Governance In Regional Development and Sustainable (Transport) Corridor Development Context

The previous sections of 2.2.2 (sustainable regional development) and 2.2.3 (sustainable transport corridor development) mentioned that coordination in the planning process is needed, and governance can help accomplish it. Thus, in this section, the study will first define the term governance and how it can guide and

direct the coordination and collaboration among actors when dealing with complex issues, followed by a literature review that elaborates on governance in the regional development context. Afterward, the study identifies the five governance factors that can influence the decision-making process of corridor actors within their interaction processes, further impacting the delivery of the corridor's sustainability outcomes.

2.3.1 Concepts and ideas on governance

The term governance signifies a change in the meaning of government (Stoker, 1998). It refers to a new process of governing or a changed condition of ordered rule or the new method by which society is governed' (Rhodes, 1996, pp. 652-3). The conventional government approach implies that governments are the central rulers or regulators with inherent superior positions over other societal actors (Li, 2016). However, over time, governments increasingly face complex societal problems. Due to limited resources or problem-solving capacities, it is hard for them to address these wicked problems solely. Therefore, they depend upon other actors' resources: governments and private and societal organizations. As a result, the relationship between the state and society changes, where government governs with plurality and diversification of actors in which state actors and institutions become linked with non-state actors such as private or civil society actors (Bevir, 2011; Jager, 2007; Pike et al., 2007; Bruszt and Palestini, 2016), each with their interests, resources, expertise, and experiences (Denhardt, 2011 as cited in Sisto, 2018).

Therefore, while governance is a broad concept that presents itself with different meanings depending on the context to which it is applied (Rhodes, 1996; Stoker, 1997; Bevir, 2011; Oberg, 2016; Li, 2016), there is a baseline agreement in which governance can refer to, as the development of governing styles in which boundaries and responsibilities in addressing societal issues between and within public and private sectors have become blurred (Stoker, 1998). As a result, the provision of public services may still be the responsibility of the government. However, the government needs other actors to fulfill these responsibilities, involving a wide range of actors drawn from the public, private, and voluntary sectors (Rhodes, 1996; Goodwin, 2009; Shannon and van Egeraat, 2013).

Governance further implies that governments do not govern above citizens, societal groups, or private groups. Rather, governments often need to negotiate or bargain with other actors to collectively resolve problems (Rhodes, 1997; Li, 2016). Governance is then characterized by horizontal forms of negotiations and cooperation for solving problems (Jager, 2007; Li, 2016; Klijn and Koppenjan, 2016; Sisto, 2018). It aligns with Stoker's (1998) proposition that governance requires the identification of the power dependence between actors. It recognizes the different capacities of actors and uses them to steer and guide actors for collective action. In

this sense, governance can be understood as providing favorable organizational and steering conditions to coordinate the interactions of actors whose resources are required to achieve certain outcomes (Klijn and Koppenjan, 2016)

The interaction process and coordination of the behavior of actors need to be governed. That can be done with different approaches that project the relationships among actors. Lubell et al. (2004) state that the relationship between government and other actors can be command-and-control, known as top-down governance, or one that involves initiatives and actions by local actors rather than a central authority, known as bottom-up governance. The difference between the two approaches is that top-down governance emphasizes decisions and directives made by the central authority, resulting in a concentration of power and control of decision-makers at the top (Sabatier, 1986). In contrast, bottom-up governance at the local level emphasizes collaboration and participation between stakeholders at the grassroots level. These actors become the agents of regional development, utilizing their local resources and knowledge to their advantage (Shanon and van Ageraat, 2003). However, these local efforts may need to be supported and coordinated by higher-level authorities, such as regional or national governments, to be effective and sustainable in the long term (OECD, 2018).

While the top-down and bottom-up approaches project different kinds of relationships among actors, Lubell et al. (2004) stated that the two approaches do not oppose one another. Instead, they are complementary (Eckerberg et al., 2015; Lubell et al., 2004). Furthermore, when the top-down and bottom-up approaches are integrated, it can be seen as a third mode of collaborative governance (Ding et al., 2022). The collaborative governance perspective is not de facto opposed to the top-down and bottom-up governance approaches (Ma et al., 2018). Rather, it emphasizes the need to integrate multi-dimensional governance models to enable stakeholders' collaborations and negotiations when addressing complex problems (such as regional development issues) (Ma et al., 2018; Ansell and Gash, 2008; Emerson et al., 2012). Therefore, the collaborative government is not only about collaboration and negotiation, but also about designing and managing the process of interaction between actors.' (Klijn and Koppenjan, 2016; Gjaltema et al, 2019; Klijn and Edelenboos, 2007; Bryson et al., 2015; Ansell and Gash, 2007).

These different modes/approaches of governance have implications for the evolution of regional development policies (Pike et al., 2007; Shannon and van Egeraat, 2013), which will be elaborated on in the next section.

2.3.2 Regional development governance

According to Jager (2007), regional economic development and governance are linked to each other, as the shift from government to governance was mirrored in the evolution of regional development policies. These policies shifted from those

governed with a top-down approach to a bottom-up approach (Pike et al., 2007; Shannon and van Egeraat, 2013).

The early approaches to regional development, as stated by Shannon and van Egeraat (Ibid.), were characterized by the top-down initiative of the central state to bring development into the lagging regions through one-size-fits-all policies. Regional policies that were developed with the top-down approach placed the role of central governments as the regulator of the policies to address the spatially imbalanced issues of regions that became problematic after World War II (Breathnach, 2013; Svetikas, 2011). However, according to OECD (2018), the top-down approach alone failed to uplift the vulnerable regions to thrive and survive. Instead, it widened the income gap between the core regions and peripheries, as only a few investments of profits were allocated to lagging regions (Breathnach, 2013). This situation marked the urgency for place-based, evidence-based, and innovative regional policies that can be tailored to individual regions' unique needs and assets (OECD, 2009), leading to a bottom-up approach.

The bottom-up approach acknowledges the need for the optimum use of local resources as a basis for long-term development. It addresses the local needs of regions and uses policies to facilitate the networking between local firms and stimulate innovations and information-sharing, involving all relevant stakeholders at various levels (Breathnach, 2013). It is accomplished by encouraging the active participation of local communities, stakeholders, and organizations in the planning and implementation of development policies to foster local entrepreneurship and promote innovation and knowledge creation based on local assets, resources, and knowledge. This approach leaves behind the traditional hierarchical relationship among various levels of government and regional/local authorities. Instead, it supports coordination between sectoral units (such as among governmental departments or county councils) or governments with other regional/local actors, such as local development groups or the local chamber of commerce (Shannon and Van Egeraat, 2013).

In regional development theories, the transition of approach from top-down toward bottom-up was marked by the co-evolution, complementarity, and interdependence relationships of actors, instead of fierce competition, exclusiveness, hierarchy, and domination (Tappeser et al., 1997). The bottom-up approach emphasizes the need for partnership in human and institutional relations and the participation of individuals in decision-making processes (Ibid.). It explains why OEDC (2009) describes the term "regional development policy" as a shared responsibility between levels of government, engaging a variety of public and private actors that project both vertical and horizontal relationships.

The different key ideas between top-down and bottom-up approaches used in regional development postulate each's strengths and weaknesses. Policies with the

top-down approach are set as one-size-fits-all policies that are managed within hierarchical systems, often used as the general framework to integrate various sectorial plans. However, such policies are uniformly used in standardized ways to address problems in the regions regardless of their local context or the heterogeneity of regions (Breatnach, 2013; Ouyang, 2020). Ouyang (2020) added that top-down regional policies preclude the possibility of engaging local stakeholders and often lead to objections or resentment of the locals to the related state policies. Meanwhile, the central government that initiates the policies may not possess complete knowledge regarding the context in which they are utilized, causing policies to be inadequate in responding to local complexities (Crescenzi and Pose, 2011; OECD, 2009).

On the other hand, a bottom-up approach focuses on key ideas that optimize endogenous local assets and knowledge to continually stimulate the regional and local economic systems, done through the cooperation among various tiers of governments and multiple actors from the government, public, private, and NGOs (Shannon and van Egeraat, 2013; Keune,2001). Policies within such an approach tap the underutilized regional potentials and deliver context-adaptive solutions (place-based) that are perceptive to territorial needs (Ouyang, 2020; Keune, 2001; Shannon and van Egeraat, 2013). However, bottom-up policies are too focused on the use of bottom-up initiatives. It lacks the ability to function as a framework (from a macro perspective) that integrates the different planning of various scales (Crescenzi and Pose, 2011).

A multitude of scholarly works in the field of regional development has underscored the inadequacies inherent in the exclusive adoption of either a top-down or bottom-up approach (Crescenzi and Pose, 2011; Pisourios, 2014; OECD, 2009; OECD, 2018). Instead, finding the right balance between integrating the two approaches is needed Ibid). This attempt can be seen as collaborative governance (Ding et al., 2022), which involves power delegation (Rodriguez-Pose & Gill, 2004). The role of the central government has shifted from being a sole decision-maker to a coordination role (OECD, 2018). In this collaborative setting, state and non-state stakeholders congregate in collective forums to engage in a collective decision-making process that is formal, deliberative, and consensus-oriented decision-making to formulate/implement public policy or manage public programs or assets (Ansell and Gash, 2007; Ansell and Gash, 2008; Michel, 2017). Related actors recognize that certain issues are interconnected and require a collective response. As a result, they come together with a sense of shared purpose and mutual accountability to work together towards shared goals (Ansell and Gash, 2008; Ran and Qi, 2018; Ma et al., 2018)

Unlike the traditional governance mechanism, collaborative governance promotes interaction and empowerment of the involved actors (Milagres, 2019). It is characterized by face-to-face dialogue, trust building, and commitment among

actors (Ansell and Gash, 2007; Sisto. 2018). Nevertheless, getting actors to collaborate and invest in sustainability is challenging, since they are likely to have different perceptions of sustainability issues, the kind of solutions needed to mitigate the issues, and who can deal with the issues. Actors may also have different interpretations of the available information regarding how a sustainable corridor development should be envisioned. Additionally, actors have their objectives, interests, and values that they support, leading them to choose specific strategies that may not be necessary to balance the three sustainability pillars. These interactions can then lead to the full cooperation of actors where mutual trust is developed, or hostility where there is distrust among actors (Hindmoor 1998; Provan et al. 2009; Klijn, Edelenbos, and Steijn 2010 as cited in Klijn and Koppenjan 2016). Consequently, the process may become stagnant, and actors and sustainability aims may be sidelined, resulting in non-sustainable outcomes.

Given these complexities, the interaction processes of actors become an important area of study. These processes are contingent on providing an opportunity for actors to circulate knowledge, balance their interests, and mediate conflicts in a sustainable corridor development context. Through engagement in interactions, actors gain access to various sustainability-related information, rules, and procedures, leading to clear positions and standpoints of each actor, as well as an opportunity to tune in strategies to deliver the necessary outcomes through collaborative actions. To facilitate and guide the interaction of actors in policy-making, this study looks into governance literature that highlights the role of process management, process design, and the institutional setting of the planning process (Koppenjan and Klijn, 2013; Klijn and Edelenboos, 2007; Paim and Flexa, 2011; Gjaltema et al., 2019). These topics will be discussed further as parts of governance factors in sustainable (transport) corridor development.

2.3.3 Governance for sustainable (transport) corridor

From the previous literature study of regional development, corridor development, sustainable development, and governance, this study develops a framework intended to address various literature gaps in the study of sustainable (transport) corridors. Four gaps have been identified.

First, regional development theories focus on factors that stimulate and accelerate growth without incorporating the regions' environmental, social, and economic sustainability aspects. Corridor development literature similarly discusses how to effectively link the different growth nodes in regions and cater to the movement of people, trade, and services through transportation infrastructure development. However, those theories do not adequately address how such development can be used to address regions' existing and future environmental, social, and economic issues.

Secondly, sustainability theory emphasizes the need for a holistic approach. Still, it lacks elaboration on how to achieve such a goal when the involved actors have their perceptions, objectives, goals, and strategies to influence sustainability, often resulting in trade-offs between economy and sustainability. In addition, particular studies that combine regional development and sustainable development in a sustainable (transport) corridor context are mostly content-oriented. They tend to focus on the types of hard infrastructure and soft infrastructure provisions investments that are needed and how those investments can address certain sustainability issues of the regions. However, there is a lack of sustainable development studies that zoom into the lengthy and complex interaction process among corridor actors. As mentioned in section 2.3.1, the interaction process itself is important, for it gives the possibility for actors to share knowledge, balance their interests, mediate conflicts (due to the varied strategies), and address problems in which one actor could not have realized alone (Li, 2016; Termeer et al., 2013; Ouden,2015; Ansell and Gash, 2008; Romein et al., 2003).

By now, we can see that a sustainable (transport) corridor entails more than the coordination of actors to develop and implement linear infrastructure that connects two or more urban areas to accelerate the growth and competitiveness of regions. Instead, it requires the coordination of actors to work together with their unique capacities to arrive at sustainability premises (UNDP and CCIE, 2017; Himanen et al., 2012). As coordination does not usually create itself, a sustainable transport corridor development needs governance. However, governance theory does not particularly address regional development, or sustainable development, which leads us to the third literature gap. Even though governance theory to date outlines that certain governance factors and interaction processes are important, it does not offer a clear framework to analyze how governance can influence the interaction process of actors that enable a move toward sustainable corridor development.

Building on the concepts and ideas that are present in regional development, corridor development, sustainable development, and governance theories, despite the mentioned gaps, this study seeks to analyze how the interaction process contributes to navigating a corridor in a sustainable direction, in which sustainability outcomes are enhanced over its development phases. The study derived from the mentioned literature led us to the presence of five governance factors that seem to make a difference in the study of sustainable (transport) corridors. The governance factors can be seen as factors that condition actors' discussions and negotiation of specific sustainability issues in light of their agendas and strategies, leading to certain sustainability outcomes. These factors are assumed to contribute to explaining the sustainable nature of the outcomes of the corridor development process. The factors are elaborated as follows.

First, a vision of sustainable corridor development is needed (Jovovic et al., 2017; OECD, 2001a; OECD, 2001b; Thierstein and Walser, 1999). Such a vision is necessary to give direction to the process by which the corridor is developed. It sets the goals and values that guide the development process, and, thus, sets the scope within which proposals and activities are seen as appropriate, legitimate, and contributory. The sustainable corridor development vision is also needed to motivate actors to invest their resources (Nogales, 2014). If actors are not convinced by the vision or disagree with its purpose, opposition and conflict may ensue (Nogales, 2014).

Keune (2011) explained that the aim of any regional policy is always development. Nevertheless, he added, policymakers rarely question the kind of development they envisioned. Meanwhile, a shared vision of the region is the first step needed in developing a strategy for sustainable development (Jovovic, 2017). Developing a vision for a sustainable corridor development is also challenging since it has to convince actors involved in regional development with diverging perceptions and interests on the added value of a corridor development and the necessity to invest not only in economic gains, but also in social and environmental measures (Thierstein and Walser, 1997).

Without a clear vision of the desired outcomes and the areas of development needed, it is also difficult to distribute the role of actors in the network for an optimum contribution of actors according to their capacities. In other words, vision is also needed as an integrating framework for actors, the institutions, and the beliefs they represent. This is why OECD (2001b) recommends the step of establishing a vision (long term) based on a country's/region's core values and history, and further translated into objectives at the national and regional/local levels in order to allow actors to set their strategies, determine the necessary trade-offs should they aim for sustainable regional development, set up the means to obtain the commitment of actors, ensuring effective participation, and eventually, achieving integrations (OECD, 2001a).

Second, the combination of governance mechanisms of top-down (hierarchical), bottom-up (self-organized), and collaborative (OECD, 2018; OECD, 2010; Oberg, 2017). According to OECD (2018), sustainable corridor development requires finding the right balance between a top-down and bottom-up approach. In top-down governance, decisions are made and managed centrally in a traditional hierarchical way (Shannon and van Egeraat, 2013). This enables national coordination with uniform policies but does not acknowledge regional complexities (Crescenzi and Rodríguez-Pose, 2011; OECD, 2010). A bottom-up approach allows initiatives from lower-level governments and/or other local actors. It is embedded in the local context and, therefore, is likely to be sensitive to territorial sustainability trade-offs. It may also enhance support for measures.

However, bottom-up initiatives may lack of direction. Having the regional/local actors focusing on interventions within specific affected areas/regions means, there is a possibility that actors are not aware of, or care about the sustainability challenges on a higher scale. This requires national-regional coordination, or even global coordination. (Crescenzi and Rodríguez-Pose, 2011; OECD, 2010). A combined approach allows for vertical cooperation among various tiers of government and other actors and horizontal cooperation between public, private, and voluntary actors from various sectors (Shannon and van Egeraat, 2013), thereby enabling the inclusion of multiple perspectives on sustainability.

Whereas sustainable transport corridor development theory suggests that a combination of top-down and bottom-up mechanisms is needed, ideas on how this combination might be brought about (Oberg, 2017). Collaborative governance is understood as both the collaborative planning and implementation of policies and plans by governments and other relevant public, private, and societal actors, and the design and facilitation of interaction processes aimed at coordinating the strategies of actors from various sectors, domains, and governmental layers to arrive at joint outcomes (Emerson et al., 2012; Ansell and Gash, 2007; Bryson et al., 2006; Klijn and Koppenjan, 2016; Milagres et al., 2019).

To allow the mix between different governance modes, process management (De Bruijn et al., 2010; Klijn and Koppenjan, 2000; Mandell, 1990) and process design (Milagres et al., 2019; Michel, 2017; Klijn and Koppenjan, 2016), play an essential role (Gjaltema et al., 2019). Process management facilitates interactions and activities of actors by considering the structure of the network, including rules, positions of actors, and resource division (Klijn and Edelenboos, 2010). The term is often seen as a direct strategy or hands-on strategy (Sorenson and Torfing, 2007), which includes a strategy for joint knowledge production among actors and building a relationship of trust (Koppenjan and Klijn, 2004). On another note, process design provides an organizational guideline for actors' interactions (Edelenbos, 1999; Edelenbos & Klijn, 2006). It is seen as activities that bring together actors (including the selection of invited actors) and create a favorable institutional setting for collaboration and discussing sustainable solutions (influencing and using the existing institutional setting). Such institutionalization can start by providing a platform for actors' interaction (Gjaltema et al., 2019).

Third, the inclusion of sustainability actors representing different sustainability dimensions drawn from both government and non-government domains (OECD, 2001a). The regional development planning process necessitates the broad perspectives of various actors with skills, resources, and/or competencies coming from public, private, and civil sectors (Keune, 2001; OECD, 2010). Given the unique potentials, characteristics, and needs of regions, OECD (1997, 2018) highlighted the need for the planning of regions to be place-based (avoiding a one-size-fits-all policy), responsive or contextual, tailored to the needs of regions, thereby making

the roles of regional/local government and their respective actors indispensable. This is why Oberg (2017) stated that broad stakeholder inclusion could enhance the sustainable development process of the corridor, specifically, a set of actors that hold comprehensive knowledge of the localities of regions (OECD, 2009).

The participation of local actors is expected to deliver positive outcomes regarding emergency preparedness and disaster response planning when it comes to the planning of regions that are vulnerable to natural disasters (ICMA, 2006; Somers and Svara, 2009; Andrew and Kendra, 2012; as cited in Andrew and Carr, 2012). Local actors have significant roles in bottom-up and top-down approaches. In the bottom-up regional development approach (competitive cluster, endogenous growth, systems of innovation), they contribute to research development activities that can lead to innovation. In the top-down approach, their presence is needed due to the practice of regional development, which is difficult to rely solely on central government capacity (knowledge and implementation).

On the one hand, the inclusion of central and regional/local sustainability actors simultaneously in the regional development planning process led to complexities, as different actors represent varied agendas and objectives of the corridor. On the other hand, their presence and composition in the decision-making process hold the key in shaping the nature and quality of (sustainability) outcomes they deliver (Athukorala and Narayan, 2017). Balancing these intricacies and harnessing the potential of these actors is a critical endeavor in the pursuit of sustainable development.

Fourth, the use of different sustainability knowledge. The planning and implementation of measures within three sustainability pillars require different types of knowledge (scientific and practical, local knowledge) from varied disciplines, perspectives, and experiences (Kerkhoff and Lebel, 2006; Thierstein and Walser, 1999). Such knowledge is crucial in the decision-making process to provide and influence actors' decisions to arrive at proper sustainability measures (NRC, 2006). The diversification of actors in policy development and implementation of regional development comes with the array of knowledge that actors bring into the network as their resource capacities, which represents the emergence of policies in the new paradigm, such as the regional innovation models that focus on the learning process that recognizes the role of knowledge: local, tacit, and codified knowledge (OECD, 1997).

Fifth, the institutional setting of the corridor development process. Institutional setting refers to the set of rules, regulations, procedures, arrangements, policies, and practices that shape and constrain the behaviors of actors, together with their roles, responsibilities, and relationships (Milagres et al., 2019). Institutional settings can be formal, such as laws and regulations, or informal, such as norms and customs (Ibid.), and their presence influences not only actors' interactions but also the

outcomes they deliver (Ostrom, 1990). The institutional setting is not necessarily favorable in directing a corridor into sustainability; it may also hinder this development, for instance, by a bias towards economic growth. Depending on their resources, political power, and organizational capacity, certain actors can influence the institutional setting by systematic and intentional attempts at institutional (re-)design aimed at the initiation of reshaping organizations and institutionalized procedures, rules, and mechanisms that guide actors' decision-making process (Gjaltema et al., 2019). Designing interaction processes can be seen as forms of institutional (re-)design since they will impact the institutional setting of governance processes. Hence, it allows for setting up scenes and platforms and developing procedures and rules that promote stakeholder participation, collaboration, and sustainability considerations.

2.4. Conceptual Framework

The conceptual framework, seen in diagram 1, presents the relationship between governance factors, the interaction process of actors, and sustainability outcomes. The framework is intended to guide this study of sustainable (transport) corridor development, providing it with concepts and relationships between concepts that direct the analysis.

The dependent variables in this study's framework refer to the sustainability outcomes. According to Klarin (2018), sustainable development ensures the integrities of each environmental, social, and economic dimension. Thus, sustainable corridor development is reached when the development of the corridor stimulates economic growth and catalyzes the investment of regions, while simultaneously balancing the environmental, social, and economic dimensions of regions throughout the planning process. The outcome comprises three variables: environmental measures, social measures, and economic measures. The environmental measures stand for actions that safeguard the environmental quality and the built cultural landscape (man-made) needed to perform various economic activities and ensure the quality of life. The social measures are related to the preservation of society and cultural identity, the different values, norms, and rules within the society, and the protection of basic human rights and equality. The economic measures involve actions to sustain the natural, social, and human capital needed for people's income and living standards.

This study assessed the sustainability outcomes from the corridor initiated in 2015 until 2019, when data was collected during fieldwork. As the corridor development is still ongoing, the sustainability outcome was measured as the balance between approved programs within the economic, environmental, and social dimensions and the issues they addressed, together with the availability of funding for each dimension.

The intermediate variables in the framework refer to the interaction process by which the corridor is developed and implemented. These variables are influenced by the governance factors to then have impacts on the sustainability outcomes, which explains why they are positioned in this study as intermediate variables. The interaction process in corridor development is often lengthy, in which many things happen as multiple actors collaborate in the light of their agendas and deploy strategies to influence the outcomes - conditioned by the governance factors. Given the erratic nature of the interaction process, it will be analyzed by distinguishing various rounds of interactions. Within each of these rounds, specific issues are discussed, and the constellation of actors may differ. A round ends when actors agree on a certain decision or when an in-between outcome is realized; as a result, the nature of the interaction changes, and the next round of interaction is initiated.

Lastly, the independent variables comprise the five governance factors derived from regional development, corridor development, sustainable development, and governance theories. These factors are likely to condition the interaction process and the sustainability of corridor development. They are also dynamic: during the various rounds, the constellation of governance factors evolves. Therefore, this study will provide an analysis that describes and explains how the factors influence and reinforce one another, forming certain constellations as they co-evolve with the various rounds of the interaction process. The five factors are vision, governance mechanisms, the actors' constellation, the knowledge's type and use, and the institutional setting.

As mentioned in the previous section, governance does not automatically steer corridor development in a sustainable direction. A one-sided focus on the economy may hinder balanced, sustainable development. As the study aims to investigate the relationship between governance and sustainability using the framework, this study analyzes how governance directed the presence of the governance factors as independent variables and how these factors can explain whether the process and outcome evolve towards sustainability or not.

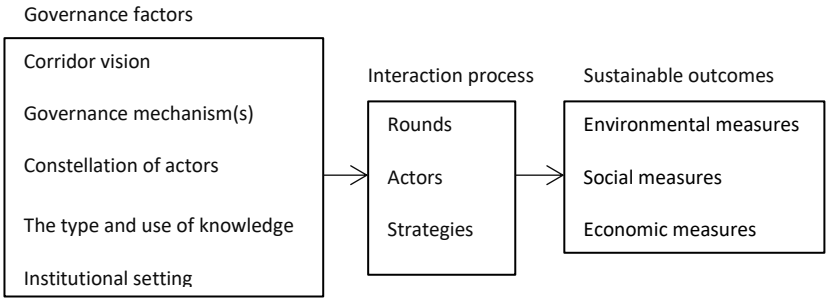


Diagram 1. Initial conceptual framework. Source: author

CHAPTER 3
METHODS AND OPERATIONALIZATION

This chapter presents the methods used in this study, followed by an introduction of the selected case studies of the Gilimanuk - Denpasar - Padangbai and the Yogyakarta - Solo - Semarang Corridors. It also discusses the types of data needed to conduct the study analysis and how it was conducted. Next, the chapter presents the operationalization of this research, including its variables and indicators. Lastly, the chapter addresses the internal validity, external validity, and reliability of the study.

3.1. Selection Methods

The study explores the relationships between the key concepts of the conceptual framework (sustainability outcomes, governance factors, and processes) guided by the theoretical review. The research utilizes the case study method, which involves studying real-life cases within a specific setting to conduct this exploration (Yin, 2009). The case study method allows researchers to gain a comprehensive understanding of an issue or phenomenon through in-depth data collection and analysis from multiple sources (Yin, 2009; Creswell, 2013; Crowe, 2011). The method also enables researchers to develop new theories from numerous topics (Eisenhardt & Graebner, 2007; Eisenhardt, 1989; Gustaffson, 2017), which, in this case, are regional development, sustainable development, and governance topics.

A case study method can involve a single case or multiple cases, wherein researchers identify themes, issues, or specific situations to study the case(s). The themes or issues are then analyzed within and across cases to augur similar or contrasting results (Yin, 2003) or presented as a theoretical model (Creswell, 2013). The case study ends with conclusions on the overall meaning/general lessons derived from learning the case(s) (Ibid.).

According to Yin (2009), the case study methodology can be used to expand and generalize theories, referred to as analytical generalization rather than statistical generalization. The goal is to gain insights and theoretical knowledge that can be applied to similar contexts or situations rather than making universal statistical claims. This is achieved through in-depth case studies, allowing researchers to generate theoretical concepts and frameworks relevant to other similar cases. Researchers identify patterns, relationships, and causal mechanisms within the specific case(s), enabling the formulation of theoretical propositions that can be further tested.

To study the framework's key concepts, this study uses two cases of Indonesian SDR Corridors: the Gilimanuk-Denpasar-Padangbai Corridor on Bali Island, and the Yogyakarta - Solo-Semarang Corridor on Java Island. These cases were chosen because they represent sustainable (transport) corridor phenomena characterized by the prioritization of economic factors and investments in regions that exhibit abundant growth nodes and robust economic linkages in combination with the ambition to address various environmental, social, and economic issues of the regions and establish a balance among the three dimensions of sustainability.

As a result, these two corridors are regarded as highly significant corridors in Indonesia due to their presence in the developed western regions of the country, characterized by a strong demand for infrastructure and commercial viability. They stand out as some of the most advanced SDR corridors, featuring international airports, seaports, metropolitan regions, and national strategic areas. Furthermore, they were among the early corridors developed to the second round (the planning round) by MPWH, signifying their importance to Indonesia's economy. The two corridors also exemplify the growing phenomenon of sustainable (transport) corridor development, where various sustainability challenges are experienced by their regions, most especially in the urbanized areas with high-density populations. The GDP and YSS Corridors include several large metropolitan regions. They are Sarbagita Regions in Bali Province, Kedungsepur and Purwomangung Regions in East Java Province, and Kartamantul Regions in Yogyakarta Province. Their sustainability challenges include waste management, traffic congestion, ecosystem degradation, lack of access to clean water and sanitation, slums, and wealth disparity. Therefore, these corridors provide the opportunity for the study to assess the extent of sustainability of the corridors' outcomes and explore how they are governed to result in sustainability outcomes that address those challenges.

The study aims to analyze how the key concepts and variables within a conceptual framework (generated from various theories) manifest in those two cases. Although the cases share common regional characteristics and national significance, they present different environmental challenges. Such distinction allows the study to examine the relationship between governance and its process in different sustainability settings, resulting in more robust findings. Additionally, each corridor involves different sets of regional and local actors with their own agendas and strategies, which influence sustainability discussions and negotiations. Those differences (of actors' agendas and strategies) enable the study to focus on the dynamics of governance factors and the evolution of interaction processes amidst the complexities of actors' interactions, including how conflicts are addressed. By analyzing these two cases, the study explores the applicability of the framework and aims to further develop it from the empirical findings that enhance further research in sustainable (transport) corridors and inform practice. The

revised framework is expected to be tested by other researchers to gain a better understanding of the study of sustainable corridors.

The selection of the two cases enables the author to conduct an in-depth investigation of the corridors phenomenon in Indonesia from the establishment year 2015 to 2019 when the fieldwork of this study was conducted to collect high-quality and sufficient related data. This timeframe allowed the study to analyze varied outcomes of the corridors across various stages of the planning and interaction process in different rounds. Although this presented a challenge due to the limited access to various types of data related to government projects in Indonesia, including access to interview respondents and obtain official records, the author managed to gather ample data to meet the study's objectives. Details on this data collection process will be provided in the upcoming section of this chapter.

3.2. Introducing Cases

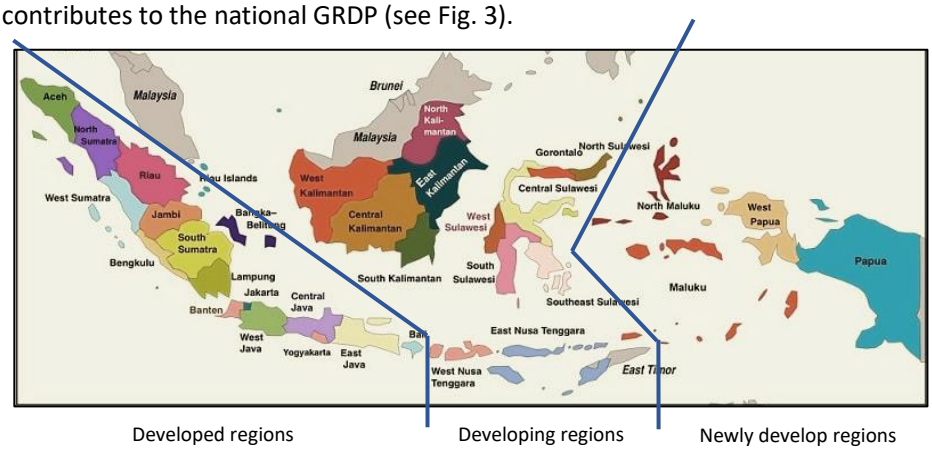
The two Indonesian corridors of the Gilimanuk-Denpasar-Padangbai (GDP) Corridor and the Yogyakarta-Solo-Semarang (YSS) Corridor are categorized as sub-national corridors, meaning they span across regions, states, or provinces within a country. The GDP corridor is governed by one provincial government (Provincial Government of Bali) as a single-state corridor, and the YSS corridor is governed by two provincial governments (Provincial Government of Special Region Yogyakarta and Provincial Government of Central Java) as a multi-state corridor.

The GDP corridor covers an area of approximately 3750 km^2, comprising seven regions of Denpasar City, Jembrana Regency, Tabanan Regency, Badung Regency, Gianyar Regency, Klungkung Regency, and Karangasem Regency. Meanwhile, the YSS corridor comprises an area of approximately 4799km^2 including ten cities/municipalities of Semarang City, Semarang Regency, Salatiga City, Yogyakarta City, Sleman Regency, Magelang City, Magelang Regency, Surakarta City, Klaten Regency, and Boyolali Regency.

The geographical characteristics of the GDP and the YSS Corridors show that the two cases transcend administration boundaries. They are illustrated as a system that knits growth centers, strategic areas, main transportation hubs, and urban and rural areas with the corridors' backbone (national road) and the local scale networks. Their purpose is to cater to the movements of people, goods, and services within the regions while addressing regions' sustainability challenges.

The GDP and YSS Corridors share common characteristics and, at the same time, face distinct sustainability challenges, involving different actors in the planning process.

The first similar characteristic is that both corridors hold strategic positions within the country and possess significant backbones. Regions in Indonesia can be distinguished into three types: the developed regions, the developing regions, and the newly developing regions (see Fig. 2). Developed regions exhibit the highest Gross Regional Domestic Product (GRDP) and concentration of economic activities, with a high demand for infrastructure and commercial viability. On the other hand, the other two categories consist of less developed regions with lower commercial viability. Investments are primarily focused on the western regions, particularly Java Island (Greater Jakarta, Surabaya, and the greater Bandung), Bali Island, and Sumatera Island (Medan, Palembang Cities). Meanwhile, the development progress of cities other than those mentioned remains slow, except for Makassar and Manado Cities on Sulawesi Island. Both corridors fall under the first advanced category, where the economic development in Java and Bali significantly contributes to the national GRDP (see Fig. 3).



Developed regions Developing regions Newly develop regions

Fig 2. The three economic regions in Indonesia, according to their GDP.
Source: Author elaboration

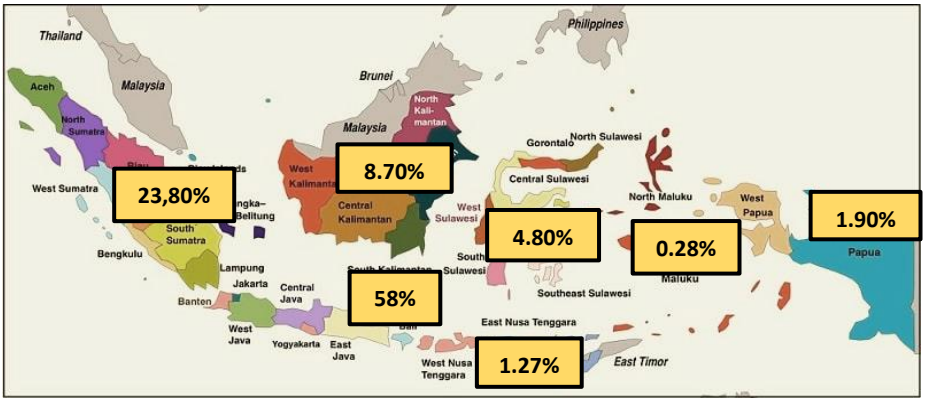


Fig 3. Contribution to the national GDP based on the cluster of regions.
Source: MPWH, 2015

Simultaneously, both corridors' backbones, represented by the national roads, play vital roles in the country. The backbone of the GDP Corridor serves as a freight transportation network that caters to the logistics between the western and eastern regions of Indonesia. The GDP corridor (see Fig. 3) features a vital corridor gateway on a national scale, namely the Ngurah Rai Airport in Badung Regency, which functions as the primary hub for foreign tourist arrivals. Meanwhile, the backbone of the YSS Corridor (see Fig. 4) is situated at the center of Java Island. It links the logistics activities between West Java and East Java while linking the vibrant and rich capitals of Central Java (Semarang City and Semarang Regency) with those in the Special Regions of Yogyakarta (Yogyakarta City). Notably, the YSS Corridor stands out among other SDR corridors, as it encompasses three international airports of Kulonprogo, Ahmad Yani, and Adi Sucipto, with the former serving as the largest domestic hub of Indonesia.

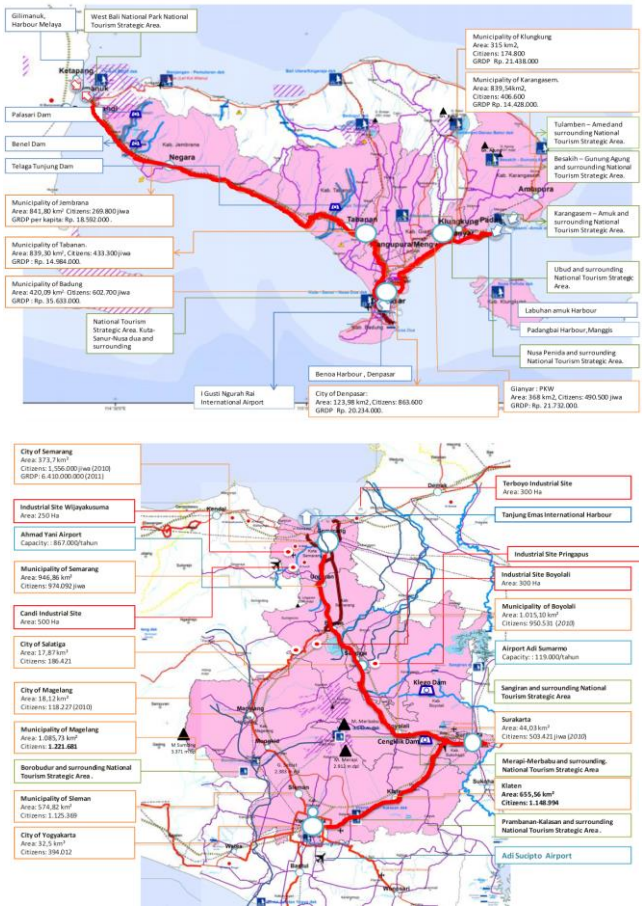


Fig 4. GDP Corridor (top) and YSS Corridor (down)
Source: RIDA, 2016

The second common characteristic is their strategic roles related to the spatial planning of Indonesia, as outlined in Government Law No.13 Year 2017. The four regions of Denpasar, Badung, Gianyar, and Tabanan Regencies, known as Sarbagita Metropolitan Regions, are formed together as one big node of Indonesia's National Activity Center (NAC). Similarly, Yogyakarta City and Sleman Regency in the YSS Corridor are parts of the Kartamantul Metropolitan Regions; Semarang City, Semarang Regency, and Salatiga City within the YSS Corridors are parts of the Kedungsepur Metropolitan Regions. Both Kartamantul and Kedungsepur have also been appointed as Indonesia's National Activity Centers.

The third common characteristic is how the regions within the corridor significantly contribute to the growth of the national economy through agricultural activities and tourism. Presidential Law No. 28 Year 2012, a high-hierarchy law in Indonesia, designated the two islands of Java and Bali as the national food barn and the center of tourism activities. According to Indonesian Statistics (2017), regions within the two corridors still have high percentages of irrigated rice fields, most of which are included in the nation's sustainable rice fields program. This program protects rice fields from land conversions for commercial activities). According to the World Travel and Tourism Council (Tempo, 2018), Indonesia has the fastest-growing tourism sector in ASEAN countries. This highlights the priority given to tourism in Indonesia's economic development. The GDP and the YSS Corridors possess the most allotment of National Tourism Strategic Areas (NTSA) compared to the other eight corridors, with the regions in these corridors being significant contributors to Indonesia's Gross Domestic Product in the tourism sector.

Overall, to specify their economic potentials, the GDP Corridor features distinguished growth nodes, including six National Tourism Strategic Areas (Kuta - Sanur - Nusa Dua; Nusa Penida; Ubud; Karangasem - Amuk; Besakih; and Tulamben), Pengambengan fisheries industrial site, the hinterlands of Tabanan and Gianyar, and the international airport of Ngurah Rai. Meanwhile, the YSS has four National Tourism Strategic Areas (Borobudur; Prambanan - Kalasan; Mount Bromo-Tengger-Semeru; and Kota Yogyakarta), the Tanjung Emas cargo seaport; hinterlands of the Boyolali, Klaten, and Magelang Regencies; and three international airports of Ahmad Yani, Kulonprogo, and Adi Sucipto.

Despite their similar characteristics, the planning of GDP and the YSS Corridors involves regional/local actors from various backgrounds. They come together in different coordination platforms with their knowledge, objectives, ambitions, goals, and strategies, leading to different sustainability negotiations.

At the same time, the two corridors face distinct sustainability issues to answer. For example, large parts of regions of both corridors are highly prone to natural disasters, as identified by the National Disaster Mitigation (2013). However, the GDP Corridor mainly faces issues related to the high tides and abrasions, as it is

positioned along the coastal lines. Whereas the YSS Corridor predominantly faces issues related to earthquakes. Another example is the waste issue caused by massive tourism activities in the southern part of the GDP Corridor, where a significant amount of waste is disposed into the oceans, posing a threat to marine life. Meanwhile, the YSS Corridor faces an issue of disparity gap, especially Magelang Regency, located on the west of the corridor where UNESCO's World Cultural Heritage Site of Borobudur Temple is situated, with a high index of poverty and a low human development index.

The sustainability issues experienced by both corridors and how different actors perceive these issues and potential solutions within an interaction process make them suitable for an in-depth analysis guided by the theoretical framework. These cases allow the study to examine the potential of governance factors in influencing and steering actors' interaction toward sustainability.

Thirdly, the key concepts and variables of the framework are analyzed throughout the rounds of the corridor development process, enabling the study to zoom into how the interaction process evolved and how a particular constellation of governance factors has been formed to influence the process. By doing so, the study explains the common patterns that arise among the key concepts investigated in the study.

3.3. Qualitative Data Collection

According to Creswell (2013), qualitative data collection is essential for conducting an in-depth study of a case(s). This is because a case study method aims to provide a detailed and comprehensive understanding of specific cases or phenomena by gathering rich-in-depth data from multiple stakeholders or sources that capture diverse perspectives on the case (Creswell, 2013; Crowe, 2011; Yin, 2009). This inclusiveness allows researchers to explore the complexity and nuances of the case under investigation by considering different viewpoints, experiences, and interpretations. Collecting qualitative data enables researchers to explore the range of perspectives, opinions, and values held by various individuals or groups involved in or affected by the case (Ibid.)

Qualitative data collection also facilitates triangulation, involving multiple data sources and methods to validate and corroborate the findings. By collecting data from different sources, such as interviews, observations, and documents, researchers can compare and cross-reference the information obtained. Triangulation strengthens the credibility and trustworthiness of the case study findings by reducing bias, enhancing data reliability, and providing a more comprehensive understanding of the case.

For these reasons, this study gathered qualitative data to analyze the GDP and YSS Corridors cases from 2015 to 2019, utilizing primary and secondary data from different sources. The primary data collection involved semi-structured, face-to-face interviews conducted firsthand by the author (Fink, 2002; Creswell, 2013). The interviews were carried out with actors within institutions, agencies, organizations, or offices relevant to planning the corridors to explore participants' experiences, opinions, and perspectives. This approach aligns with Yin's (2011) suggestion of using data representing the meanings given to real-life events by those who experienced them, instead of coming from a researcher's values or perceptions.

The study employed an interview protocol before interviews were conducted. The protocol involves making a list of carefully formulated interview questions based on the pre-developed conceptual framework. It plays a crucial role in this study, allowing for a comprehensive understanding of the information that was heard (Creswell, 2013). Specifically, the interviews serve the purpose of reconstructing the planning process over the rounds with a clear timeline and sequence. To ensure accuracy, all interviews were recorded and transcribed. Furthermore, respondents are required to provide consent, acknowledging their understanding of the study's aims and circumstances. To safeguard the anonymity and privacy of respondents, their identities remain undisclosed, ensuring that their statements cannot be directly attributed to them. This anonymity aligns with the request of the interviewed actors, who emphasized the importance of respecting their privacy.

Considering the time constraints faced by the respondents, the interview questions were pre-designed and semi-structured. This approach ensured the effectiveness of the interviews, optimizing the use of the limited time available for each participant.

The data collection also involved secondary data, using pre-existing materials that were not specifically created for this study, but serve as information sources for analyzing and interpreting the research topic. This study utilized primarily central and regional/local government data, such as policies, reports, modules, executive summaries, presentations, and minutes of meetings. These secondary data sources complemented the interview data by providing additional insights into the planning process and serve as primary information in assessing the GDP and YSS Corridors' sustainability outcomes.

The process of collecting primary and secondary data for this study was unique, considering the complex bureaucratic procedures in Indonesia. To initiate the data collection process, the author scheduled a meeting with the Head of RIDA to explain the study's objective and describe the data needed to support the analysis. This meeting was followed by obtaining a letter of recommendation from the head of RIDA, expressing support and approval for accessing relevant data from related

actors. Thus, the letter of recommendation opened the door for data collection activities in Jakarta, Yogyakarta, Semarang, Badung, and Denpasar Cities.

To maintain the independence of this research, specific measures have been taken to ensure unbiased data collection and analysis. Before the commencement of fieldwork, a careful selection of respondents (see Annex 2) was made based on their personal/institutional involvement and knowledge capacity pertaining to the study. To further guarantee independence, the entire data collection process, and analysis were supervised by two supervisors from an academic institution where this research is undertaken, with no direct affiliation with the corridor projects under investigation. Their involvement provided an objective perspective and oversight through the research.

Furthermore, the interview questions were developed based on the study's theoretical framework. Thus, the framework guided the interview questions, and the questions were formulated with theoretical foundations. The questions then went through a thorough consultation and input from the supervisors and were not shared with the respondents beforehand. This approach allows for spontaneous responses from actors during interviews, based on their perceptions, knowledge, and memories regarding the development of the corridors. By refraining from providing the interview questions in advance, this study maintains its independence and avoids any potentially biased information from respondents. In addition, data triangulation was done to confirm that the respondents' statements align with others, especially independent experts from local universities and representatives of local communities, and to corroborate the information obtained with written documents (policy documents, reports, archives, and minutes of meetings). The objective selection of respondents, supervision by independent supervisors, the design of interview questions based on theories, and data triangulation overall contributed to the reliability of the study.

The initial data collection took place in Jakarta, where the interviews were conducted with seven RIDA officials and two practitioners who were team leaders of the GDP and the YSS IIDP program. Simultaneously, different types of secondary data were also collected, including: 1) the documents of MPWH Strategic Plan 2015-2019; 2) the Java-Bali Islands Master Plan; 3) the SDR module; 4) The final, mid, and final IIDP reports of the GDP and the YSS Corridors; 5) IIDP executive summaries of the GDP and the YSS Corridors; 6) IIDP Minutes of Meetings; 7) IIDP Term of References; 8) Pre-RC's Term of References; 9) Base Line Programs List from Years of 2016-2019; 10) RIDA's annual performance books; 10) RIDA's Synergy bulletin books; 11) various power points documents related to the SDR Corridors development.

The next step was obtaining primary and secondary data from the regional and local actors. This activity was done at the metropolises of Bali Province (Badung Regency

and Denpasar City), Central Java Province (Semarang City), and Special Regions of Yogyakarta (Yogyakarta City), where various Provincial/Local Government offices from different sectors (spatial planning, environment and natural resources, transportation, water management, housings provisions, settlements, tourism) are situated.

Interviews were carried out with eight regional/local government actors involved in the planning of the GDP Corridor and ten regional/local government actors involved in the planning of the YSS Corridor. All interviews were conducted face-to-face, except one (with a provincial actor of Bali in the form of a phone interview). From those officials, the author obtained secondary data, including: 1) the Bali, Central Java, and Yogyakarta City Mid-term Development Plans; 2) Power Point documents regarding the short-term, mid-term, and long-term regional planning of the related provinces; and 3) Annual Provincial Statistics reports.

Meanwhile, to conduct interviews with relevant academics, NGOs, the Chamber of Commerce, and the private sector, the author identified the relevant actors through official websites, except for two GDP and two YSS actors recommended (snowballed) by other provincial governments and NGO actors. The interviews were done in Sarbagita Regencies (Bali), where face-to-face interviews were arranged with one academic from Udayana University and a representative from the Bali Chamber of Commerce associated with the GDP Corridor. Other interviews were done in Semarang City and Yogyakarta City, involving two academics from Diponegoro University and the Yogyakarta University of Technology, one private sector from Candi Industrial Site, and two environmental NGOs related to the YSS Corridor. On the one hand, the snowball method allows data to be acquired efficiently within the limited time of fieldwork. This was needed since certain actors initially identified for interviews were unavailable. Thus, the snowballed actors filled the gap in the data collection. On the other hand, this method is known to be sensitive and possibly biased. Thus, the study minimized the number of snowball respondents and applied data triangulation to validate their statements' credibility.

By having the varied types of actors for interviews and obtaining the secondary data, the author used different entry points to include the different perspectives on corridor development and the sustainability issues of the two corridors. The interview process, including the scheduling and conducting the interviews, occurred in Indonesia over a three-month fieldwork period from June to September 2019. The author also contacted various sources outside the fieldwork period to confirm the interviewees' statements or ask additional questions via phone until a saturation point was reached, at which point no new or significant insights were gained through the interviews.

The interviews were carried out primarily with government actors (RIDA and provincial governments) for two reasons: firstly, those actors possess the

knowledge and experience involving the overall planning processes of the corridors (the establishment of the SDR concept, followed by the envisioning of the Master Plan Development Plan of the two corridors, and the implementation of the corridors). Secondly, the author's constraints on scheduling the non-government actors for interviews (such as private actors and the chamber of commerce of Central Java and Special Regions of Yogyakarta). Nevertheless, the author conducted interviews with other regional/local actors from NGOs and academic backgrounds, who enriched the information needed regarding the regions' environmental, social, and economic issues and their potential solutions.

Regarding interviews, baseline questions were designed before the start of fieldwork (see Annex 3). The interviews were semi-open and adjusted according to the interviewees' responses and time availability. Three types of questions were listed: those for RIDA, the regional/local governments, and non-RIDA actors. Different questions were designed since actors' roles in the corridors networks and the rounds they participated in differed. Overall, all questions were primarily directed toward the actors' perceptions of the corridors' idea, their personal or their institution/agency/organization/office's objectives and strategies for the corridors' development, their knowledge of the sustainability issues of the related corridor, and involvements in the planning and/or implementation of the corridor.

There are differences between questions given to RIDA, regional/local government actors, and non-government actors. The questions for RIDA emphasized the development process of the corridors, including how they originated ideas and progressed to their establishment and implementation. The questions also focused on critical moments in the corridor development, the guiding principles (vision, theories used) behind the corridor idea, and the institutional setting, including the rules and procedures involved in the planning and implementing of the corridors.

Meanwhile, the main questions that guided the interviews for regional/local actors pertained to the involvement (roles) of their institution/agency/organization/office within the corridor development. The questions also explored the interaction and coordination process between actors' institutions, agencies, organizations, or offices with RIDA throughout different planning stages. Furthermore, the questions were designed to gauge their optimism or pessimism towards the corridor's ability to address the sustainability issues of the regions.

Lastly, the main questions for non-government actors revolved around their awareness of the presence of corridors and its concept (the SDR). The questions explored their input to the government regarding future planning and significant changes that could improve the sustainability of the corridor. Additionally, the questions inquired about the kind of roles that actors' institutions/agencies/organizations/offices could offer in the future for involvement in corridor development.

3.4. Data Analysis

The study employed process tracing to analyze the sequential events and draw the causal configurations and mechanisms (Bennet, 2010; Blatter and Blume, 2008; Collier, 2011). The empirical study of the process was done with a rounds-model analysis (Teisman, 2000; Klijn and Koppenjan, 2016; Beach and Pedersen, 2013; Blatter and Haverland, 2014; Crozier and Friedberg, 1980; Radford, 1977). This method enabled the study to describe the evolution of variables during the corridor planning process and reconstruct the actors' interactions by establishing a timeline of their strategic engagements and the intermediate outcomes during the development process (Beach and Pedersen, 2013; Blatter and Haverland, 2014). This study delineated rounds by the core/critical decisions in the corridor development process.

The complexity of the analysis was reduced by splitting up the lengthy interaction process into smaller rounds for further analysis. Core decisions served as important intermediate outcomes that set the scene for the following process round. Each round was characterized by a specific constellation of factors and interaction patterns (Teisman, 2000; Klijn and Koppenjan, 2016). During a round, actors engaged in discussions and negotiations of particular issues based on their agendas and strategies, leading to intermediate outcomes. Governance factors conditioned these interactions and their outcomes.

All variables in this study were analyzed within three rounds of corridor development aimed at achieving identifiable outcomes. The rounds are the SDR Conception Round, where the general SDR concept and delineations were elaborated comprehensively within the MPWH Strategic Plan; the corridors' Planning Round, where each SDR corridor's ultimate goal and regional development strategies were planned/formulated within the Integrated Infrastructures Development Plan Program; and the corridor’s prioritization and implementation round, where public work infrastructure programs were selected for implementation in regions within the Pre-Regional Consultation Forum. The application of the rounds model allowed the comparison of variables’ values in all three identified rounds to examine their evolution and influence (Blatter and Haverland, 2012).

The coding process in this study followed a systematic approach that incorporated open and closed coding techniques using Atlas TI software. Coding is considered an active endeavor in which a researcher organizes textual materials into segments of texts that convey information (Rossman and Rallis, 1998, as cited in Creswell, 2013). Coding activity can be distinguished into open coding and closed coding, which exhibit fundamental distinctions.

Open coding follows an inductive approach. It involves a process where researchers thoroughly analyze data in all possible directions (Qureshi and Unlu, 2020) to

generate knowledge from the ground up. It involves coding phrases, sentences, paragraphs, and other elements from data that generally depict specific content (Linneberg and Korsgaard, 2015). Such coding provides a new perspective that existing theory has yet to consider. On the contrary, closed coding follows a deductive approach. It enables a researcher to organize and refine an analysis based on predeterminant concepts derived from the pre-existing conceptual framework.

This study involves closed and open coding. The decision stemmed from the exploratory nature of this study, as even though a conceptual framework guides this study analysis, it remains uncertain how exactly the governance factors, governance process, and sustainability outcomes were related in a sustainable (transport) corridor setting. By employing open and closed coding in tandem, the author could, on the one hand, maintain awareness of the key concepts within the conceptual framework, facilitating the identification of codes that pertain to the framework's concepts. On the other hand, this approach allowed the generation of additional codes that went beyond the established concepts, enabling the exploration of additional concepts and relationships between concepts in the preliminary framework with the intention of revising the study's preliminary framework.

After labeling data and assigning descriptive names during the closed and open coding process, the codes were then organized into categories. This organization was done by clustering codes that pertain to the same topics or general concepts based on their similarities and associations. These categories were named based on the existing codes or by formulating new codes that best captured the diverse range of codes present (Strauss and Corbin, 1990; Qureshi and Unlu, 2020). Furthermore, the data underwent iterative refinement to ensure the emergence of major categories that validated the similarities observed in the previous categories. This refinement process continued until saturation, meaning that no more codes could be grouped together (Strauss and Corbin, 2008). These processes contributed to establishing a more nuanced and coherent theoretical framework that explained the phenomenon of interest based on the involved data.

Through coding, the author first analyzed the pieces of statements from interviews as well as fractions of texts from the secondary data, resulting in 48 codes (see Annex 4). Specific coding procedures were presented in the following.

First, identifying the rounds in which variables of the key concepts were going to be analyzed. Since the study aims to explore the relationship between the Indonesian corridors' governance and their sustainability outcome, it needed to identify the number and the nature of the rounds in which the values of sustainability outcomes, governance factors, and interaction process were going to be analyzed.

The rounds were defined by coding the main secondary data (MPWH Strategic Plan, IIDP Reports and executive summary, SDR module, IIDP term of references, Pre-RC guidelines, and baseline programs list), which identified the sequence of the rounds. The classifications of rounds were strengthened by the statements of actors within interviews (primary data) that elaborated the overall planning process of the corridors. As a result, 3 codes emerged: SDR conception - nature of R1; envisioning of corridor/nature of R2; and prioritization and implementation of programs/nature of R3.

Second, the author used the interview data (primarily from provincial/local government actors, academics, and NGOs) to identify codes for the environmental, social, and economic issues that were problematic and hindering the corridor's sustainability. This was followed by the coding of secondary data (the IIDP final reports and the IIDP executive summaries) that specified the sustainability issues of the GDP and the YSS Corridors in detail. Afterward, the author analyzed various secondary data (MPWH Strategic Plan, IIDP reports, IIDP executive summary, and Pre-RC baseline programs list) to identify the values of the sustainability outcomes (dependent variables). This second procedure resulted in 6 codes: 3 for the types of environmental/social/economic sustainability issues; and 3 for types of environmental/social/economic sustainability measures. Each statement within the three sustainability outcomes codes was layered with another coding that shows the round it is in, either in rounds 1, 2, or 3.

Third, the coding of primary data (interviews of each type of actor) that projected various actors' perceptions and experiences in relation to the planning process of the corridor’s development. The coding for such primary data was complemented by the coding of secondary data (MPWH Strategic Plan, IIDP TOR, IIDP executive summary, Pre-RC Guideline) that simultaneously defined the values of the governance factors (independent variables) and the interaction process (mediating variables). The procedure generated 38 codes: 6 codes that marked the start and end of each round; 3 codes of the different types of corridor actors (central government, regional/local government, non-government actors) involved in the corridors’ planning process; 3 codes of actors’ perceptions and 3 codes of actors’ strategies that were all differentiated based on the three types of actors; and 3 codes for the process outcome that each round delivered.

Continued coding yielded 3 codes each for environmental, social, and economic visions; 1 code for visions extending beyond the corridor; 3 codes for governance mechanisms, including top-down, bottom-up, and collaborative approaches; 3 codes for actor types corresponding to the sustainability dimensions they represent; 6 codes for knowledge types influencing the decision-making process (environmental, social, economic knowledge, along with local, tacit, and codified knowledge); and 5 codes covering the institutional setting, rules, procedures, and platform types relevant to corridor planning. The codes related to the kinds of

actors that were present, their perceptions and strategies, the presence of visions, knowledge, and the institutional setting and process design were all layered with codes that marked the rounds they were in.

Additionally, from the overall 48 codes generated, those within the same theme of key concepts were grouped (axial coding). The process resulted in 5 new grouped codes of sustainability issues, sustainability outcome, governance factors, interaction process, and external factors. The 4 former codes were further grouped into 2 main themes of sustainability and governance, while 1 code for external factors remains, as additional factors outside the corridor's governance that influence the interaction process and sustainability outcomes.

The coding helped the study's empirical analysis by projecting the values of variables indicated in the study's conceptual framework. It shows that there is a relationship between governance and the sustainability of the corridors, situated within rounds of corridor development. Throughout the coding of the secondary data of sustainability outcomes (second procedure), it became apparent that the number of quotes within the environmental mitigation and social mitigation codes increased from the second round onwards. This was in line with the coding of primary data that showed more involvement of sustainability actors in the later planning process of the corridors and how the perception and strategies of actors evolved within rounds. The coding of secondary data also specifically revealed the incorporation of additional sustainability ideas into the corridor vision. This is evidenced by the integration of diverse sustainability analyses and knowledge during the decision-making process of stakeholders, and straightforward process design aiming to incorporate more actors with diverse sustainability knowledge and implementation capabilities into the plan.

Moreover, while coding the independent variables, the values found for the GDP and the YSS Corridors appeared to be predominantly similar. For example, they shared common visions, types of sustainability knowledge used, and the rules, procedures, and platforms surrounding the development of the two corridors. Despite such similarities, the coding of the mediating variables showed striking differences due to the governance complexities within the interaction process. For example, various regional actors mentioned their objections towards the GDP delineations that left behind the northern regions in Bali. Meanwhile, the YSS Corridor regional actors had no objections to the YSS delineations. However, they introduced additional objectives to enhance the socio-economic conditions in the western regions that are poorer than the rich Northern and Southern Regions, and enhance sustainable tourism in the Western and Southern Regions.

Overall, this section outlines the coding procedures and analytical approaches employed in the study. It specifically describes the data sources, data analysis techniques, and the rationale behind the coding decisions. This level of detail allows

other researchers to understand and replicate the study's methods and procedures. By following the outlined approach, researchers can utilize process tracing, rounds-model analysis, and coding techniques to examine the relationship between governance factors and sustainability outcomes in the context of corridor development. The Generated codes are applicable to other researcher(s) or other parties involved in the study of sustainable (transport) corridor development, as the codes were grounded from a well-established body of knowledge related to such study.

3.5. Research Operationalization

This research was conducted with a framework demonstrating how the five governance factors influence the interaction processes and the sustainability of outcomes. With this operationalization, the study defined the relevant variables of the key concepts (governance factors, interaction process, and sustainability) and their indicators to guide the empirical analysis. It was assumed that a high or low score of the independent variable would either enhance or inhibit a sustainable outcome.

The operationalization of this study's framework concepts is presented in Table 1 below.

Dependent Variables

VARIABLES	DEFINITIONS	INDICATOR
Environmental outcomes.	Measures of goals announced in documents or decisions for strategies that safeguard the environmental quality needed to perform various economic activities and quality of life.	▪ Relevance and proportionality of approved plans/programs that involve resource management, environmental protection, habitat restoration, and preservation. It includes actions to mitigate environmental issues such as waste, air pollution, traffic congestion, land conversion, and natural disasters. ▪ The delineation and substance of the corridor regarding the environmental aspect. ▪ Funding for implemented environmental programs.
Social outcomes.	Measures of goals announced in documents or decisions for strategies that safeguard human rights and equality, cultural identity/cultural diversity.	▪ Relevance and proportionality of approved plans or programs that maintain or improve the quality of life, education, community development, equal opportunities, law, and ethics. It includes mitigation for social issues such as the provision of basic infrastructures and

		protection of the local wisdom or culture. ▪ The delineation and substance of the corridor regarding the social aspect. ▪ Funding for implemented social programs.
Economic outcomes.	Measures of goals announced in documents or decisions for strategies that sustain the natural, social, and human capital needed for the income and living standards of people.	▪ Relevance and proportionality of approved plans/programs related to smart growth, long-range planning, cost savings, R&D spending, and cost of living. It mitigates issues related to regional disparity or enforcing local economic potential. ▪ The delineation and substance of the corridor regarding the economic aspect ▪ Economic growth ambition. ▪ Funding for economic programs.

Process Variables

VARIABLES	DEFINITIONS	INDICATOR
Rounds.	A period within which the game evolved, and actors discussed and negotiated specific issues in the light of their agendas and strategies	The start: The initiation of a critical plan/assignment within the conceptualization round of the SDR, the planning round of the GDP/YSS Corridor, and the implementation round of the GDP/YSS Corridor. End: Decisions reached on a critical plan/assignment within the conceptualization round of the SDR, the planning round of the GDP/YSS Corridor, and the implementation round of the GDP/YSS Corridor.
Actors.	Individuals/groups/groups of organizations that take part in the planning and/or implementation of the corridor development.	Actors included in the planning or decision-making process of corridor development.
Strategies.	Directions, or plans of actions that actors decide, grounded on their own perceptions to influence the course of the game and its outcome according to their objectives.	Statements, proposals, and activities that project the direction in which actors chose to accomplish their corridor development goal.

Process outcomes.	Intermediate outcomes resulted from the interaction process of actors that set the scene for the following process round.	Plans, decision criteria, proposals, and selection of measures such as law/policies, Terms of Reference, academic script, and reports that resulted formally at the end of each corridor development round.

Independent Variables

VARIABLES	DEFINITIONS	INDICATORS
A vision guiding the corridor development.	An aspiration that sets the end goal and values to the corridor's planning process, motivates, and gives direction to actors to move forward with decisions.	Statements within policy or formal documents that direct the delineation of the corridor based on certain environmental/social/economic goals, or the functionality of programs in terms of the sustainability pillars.
Modes of governance.	The mechanism used in the planning of a corridor that sets the types of actors involved and their relationships/interactions within a decision-making process.	Major decisions for policymaking and implementation done solely by the central government (top-down) and/or with initiatives from the regional/local actors (bottom-up) and/or collaboration between governments with other relevant public, private, and societal actors; and/or process management and process design that steered and brought people into the corridor network aimed at sustainability.
The constellation of actors.	Set of actors in the network representing different agendas, information, skills, resources, and/or competencies.	The presence of actors representing environmental, social, and economic sustainability interests within the set of involved actors.
Knowledge type and use.	The availability of different types of knowledge (local, tacit, and codified) across different disciplines and levels of government that contribute to the decision-making process of actors.	▪ Sustainability knowledge collection and diffusion. ▪ Procedures involving the use of specific sustainability knowledge.
Institutional setting and process design.	Organizational arrangements, rules, and procedures that set the scene for the corridors' planning process.	▪ The presence and nature of institutional planning procedures, the institutional position of actors, and their mandate that enhanced sustainability. ▪ The presence of a coordination platform to discuss and negotiate

		sustainability programs of the corridors. ▪ Nature of process rules regarding scope, participation, and rewards that guide the interaction process to enhance sustainability.

Table 1. Operationalization of the study
Source: Author

3.6. Validities and Reliability

This section discusses the internal validity, external validity, and reliability of the study. Strong internal validity ensures the credibility of the findings, establishing a solid foundation for drawing conclusions (Kaya, 2015). On the other hand, robust external validity enhances the transferability and generalizability of the study's findings, enabling broader implications beyond the specific research context (Findley, 2021; Winder et al., 2022). Finally, high reliability demonstrates the consistency and dependability of the study's methods and data, increasing the replicability of the study (Drost, 2011; Mohajan, 2017). These three elements are essential contributions to the quality of research, ultimately enhancing its impact and contribution to its respective field(s)

Internal Validity

Internal validity is a crucial aspect of research. It ensures that the relationship between dependent and independent variables is not random but causal (Kaya, 2015; Slack and Draugalis, 2001; Cook and Campbell, 1979), and that the observed relationships between variables are reliable and free from confounding factors (Drost, 2011). There are three reasons why this study is considered to have strong internal validity.

First, this study provides a clear elaboration in the literature review section on how the conceptual framework was formed. It presents a structured sequence of how different theories were reviewed and integrated, starting with the combination of regional development, corridor development, and sustainability theories, which are then complemented by governance theory. These theories inform the selection of governance factors, process, and sustainability outcomes variables, that led to the formulation of research operationalization before the author conducted fieldwork for data collection. The operationalization specified the variables of interest and how they would be measured, to ensure that the study systematically focuses on relevant and meaningful aspects of the research topic and provides a coherent and robust interpretation of the data, linking it back to the theoretical underpinnings.

Such an attempt guided the author in identifying the types of data needed for analysis and designing a list of interview questions for multiple actors so that the

data would be sufficient to answer the research questions. ATLAS TI was then used to analyze and code the obtained data systematically. The generated codes demonstrated how the collected data were consistent with the variables of the study's operationalization table, enabling the author to answer all research questions and reinforcing the internal validity of the measurements.

Second, the use of multiple data collections allowed this study to capture different perspectives when analyzing the study's key concepts and variables and triangulating the findings (Crowe, 2011). The author acknowledges that seven interviewees in this study were RIDA officials who possessed the most knowledge regarding the corridors' early conception and entire planning process since RIDA is the institution that initiated the SDR Corridors. Conversely, regional/local actors have more knowledge of the regions and their local wisdom. To ensure that this study analysis mitigates any potential bias, the author gathered extensive data by interviewing various non-public authors, including Provincial/Local Governments, experts, academics, NGOs, the Chamber of Commerce, and the private sector representing different sustainability dimensions. The interviews captured their perceptions and knowledge related to the corridors' idea, the corridors' planning process, the sustainability challenges of regions, and the suitable interventions. The information obtained from the interviews was then used to corroborate each other's statements to increase the study's internal validity.

This study involves data in which information was obtained based on respondents' past experiences or personal recollections related to the corridor development process and personal knowledge of sustainability issues of regions. This can present difficulties as data of this nature could be susceptible to biases and constraints., in which memory can be fallible and influenced by various factors such as time, perception, and personal interpretation. Therefore, data triangulation was performed using various extensive government documents and archival records from multiple sources to enhance internal validity. This allowed the study to cross-verify the information obtained (Patton, 1999).

Multiple data sources were also used to assess the extent of sustainability outcomes of the GDP and YSS Corridors, which are still undergoing development until 2026, which makes them challenging to measure. This is also the study's first objective mentioned in Chapter 1, but it hardly gets attention. While the study cannot measure the corridors' impact on regions, as activities are yet to start or have just started, it presents innovative ways to measure sustainability outcomes rather than impacts.

To ensure that the study can objectively measure the dependent variables of this study, sustainability needs to be analyzed from various perspectives, including the proportions of programs in each sustainability dimension, their funding allocation, and the number of sustainability issues they address. For this purpose, primary data alone was insufficient, as the author cannot rely solely on statements of interviews.

Therefore, the study obtained additional materials of secondary data, including the MPWH Strategic Plan, the final report of the IIDP program, and a list of baseline programs. As a result, while the study explores the existing sustainability challenges as perceived by regional/local actors, especially using insights from the NGOs and academics, it analyzes a variety of secondary documents that contain different information about the planned and delivered programs in each round of corridor development, allowing the study to assess the outcomes in the overall rounds.

Obtaining such extensive data was difficult and required the author to be persistent in the process of data collection. Therefore, while a study involving detailed government data in Indonesia related to the strategic development region corridors is relatively new, this study has combined various primary and secondary data to strengthen the study's internal validity.

External Validity

External validity refers to generalizing the research findings to a larger population or real-world scenarios (Drost, 2015; Cook and Campbel, 1979). It particularly addresses the extent to which the findings are applicable to other cases beyond the specific context in which the study was conducted.

The study has acknowledged the challenge of generalizing findings to other corridor studies, considering that regions in the corridor are often seen as polycentric regions with unique potentials and characteristics (Dhimitri et al., 2015). However, this study has addressed this limitation by reviewing general theories of regional development, corridor development, sustainable development, and governance to develop and improve the study's conceptual framework. A well-developed conceptual framework based upon comprehensive literature reviews and implemented systematically allows for the identification of general patterns that may also be present in other cases or contexts, contributing to generalization towards theory.

Furthermore, the study has leveraged the similarities among the analyzed Indonesian strategic corridors, as these corridors represent common phenomena associated with advanced corridor cases worldwide aiming for sustainability, allowing the study to broaden its scope and relevance. These phenomena include the establishment of corridors based on regions' significance to a country's economy, whether stemming from regions' mono-sectoral activity or multi-sectoral activities; the presence of a robust backbone that links various growth nodes; and the expectation of a trickle-down/spread effect from the advanced to the less advanced regions within and outside the corridor. At the same time, the two cases were envisioned to address the sustainability issues of regions. The study's efforts to leverage the common phenomena of corridors that align with prevalent goals and practices in sustainable corridor development have contributed in enhancing the study's external validity. By considering these aspects, the findings and

conclusions of the study have become more applicable and relevant to similar strategic corridor initiatives in different regions and countries.

Secondly, this study has noted that the sustainability of both corridors was strengthened over the rounds due to a contribution of an additional external factor, Indonesia's commitment towards sustainable development agendas. In addition, regional/local actors in GDP and YSS cases were already familiar with the presence of an adapted coordination platform, the annual Pre-Regional Consultation forum. This made the actors' discussion and negotiations more facile. It was also noted that in GDP and YSS Corridors cases, both central government and regional/local actors were aware of their dependency on each other's capacities, which makes joint actions more possible in this context. These are the unique features of the Indonesian context studied in both cases that make comparison to other cases difficult since this factor probably will not be present. Therefore, despite the attempt to strengthen external validity, this remains a concern, and therefore, more research into other cases is needed to further strengthen the findings of this study.

Reliability

Reliability is the consistency and stability of research findings, indicating that the measurements deliver consistent and dependable results when repeated under similar conditions (Bollen, 1989; Mohajan, 2017). Reliability allows a meaningful conclusion to be drawn from the study.

Qualitative research surrounding the topic of sustainable (transport) corridors is scarce, and there has yet to be any study that systematically elaborates on the means to knit the different theories to discuss this topic and how the theories are dependable. Therefore, this research has provided a structured sequence of how different theories, using reliable sources of literature, were reviewed and integrated within the literature review. This has provided insights into the realm of sustainable transport corridors and showed how the conceptual framework, its key concepts, and variables were formed, and how they are in line with coding generated from qualitative data analysis. Anchored on the existing knowledge base, this study reinforces the credibility of its analysis, reducing the influence of biases in drawing the study's conclusions, which strengthens the reliability of the study as it allows other researchers to assess and agree upon the key concepts and variables used in the study to result in the findings.

Furthermore, to allow other researchers to replicate this study in other cases, the author clarifies the reasonings behind the chosen method and selection of the case studies, and how the study was designed and executed, presented in this chapter in detail, which strengthens the reliability of the research. Moreover, since the intention is to conduct an in-depth analysis, the author was also transparent on the types of qualitative data needed to do this kind of study sufficiently. Analyzing the

data itself was challenging, as it involved extensive data collection that needed to be systematically analyzed. Therefore, a study protocol has been shared in this chapter, elaborating on how the obtained data were analyzed with ATLAS TI software. The protocol includes information on how the codes were generated with their number, their classifications into specific categories, and an explanation of relationships between the key concepts in the research framework. By presenting the study protocol, other researchers can observe and replicate the critical steps taken in this study and apply them in their research. This procedure enhances the reliability of the study.

CHAPTER 4
SUSTAINABILITY OF GILIMANUK - DENPASAR - PADANGBAI CORRIDOR

This chapter presents the research findings concerning the sustainability outcomes of the Gilimanuk – Denpasar - Padangbai (GDP) Corridor, serving as the inaugural case study within this research. The sustainability outcomes are the dependent variables of this study, which are discussed in this chapter to answer the study's first sub-research question. The first sub-research question is regarding the extent to which GDP Corridor development rounds result in sustainability outcomes.

In the literature, it is stated that a transport corridor has straightforward objectives of facilitating a wide range of economic activities and the movements of people, goods, and services (Hope and Cox, 2015). While such large-scale activities stimulate the economic dimension (Brunner, 2013), they often fall short of ensuring economic sustainability. This is because economic corridors prioritize regions with growth nodes, while the concept of economic sustainability emphasizes the distribution of wealth and income equality to address the poverty issue (Camdessus, 1995). At the same time, hard infrastructure programs that stimulate economic activities in the corridor can impact environmental degradation, the loss of habitat and ecosystems, and the disparity gap (resulting from the uneven infrastructure investments in regions) (Nogales, 2015). Hence, this study needs to explore the equity between the three sustainability dimensions of the Indonesian Corridors (Thierstein and Walser, 1997b; Jovovic, 2017). This is done by identifying types of sustainability measures, the proportions of measures, the issues addressed, and the availability of funding representing each sustainability dimension.

The GDP Corridor lies on the Island of Bali, Indonesia. The corridor is a vital and picturesque route connecting the Island's western, southern, and eastern coasts. This corridor is crucial in facilitating tourism, trade, and transportation within Bali, a world-renowned destination known for its natural landscapes and vibrant culture. The GDP Corridor not only facilitates domestic and international travel but also serves as a vital conduit for the Island's economy. The tourism industry is a primary source of revenue for regions, apart from trade and commerce, agricultural, and fisheries activities, enhancing Bali's economic vitality.

Additionally, two of Indonesia's major transportation hubs lie in the corridor. They are Ngurah Rai International Airport and Benoa Port, both recognized as the country's primary international gateways. However, the corridor is not without its challenges. The steady influx of tourists and economic activities has strained the Island's infrastructure and environment. Issues such as traffic congestion, waste management, the presence of slums, natural disasters, disparity gap, and the lack

of basic infrastructure infrastructure provisions (clean water and sanitation) need to be addressed to ensure the sustainability of the Island.

This chapter presents an outlook of the GDP Corridor's profile that captures the existing environmental, social, and economic states of the corridor based on this study's obtained data in 2019. The profile analysis is followed by an analysis investigating the extent of sustainability outcomes delivered throughout various rounds of GDP Corridor development.

4.1. GDP Corridor's Sustainability Profiles

4.1.1 GDP corridor's overview

The GDP corridor comprises one city and six regencies on the Island of Bali, governed by the Provincial Government of Bali. Regions within the corridor are Denpasar City (the capital city of Bali) and Jembrana, Tabanan, Badung, Gianyar, Klungkung, and Karangasem Regencies (see Fig. 5); it excludes two northern regencies of Buleleng and Bangli. The corridor has a total size of ±3.749,97km2, which equals 67% of the whole of Bali Island. According to Bali Statistics (2019), its total population was ±3.449.000 people or 79.5% of the total population of Bali. ±2.575.200 people, or 75% of the corridor's residents, lived in Sarbagita Metropolitan Regions (the four southern regions of Denpasar, Badung, Gianyar, and Tabanan). Meanwhile, Jembrana Regency in the West has the largest area among regions in the corridor, with an area of ±841.8km2. However, its municipality has the lowest population density of ±323 people/km2. A contrasting number can be seen in Denpasar City, the smallest region of ±127,78km, but with the highest population density in Bali of 6.892 people/km2.

MPWH (2016a) made a projection analysis for 2026 that shows how the total population of the corridor would reach ±4.597.136 people or 22.5 % more than the current population. 80% of its residents would reside in Sarbagita Metropolitan Regions, with Denpasar and Badung having the largest population, with 30% and 24%, respectively. This situation portrays how the human capital would remain centered in the Southern regions. Thus, intervention is needed to allow the corridor's western and eastern regions to benefit from this condition.

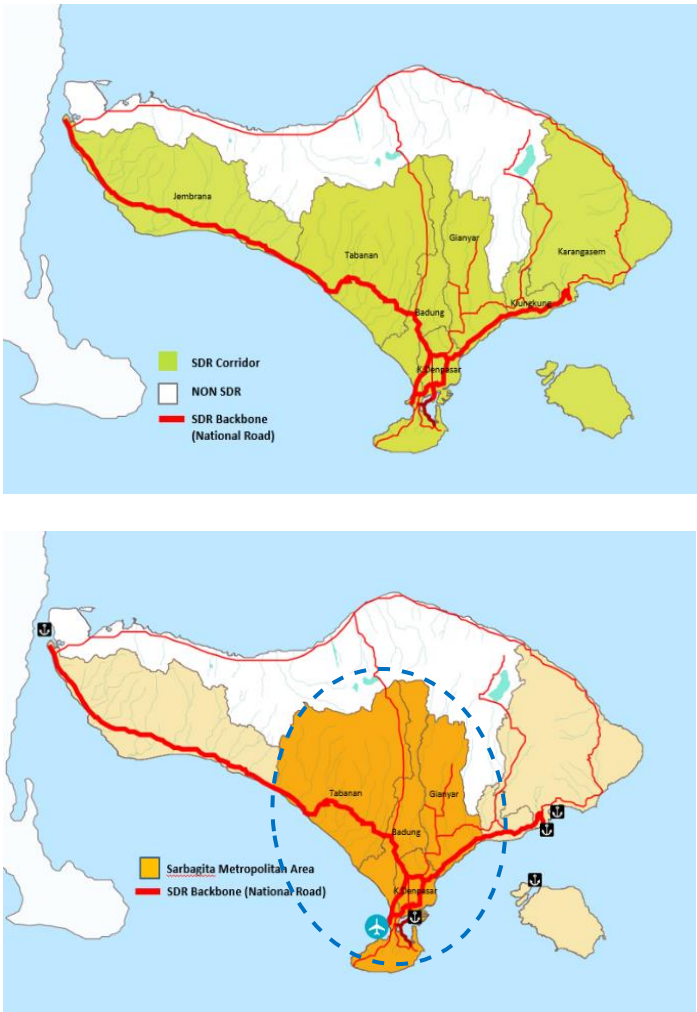


Fig 5. Top: The GDP Corridor. Down: Sarbagita Metropolitan Regions
Source: Author (2015)

Regions in Bali have significant roles in Indonesia. Presidential Decree No. 28 Year 2012 (the Island Spatial Plan of Java and Bali) mandated regions within the GDP corridor as international tourism destinations, the national food barn, and the center of urbanized nodes. Meanwhile, the Regional Regulation of Bali No. 16 of 2009 mandated Sarbagita Metropolitan Areas as National Activity Centers (ACPs). Additionally, Government Regulation No.50 of 2011 (National Tourism Development Master Plan) mandated eleven tourism areas in Bali Island as National Tourism Strategic Areas (NTSAs). Of these, six NTSAs are situated in the corridor, namely the Kuta-Sanur-Nusa Dua and its surroundings, Nusa Penida and its

surroundings, Ubud and its surroundings, Karangasem and its surroundings, Tulamben and its surroundings, and Besakih and its surrounding (see Figure 6).

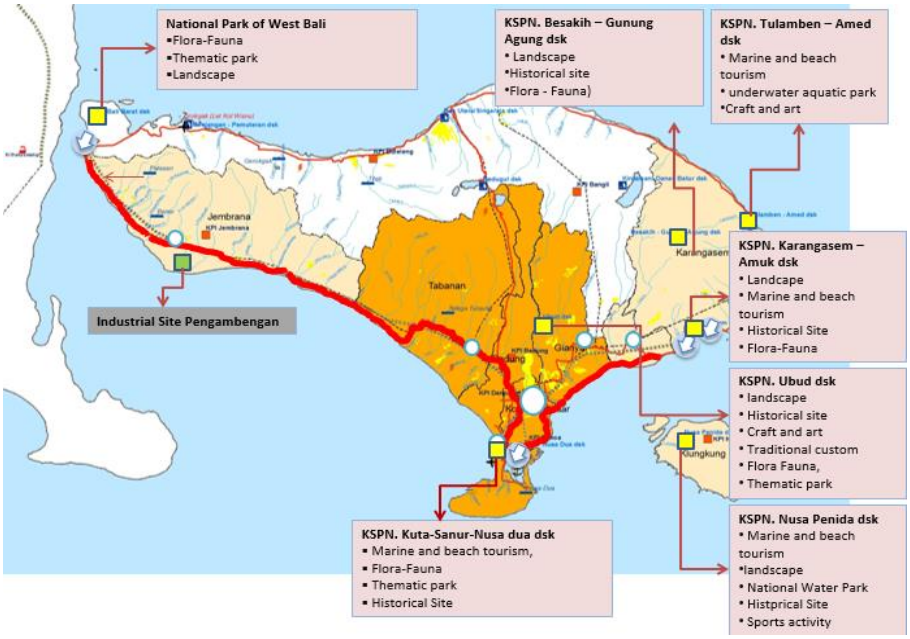


Figure 6. Map of National Tourism Strategic Areas within the corridor
Source: Author

The GDP corridor has various tourism destinations (Figures 7 and 8). The destinations provide travelers with multiple tourism options, from marine tourism, natural heritage tourism, cultural heritage tourism, health/wellness tourism, outdoor and recreation, or MICE tourism (Meetings, Incentives, Conferences, Exhibitions). Among the potential touristic areas in the corridor, one unique destination acknowledged by UNESCO as a World Heritage Site is Subak Rice Fields. Subak is an irrigation system for paddy/rice fields that uses the traditional concept of Tri Hita Karana, a metaphor for how humans live in harmony with God, nature, and the surrounding community. The most popular destination for Subak paddy field is Jatiluwih Rice Fields in Tabanan Regency and Tegalalang Rice Fields in Gianyar Regency, both are within Sarbagita Metropolitan Regions).

In Bali lie several international transportation hubs, particularly in the South of the corridor. One is International Airport of Ngurah Rai in Badung Regency, and the second is International Harbor of Benoa in Denpasar City. However, the projection analysis of Ngurah Rai airport capacity estimated that in the future, these hubs would probably no longer have sufficient capacity to cater to the tourism activities in Bali. In 2016, Ngurah Rai Airport facilitated ±17.764.285 passengers. The number

was expected to rise to ±22.179.173 commuters in 2021, with a further increase to ±27.691.275 people in 2026. However, the capacity of Ngurah Rai Airport itself remains limited to 24.643.619 passengers.

The second major hub in Bali, Benoa Port, accommodated ±691.214 people in 2016. The number would climb to 1.093.386 commuters in 2021 and ±1.729.557 people in 2026. Meanwhile, the port has a limited capacity of ±1.100.000 passengers. Thus, to keep up with this projection, the airport, and the harbor will need to be expanded in the near future. However, these hubs are reaching their saturation concerning environmental carrying support capacities without the possibility of future expansion.

In addition, three more seaports are supporting Ngurah Rai Airport and Benoa Harbor as the gate of Bali. They are Gilimanuk Port in Jembrana Regency (West), Padangbai Port in Karangasem Regency (East), and Nusa Penida Port in Klungkung Regency (East). Gilimanuk Port connects Bali to Java Island. It was reported that in 2014, the port catered to ±12.521.033 passengers, ±3,473,973 units of vehicles, and ±9,265,967 tons of goods. However, Gilimanuk Port is located towards the west end side of the corridor. Even though there is a significant daily movement between the South and the West regions, the corridor simply functions as a movement passage. This means the local communities do not get the socio-economic benefit from the large movements across the regions. Many areas along the passage remain underdeveloped with minor economic activities/investments.

Apart from the crossing harbors, there is Pengambengan Port in Jembrana Regency (West), which plays a vital role as a National Fishery Port. Pengambengan area has an essential role as a Minapolitan Area appointed by the Ministry of Maritime Affairs and Fisheries Regulations No. 35 Year 2013 and No.45 Year 2014. Such a role needs to be supported by better accessibility to the national road, along with the provision of quality infrastructure for the fishermen's settlements.

Bali Statistics (2018) estimated that the number of foreign tourists who came to Bali in 2013 was ±3.278.598 people. The number rose to ±6.070.473 people in 2018. For domestic tourists, the number was ±6.976.536 people in 2013, which climbed to ±9.757 991 visitors in 2018. This means the number of foreign visitors has almost doubled within the last five years, while domestic visitors have increased by more than 70%. Bali Statistics (Ibid.) further shows that there were 534 accommodation facilities scattered within the corridor, of which 97% were situated in Sarbagita Metropolitan Regions, notably in Badung Regency. These numbers projected the growth in the tourism sector along with agriculture, forestry, livestock, and fisheries sectors, contributing 47.15% to Bali's Gross Regional Domestic Product (GRDP).

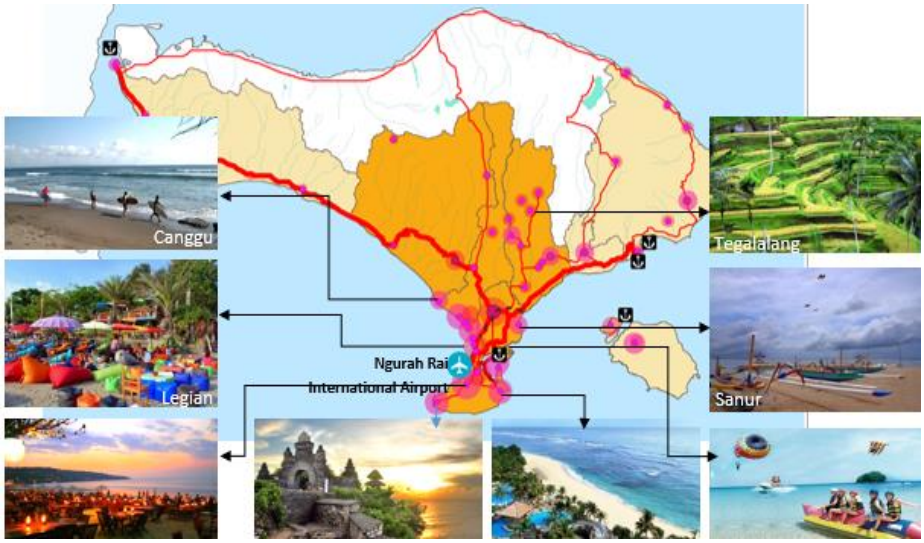


Figure 7. Tourism destinations in the southern part of the GDP corridor
Source: Author and Google image

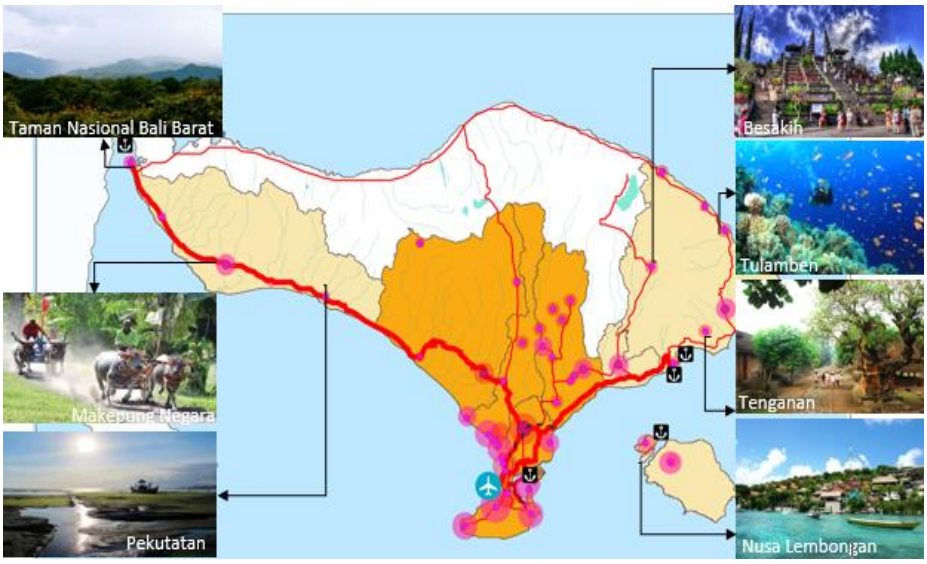


Figure 8. Tourism destinations in the West and East parts of the GDP corridor
Source: Author and Google image

4.1.2 GDP's environmental profile

Urbanization and the growth of tourism sectors in Bali are the predominant reasons for the land conversion issue in Bali due to the increasing demand for housing and commercial facilities (Budhi et al., 2017; WWF, 2007). This circumstance was

expressed by Respondent 16, who described urbanization as the leading cause of environmental degradation in Bali. More locals move to the bigger cities for work, leaving the rural areas behind. With more population living in the cities, more land was needed to establish settlements and supporting facilities such as grocery stores, shops, restaurants, and services for the daily needs of the residents. In many cases, such practice converted agricultural areas into urban areas.

The agricultural lands in Bali, particularly those in the South, are pressured by their surrounding settlements. This means that protection towards agricultural land use was needed, considering the southern regions' low environmental carrying and support capacities. Should land conversion remain or be extended soon, in which settlements and infrastructure are taking over areas meant for ecological function, the lands may lose their ability to absorb carbon dioxide and rainwater into the ground and prevent flooding or erosions. Currently, areas in the corridor except for Denpasar City are prone to erosions, particularly Jembrana and Karangasem Regencies (MPWH, 2016).

> "Urbanization impacts traffic, population growth, and land conversion. With urbanization, it means, there should be a place to live. That is why there are difficulties with the land conversion" - Respondent 16.

The most extensive rice fields in 2017 were situated in Tabanan Regency and Gianyar Regency. The UNESCO World Heritage Site of Jatiluwih rice fields (Tabanan) and the famous Tegalalang rice field (Gianyar) lie in these regions. These rice fields are unique due to the use of the Subak irrigation system. Nevertheless, Bali statistics (2017) reported a decline in land use for agricultural activities in all GDP regions each year (see Table 2) from 2015 to 2017, while the non-agricultural ones expanded. Various news platforms reported that many paddy fields have been converted to support tourism, impacting the local's socio-cultural values, as Bali's agrarian culture began to switch to commercial culture (Bali Tribune, 2019; Radar Bali, 2002).

City/ Municipality	Agriculture land: Paddy Wet Field			Agriculture land: Non-Paddy Wet Field			Non-agriculture land (Roads, Houses, Buildings, Rivers)		
	2015	2016	2017	2015	2016	2017	2015	2016	2017
Jembrana	6.775 (8,05%)	6.757 (8,03%)	6.758 (8.02%)	25.751 (30,39%	25.746 (30,58%)	25.723 (30,55%)	51.654 (61,36%)	51.677 (61,39%)	51.669 (61,41%)
Tabanan	21.714 (25,87%)	21.452 (25,56%)	21.089 (25,12%)	40.557 (48,32%)	40.697 (48,49%)	41.127 (48,99%)	21.662 (25,81%)	21.784 (25,95%)	21.717 (25,86%)
Badung	10.006 (23,91%)	9.976 (23,84%)	9.938 (23,75%)	18.126 (43,31%)	18.122 (43,30%)	18.129 (43,31%)	13.720 (32,78%)	13.754 (32,86%)	13.785 (32,93%)
Gianyar	14.420 (39,18%)	14.376 (39,07%)	14.320 (38,91%)	12.542 (34,08%)	12.548 (34,10%)	12.563 (34,13%)	9.838 (26,73%)	9.876 (26,84%)	9.917 (26,94%)
Klungkung	3.843 (12,20%)	3.884 (12,20%)	3.779 (11,99%)	19.331 (61,37%)	19.301 (61,27%)	19.346 (61,41%)	8.326 (26,43%)	8.356 (26,53%)	8.375 (25,58%)
Karangasem	7.151 (8,52%)	7.142 (8,51%)	7.122 (8,48%)	53.051 (63,19%)	53.052 (63,19%)	53.043 (63,18%	23.752 (28,29%)	23.760 (28,30%)	23.789 (28,33%)
Denpasar	2.479 (19,40%)	2.444 (19,13%)	2.409 (18,85%	510 (3,99%)	510 (3,99%)	510 (3,99%)	9.789 (76,61%)	9.824 (76,88%)	9.859 (77,15%)

Table 2. Land use (agriculture/non-agriculture I 2015-2017 (in hectares)
Source: Statistics Bali 2015, 2016, 2017

Due to the expansion of the population rate in Bali, the GDP Corridor experiences other environmental issues of solid waste, as revealed by Respondent 17. This issue prevails in dense areas or where tourist occupancy is high. The circumstance led to higher consumption of goods in which people left their waste in the form of plastics, styrofoam, food waste, one-time used cutleries, food boxes/wrappings, or supermarket products with non-degradable packages. In 2014 (MPWH, 2016), the amount of waste in the corridor had reached as high as ±7544 m3/day, predominantly produced in Denpasar City (±3500 m3/day), Gianyar Regency (±1674 m3/day), and Badung Regency (±1500 M3/day). Bali Partnership (Mongobay, 2019) further stated that 11% of the total waste eventually ends in the ocean. Respondent 6 shared an example of the waste issue in Manta Point-Nusa Penida, one of the National Tourism Strategic Areas in Bali.

> "The prominent issue that has not been resolved (by the government of Bali) is the waste. It is the dry season (so we do not see much waste around). However, during the rainy season, you can smell the waste from the airport" - Respondent 17.

> "Last year, Bali became viral when the Guardian covered a story of someone (British tourist, Rich Horner) who went diving in Bali. There are a lot of factors (which cause waste), but where there are more people, there is more trash"- Respondent 6.

By Indonesian Law Number 18 of 2008, waste management is considered a final waste processing place in which the waste is managed and safely returned to the environment without harming humans and the environment. However, among the five landfills within the corridor, Bali Partnership (Mongobay, 2019) stated that 70%

of the waste ended up in Suwung Landfill (the largest landfill in Denpasar City with an estimated size of 32 ha). Suwung landfill experienced overcapacity since the landfill received trash not only from Denpasar City but also from Badung, Tabanan, and Gianyar Regencies.

The presence of a poorly managed landfill appears to cause two issues. First, the landfill becomes prone to fire during the dry season. On September 24th, 2018, it was reported that a fire occurred in the landfill and burned nearly half of the total area of Suwung. Since then, the Governor of Bali has prohibited the Tabanan, Gianyar, and Badung Regencies from dumping their waste for now (Kompas, 2019). Second, organic waste leaked to the ground or entered the water canal. Such conditions reduced the amount of O2 and increased the harmful organism's growth (Bhada-Tata and Hoornweg 2016). As stated in the IIDP report (MPWH, 2016), out of the 162 rivers that flew into the sea, 34 were in critical condition. Environment Statistics Indonesia (2018) also stated that Ayung and Tukad Yeh Ho rivers were heavily polluted. Several respondents also shared their concerns regarding the condition of the landfill. One of them was Respondent 34.

> "The surrounding waste is horrifying. Currently, there is no effort (to manage the waste). Go check the landfills in Bali. Every one of them is problematic, including the one in Sarbagita. It may look proper from the outside, but from the inside, waste has been piling up for years. The surface appears managed, but it is not so underneath. The presence of Methane gas is perceptible at certain times. Furthermore, next to the river is the LPG tanks. It is terrifying. In the Tabanan landfill, for example, or in Karangasem, or Gianyar Regency, every landfill has an issue. So, the most crucial thing to tackle in Bali is the waste issue; but it seems like there is no desire (from the government) to resolve the issue. There is always a budget issue as an excuse" - Respondent 34.

Another issue raised in the environmental dimension is regarding natural disasters, which all regions in the GDP corridor are prone to. One prominent issue is the tidal waves since GDP regions are located along the coastal lines. At the same time, the southern coasts of Bali are prone to tsunamis, from the west coast (Pekutatan area and Jembrana Regency) to the east coast (Ujung area and Karangasem Regency), as well as the southern areas of Nusa Lembongan and Nusa Penida. Meanwhile, abrasions and coastal erosions threatened Denpasar City's coast, Badung, Gianyar, Klungkung, Karangasem, Jembrana, and Tabanan Regencies. Another common flooding disaster was threatening the regions of Badung, Gianyar, and Karangasem. At the same time, volcanic eruption was a danger, particularly to the Klungkung and Karangasem Regencies, due to its proximity to Mount Agung.

The last notable environmental issue is traffic congestion. The IIDP document (MPWH, 2016) that presented the transportation analysis of the GDP Corridor stated that from 2014 to 2018, the number of vehicles in Bali Province rose sharply, dominated by the number of motorcycles and cars (see Table 3). These situations happened for several reasons. First, there is ineffectiveness and inadequate public transportation in the corridor. The primary means of travel in the southern part of Bali by public transport was the Trans-Sarbagita Bus. However, due to insufficient service coverage, fewer people chose this option (as seen in Table 4), and the number of passengers (both public and student) that used the Trans-Sarbagita Bus in Corridor I and II declined. Moreover, this bus service had two more corridors/routes: Corridor 7 (Tabanan - Mengwi - Bandara) and Corridor 11 (Mahendradatta - Sanur - Lebih). Nevertheless, these options were shut down due to the low demand for services, as explained by Respondent 34.

> "What is sad is that the government programmed Trans-Sarbagita but failed since there is no demand for it. People were not convinced to use the facility, even though it was cheap. They did not know if the unit was available, nor would they arrive at the airport in half an hour. It was uncertain. If this (public transportation) issue is not resolved, I am certain the tourism in Bali will be harmed"- Respondent 34.

Second, the rise of online transportation services that provide cheap transportation services on the island leads to more vehicle use, causing traffic congestion. For example, renting a 1300-2000CC vehicle with the inclusion of a private driver and gas would cost ±480.000 - 640.000 Rupiah, or equal to ±30 - 40 Euro for 10 hours, and an average motorcycle rental of 155cc for 24 hours costs ±50.000 - 100.000 Rupiah or 3 - 6 Euro/day. However, the insufficient parking facilities and narrow roads situated in the South of Bali could worsen the condition, specifically in Kuta, Seminyak, Legian, Canggu, Uluwatu, Jimbaran, and Nusa Dua.

Types of vehicles	Years							
	2011	2012	2013	2014	2015	2016	2017	2018
Buses	5609	5983	6533	7090	7532	7791	8223	8643
Trucks	88.843	101.509	113.937	123.609	132.773	138.297	142.780	148.238
Motorcycles	2.154.568	2.374.604	2.586.715	2.881.192	3.015.287	3.184.947	3.337.32	3.516.415
Cars	245.462	267.068	296.503	326.221	350.392	372.007	396.710	442.868

Table 3. Number of Vehicles in Bali from 2011-2018.
Source: Statistics Bali 2019

Users	**Corridor I Center - Garuda Wisnu Kencana**			**Corridor II Batu Bulan - Nusa Dua**		
	2016	**2017**	**2018**	**2016**	**2017**	**2018**
Public	156.588	126.898	132.430	411.013	347.388	82.706
Student	158.325	147.047	44.985	152.640	128.249	80.982

Table 4. Number of Passengers that use the Trans-Sarbagita Bus service.
Source: Statistics Bali 2015, 2016, 2017

4.1.3 GDP's social profile

Most infrastructure investments and vibrant economic activities are in the southern part of Bali, where Sarbagita Metropolitan Regions are located. This imbalance causes a contrary situation between the western and the eastern parts of the corridor. Numerous respondents, such as Respondents 14 and 15, mentioned this condition. The disparity of the corridor can be projected from the social state of the corridor, seen from the poverty rate, the Gini Index Ratio, the human development index, and the number of people who had access to clean water and proper sanitation.

> "The reality is the condition of our people on the north and east, the pool of poverty there is the highest of all" - Respondent 14.

> "Areas like Jembrana, Buleleng, Karangasem, and part of Bangli are the pools of areas where the underdevelopment indication is higher than the south of Bali" - Respondent 15.

Statistics Bali (2019) recorded that in 2011, ±133.700 people in the corridor lived under the poverty line (see Table 5). The number decreased in 2013 to ±130.300 people; in 2018, the number dropped to ±125.000 people. Within these numbers, in 2018, Karangasem Regency had the highest percentage of poor people, followed by Klungkung Regency and Jembrana Regency. The two regencies mentioned earlier are situated in the eastern part of the corridor, while the latter is in the western. This circumstance shows a high contrast when compared to Badung Regency and Denpasar City in the South, with the least number of poor people.

City/ Municipality	Number of the population (in thousands)			Number of poor people			Percentage of poor people		
	2016	2017	2018	2016	2017	2018	2016	2017	2018
Jembrana	273.3	273.3	276.6	14.530	14.780	14.350	5.33	5.38	5.20
Tabanan	438.5	438.5	443.5	21.900	21.660	19.770	500	4.92	4.46
Badung	630.0	630.0	656.9	13.910	13.160	12.970	2.06	2.06	1.98
Gianyar	499.6	499.6	5008.1	22.130	22.420	21.260	4.44	4.46	4.19
Klungkung	176.7	177.4	178.3	11.210	11.150	10.430	6.35	6.29	5.86
Karangasem	410.8	412.8	414.8	27.120	20.020	26.020	6.61	6.55	6.28
Denpasar	898.3	914.3	930.6	19,170	20.700	20.720	2,15	2,27	2,24

Table 5. Number and percentage of poor people by city/municipality in Bali 2016-2018
Source: Statistics Bali 2019

Table 6 presents the poverty gap and severity indexes. According to Bali Statistics (2019), the poverty gap index estimated the depth of poverty. A higher index value means a higher gap between the average expenditure of the poor and the average poverty line. Meanwhile, the poverty severity index gave an overview of the inequality among the poor by examining the spread of their expenditures. A higher value means a higher inequality. Among all GDP regions, Karangasem Regency had the most severe poverty gap and poverty severity indexes. Their poverty line was

288.436 Rupiah per month in 2016 to 311.321 Rupiah/month in 2018. The indexes contrasted with the wealthiest regions of Denpasar and Badung, with their lowest poverty gap and poverty severity indexes. These two regions also had a poverty line that almost doubled the amount of Karangasem Regency within the same year.

City/Municipality	Poverty Gap Index			Poverty Severity Index		
	2016	2017	2018	2016	2017	2018
Jembrana	0,53	0,86	0,57	0,08	0,19	0,09
Tabanan	0.57	0,69	0,50	0,12	0,13	0,10
Badung	0.19	0,21	0,28	0,05	0,05	0,07
Gianyar	0.43	0,57	0,43	0,07	0,11	0,08
Klungkung	0.78	0,33	0,79	0,13	0,04	0,21
Karangasem	0,58	0,87	0,83	0,09	0,18	0,22
Denpasar	0,20	0,40	0,32	0,03	0,12	0,07

Table 6. Poverty Line per Capita per Month by Regency/Municipality in Bali Province, Year 2014-2018 (in Rupiah)
Source: Statistics Bali 2019

The gap between regions in the corridor affected not only the poverty issue but also the human development aspect, which was explained in Bali Statistics (2019) as "a long and healthy life, being knowledgeable and having a decent standard of living" (p.130). The human development index is analyzed based on three indicators: education (expected years of schooling and the average length of education), the mortality rate, and living standards (calculated from region's Gross Domestic Product rate). These variables are essential to see if a country or a region has successfully improved the quality of life of its people to determine the development status of a country or a region and to compare the progress of development within a period.

The Human Development Index in 2018 (see Table 7) shows that apart from poverty, the Karangasem Regency suffered from the lowest life expectancy at birth, the lowest expected years of schooling, the average years of education, and the lowest expenditure. These numbers led to the human development index of Karangasem being 66.49. Klungkung and Jembrana appear to have followed the same suit in terms of the poor condition of Karangasem. Meanwhile, the average of Bali had an index of 74,77, but Denpasar City and Badung Regency had higher indexed than the average of Bali (Statistics Indonesia, 2019).

Karangasem had the lowest index for its expected years of schooling due to several factors. It has had the highest percentage of people who never attended formal education, who did not complete primary school, while the lowest percentage of those who attended school and are literate. Meanwhile, the rest of the regions in Sarbagita (Denpasar, Badung, Tabanan, and Gianyar) displayed different circumstances (see Table 8). In Bali, those who finished the primary, junior high

school, and senior high school levels tended to work in the agriculture, livestock, fisheries, and forestry sectors or the hotels and restaurant industries that supported the tourism activities in Bali. On the other hand, the people who obtained a college degree had more varied options than tourism, including the educational sector, government sector, services and retail trading, health services, and finance sectors (Ibid.).

City/Municipality	Life expectancy at birth	Expected years of schooling	Average years of schooling	Expenditure	Human development index	Number of Poor People
Jembrana	71.91	12,61	7,95	11.666.000	71.65	14.350
Tabanan	72,23	12.96	8,64	14.245.000	75.45	19.770
Badung	74,71	13,95	10,06	17.325.000	80.87	12.970
Gianyar	73,26	13,71	8,92	14.376.000	76.61	21.260
Klungkung	70,70	12,95	7,75	11.318.000	70.90	10.430
Karangasem	70,05	12.39	5,97	10.050.000	66.49	26.020
Denpasar	74,38	13.98	11,16	19.698.000	83.30	20.720
BALI	71,68	13,23	8,65	13.886	74,77	171.770

Table 7. Human Development Index (HDI) and poverty rate by Regency/Municipality in Bali Province, 2018
Source: Statistics Bali 2019

City/Municipality	Percentage of Population 15 Years of Age and Over by Educational Attainment and Regency/Municipality in Bali Province, 2018					
	Never Attending School	Not Completed Primary School	Primary Education	Lower Secondary Education	Secondary Education and Above	College
Jembrana	4,36	14,76	30,03	17,01	24,70	9,13
Tabanan	4,60	12,49	23,84	17,77	29,26	12,03
Badung	4,29	7,72	1339	17,42	40,64	16,54
Gianyar	6,73	9,49	19,33	17,23	35,77	11,44
Klungkung	11,74	10,95	21,43	14,34	29,91	11,62
Karangasem	15,80	17,41	27,24	16,98	16,74	5,84
Denpasar	1,57	7,31	14,01	18,49	39,64	18,95

Table 8. Percentage of population above 15 years old and academic access rate by Regency in Bali Province, 2018
Source: Statistics Bali 2019

The last issue discussed within the social dimension is regarding access to clean drinking water and sanitation facilities, as described by Respondent #14. This issue is crucial to address since it is part of the Sustainable Development Goals (Goal No. 6) that Indonesia attempted to manage. It links to community health and the condition of a living environment.

> "Bali is crowded. It impacts the degradation of environmental qualities, air pollution, and waste until the need for clean water, sanitation, and other things" - Respondent 14.

To investigate this issue, we need to observe the percentages of households' access to proper sanitation. The service coverage of sanitation facilities has improved in the whole region throughout the years. However, there is a gap between Karangasem Regency and the rest of the other regencies in the corridor. In 2018, Karangasem had 79.97% access to sanitation, while others had access within the 89,96% - 94,38% range, with Denpasar as the highest city served. A completely different note was happening with the access to clean drinking water within the same period, wherein, in general, there was a decline in regional coverage. The clean drinking water coverage of Jembrana Tabanan, Badung, Gianyar, Karangasem, and Denpasar Regencies decreased. Jembrana, Gianyar, and Tabanan individually suffered a gap of 16.06%, 5.16%, and 3.96%, respectively, between 2017 and 2018. Jembrana Regency experienced the lowest access (75,60% of the total area). The number was far behind the rest of other regions in the GDP corridor, with access ranging from 89.94% to 98.85%, with Denpasar again as the region with the most extensive coverage.

4.1.4 GDP's economic profile

As mentioned in the earlier section, there is a disparity gap between Sarbagita Metropolitan Regions (Denpasar, Badung, Gianyar, and Tabanan) situated in the South of Bali, with the western region of Jembrana and the eastern region of Klungkung and Karangasem. This condition is evident from how several main transportation hubs and tourism facilities are predominantly situated in the South and the high rate of human development index of the southern regions. The spatial structure of Bali also displayed uneven investments in road infrastructure development centralized in the South of the corridor but faded towards the Western and Eastern parts of Bali.

According to Rammelt (2018), infrastructure investment stimulates regions' development toward a market-economic transformation and integration, and infrastructures are conducive to productivity growth. However, Rammelt (Ibid) continued that infrastructure mostly facilitates the development process for global market integration. This condition only benefits a particular socio-economic group, while others from different socio-economic groups may benefit, suffer, or remain neutral from it. The condition can be seen in Bali, where infrastructure development had been focused on the South of Bali, leading to spatial inequality, disparity gap, and imbalanced growth between regions (Figures 9 and 10).

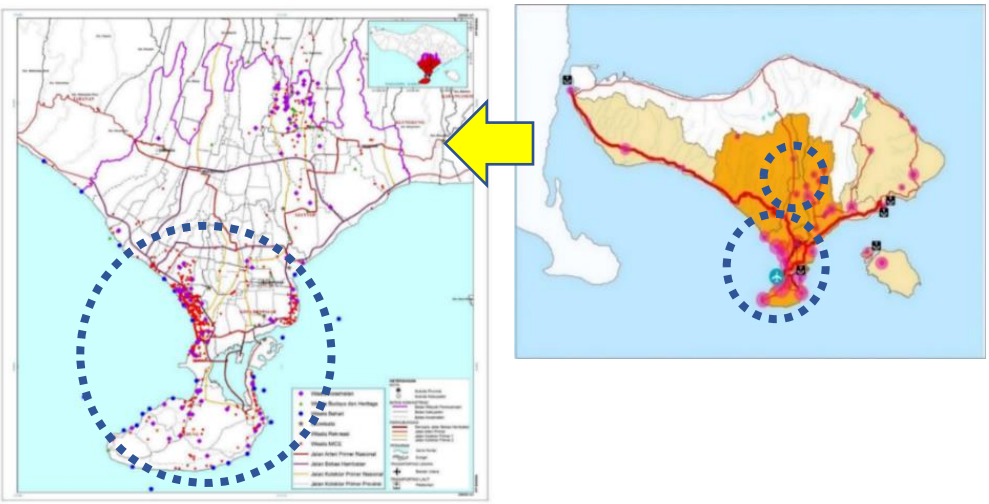


Figure 9. Economic activities that are clustering in the South of Bali
Source: Author

Figure 10. Road Infrastructure Network in Bali
Source: MPWH, 2015

Furthermore, Bali's economy went up to 6.72% in 2014. The number was above Indonesia's national economic growth (at a rate of 5%). At the same time, each region in the GDP corridor experienced a rise in its Growth Regional Domestic Product (GRDP). The Gross Regional Domestic Product data projected the economic growth of Bali from 2017 to 2026 (see Table 9). In 2017, the highest rate was experienced by Badung Regency, followed by Denpasar, Tabanan, and Gianyar Regencies. All of them are parts of the Sarbagita Metropolitan Regions. On the other hand, Klungkung Regency displayed the lowest rate, followed by Jembrana and Karangasem. The same condition was persistent in all regions, which shows how the disparity issue remains problematic in Bali.

Regencies	**Projection table of GRDP Growth (on constant price), in billions of Rupiah**									
	201	**2018**	**2019**	**2020**	**2021**	**202**	**2023**	**2024**	**2025**	**2026**
Jembrana	8,509	9,024	9,570	10,149	0,76	11,414	12,105	12,837	13,614	14,437
Tabanan	21,308	23,238	25,34	27,640	30,144	32,875	35,854	39,102	42,645	46,508
Badung	43,513	50,732	59,14	68,962	80,4	93,741	109,293	127,425	148,565	173,212
Denpasar	32,794	35,086	37,53	40,163	42,9	45,974	49,187	52,626	56,304	60,240
Gianyar	17,386	18,569	19,83	21,180	22,620	24,158	25,801	27,556	29,430	31,431
Klungkung	5,399	5,722	6,064	6,427	6,811	7,219	7,650	8,108	8,593	9,107
Kr.asem	10,106	10,713	11,357	12,039	12,763	13,530	14,343	15,205	16,119	17,088

Table 9. Projection of GRDP growth up to the Year 2026 in each region
Source: Annex of regional Law of Bali No. 16 the Year 2009, cited in MPWH, 2016

The economic gap can be seen more evidently by looking at the Gini Coefficient or the Gini Ratio of regions of the GDP Corridor that indicates a region's income equality level. A Gini ratio of 0 (zero) indicates perfect income equality among the populations. Meanwhile, a Gini ratio of 1 shows a large gap between the group of people with everything and another group with nothing. Thus, regions attempted to obtain a development that led them to a Gini Coefficient close to 0. Within Bali Province, the number fluctuated from 2011 to 2015 from 0.41 to 0.38. In 2015, the highest index was in Klungkung Regency at 0.37, followed by Denpasar City at 0.36. Meanwhile, Jembrana, Badung, and Karangasem Regencies had their Gini coefficient at 0,31.

Moreover, in the economic sector, regions in the GDP Corridor are known for their agricultural potential. This agricultural sector particularly highlights the role of the lagging regions in the western and eastern parts of the corridor. Karangasem Regency was reported to have the highest paddy productivity of 6,39 tons/ha, with a production of 47.904 tons from a 7.496 ha harvested area. Karangasem had the highest maize production in 2018, at 8.784 tons, followed by Klungkung Regency at 5.378 tons. Similarly, soybean production is also high - 2,397 tons in Jembrana

Regency, and 1,242 tons in Klungkung Regency. Karangasem appears to dominate the production of horticultural and medicinal plants such as shallots (1053 tons), chilly (12.118 tons), ginger (408 tons), and east Indian galanga (121 tons). While Karangasem Regency further contributed to the agricultural sector with the production of coconut (16.631 tons) and cashew nuts (3145 tons), Jembrana Regency produced the most Cocoa (2605 tons) and cloves (605 tons).

4.1.5 Summary of GDP's sustainability profiles

Gilimanuk-Denpasar-Padangbai Corridor traverses diverse regions grappling with unique sustainability challenges. The Western and Eastern regions face issues predominantly in the social and economic dimensions, while the wealthier Southern regions, including Denpasar, Badung, Gianyar, and Tabanan, contend with more pronounced environmental threats.

This Southern area, known as the metropolitan regions of Sarbagita, serves as Bali's economic nucleus, driving tourism, trade, and services activities, and acting as a transportation hub. However, Sarbagita confronts many environmental, social, and economic challenges, such as traffic congestion, air pollution, solid waste, slum areas, and disparities in wealth and opportunities. Due to the heavy reliance on tourism, Sarbagita experiences significant land conversion as agricultural lands give way to commercial facilities, exacerbating the strain on its environmental and carrying capacities.

The concentration of economic activities in the South leads to uneven distribution of wealth across Bali, leaving regions like Jembrana in the West, and Klungkung and Karangasem in the East, with insufficient infrastructure investments and limited development opportunities. These regions, particularly Karangasem, Klungkung, and Jembrana Regencies, face high poverty rates, low human development indexes, and inadequate access to clean water, sanitation, education, and affordable housing.

In addition to the varied issues, all regions within the GDP Corridor are threatened by common environmental challenges related to abrasion and coastal erosion. Positioned along Bali's western to eastern coastlines, all seven regions are susceptible to land displacements caused by the relentless impact of strong waves against the coastline.

4.2. Sustainability Outcomes of the GDP Corridor Development Rounds

Sathaya et al. (2007) mentioned that sustainable development incorporates a comprehensive and integrated approach to economic, social, and environmental processes. In the Strategic Development Region case, the processes are carried out through sustainability measures in various rounds of corridor development. The measure itself, according to Indonesian Law No. 24, Year 2007, and Government Law No.21, Year 2008, is defined as a series of efforts to reduce or minimize disaster

risks. A similar meaning of sustainability measure was shared by Drabek (1986) as" purposive acts designed toward the elimination or reduction in the probability of, or reduction of the effects of potential disasters" (p.21).

This section analyzes the GDP's sustainability outcomes within the three corridor development rounds. In the first round (SDR conception round), the sustainability outcomes were analyzed from measures delivered in 2015. The outcomes can be found in the secondary data (MPWH Strategic Plan 2015-2019) as a central government policy that catered to the macro SDR conception and the delineations of all SDR corridors. In the second round, the sustainability outcomes were analyzed from measures delivered in 2016. The outcomes can be found within two secondary data: the GDP's Integrated Infrastructure Development Plan (IIDP) reports and executive summary. The two documents comprised the GDP's ultimate goals and regional development strategies that directed the mezzo-micro planning of the GDP Corridor. Lastly, in the third round, the sustainability outcomes were analyzed from a list of public work infrastructure programs delivered throughout 2016-2019. The data is limited to 2019 from the fieldwork conducted in Indonesia.

4.2.1 SDR conception round/round one (October 2014 - December 2015)

In this first round of corridor development, the focus was on formalizing the overall concept of the Strategic Development Region (SDR) Corridors and defining the delineations of all SDR Corridors. The concept and delineations were accommodated within Ministerial Law of Public Housing No. 13.1/PRT/M/2015 regarding the MPWH Strategic Plan 2015-2019.

Within the Strategic Plan, the term sustainability was mentioned twice. It defined sustainable development in accordance with the infamous Brundtland report as an attempt to fulfill the present needs without sacrificing the needs of future generations. The concept is implemented within three sustainability dimensions: environment, social, and economy (MPWH, 2015. p.2). The attention to sustainability was strengthened with another statement in the strategic plan document regarding the importance of public work infrastructure development not only to drive regional economic growth, but also to establish a synergy with environmental sustainability, address the disparity between regions, fulfill the basic infrastructure needs of the people, and improve the living quality of the people and their well-being (p.50).

The above statements were then translated into the SDR principles and strategies within the MPWH strategic plan document. In the Strategic Plan, SDR was illustrated as "a development that is directed towards accelerating the physical development in economic growth centers, maximizing the agglomeration benefit, the potentials of regions, and the efficiency of infrastructure provision in the region" (MPWH, 2015. p.53). While the illustration of the SDR projected an economic mindset, the SDR concept was formulated with additional environmental and social principles.

There were seven main principles of the SDR stated how the development of the corridors should: 1) address the environmental carrying and support capacities of regions, 2) address the disparity among regions, 3) fulfill the basic needs of settlements, 4) eliminate slums in cities, 5) be based upon the economics of scales of regions, 6) synergize the transportation infrastructure development for international and national connectivity 7) sustain the water resources for drinking water, sanitation, irrigation purposes.

The strategic plan further elaborated the SDR strategies. The strategies focused on the roles of SDR to push the growth of the sectoral nodes and the competitiveness of regions as the regional engine of growth. While these two strategies lean towards the economic dimensions, strategies were also appointed to address the natural disasters of regions and basic infrastructure provisions.

Moreover, apart from the SDR principles and strategies, the strategic plan also directed Bali's development theme, highlighting the sectoral potential in Bali. The document described the development of Bali as "the national food barn, the gateway to the world's best tourism destination, the driving force behind the industrial and national service sectors, and the acceleration of the maritime-based economy" (p.52). This potential was the basis for delineating the GDP Corridors in which tourism, agriculture/hinterlands, and maritime nodes along the national road were mapped and identified.

The process resulted in GDP delineations from an economic perspective. The delineation spanned from the western regions (known for their fisheries potentials and the presence of the Gilimanuk crossing harbor) to the southern regions (known for their abundant tourism nodes and facilities, trade and services, and the presence of Ngurah Rai International Airport and Benoa International Harbor) - and the eastern regions (known for their agricultural products, Padangbai crossing port, and various tourism nodes such as the diving spot of Tulamben and the traditional village of Tenganan).

The overall sustainability outcomes thus included the SDR principles and delineations and Bali's development themes, which all projected strong economic ambition. While SDR Corridors also complemented by sustainability ambitions to answer the existing and future environmental and social issues of regions, the outcomes did not specifically address regions' unique and contextual challenges, such as the cultural relationship between regions in Bali, or the disparity issue in Bali between the rich southern regions and the lagging northern regions. While this appeared to be the weakness of such macro outcomes, on the other hand, the generic nature of the SDR principles opened the door for the next planning rounds to be tailored to the contextual challenges of regions in a more detailed manner.

4.2.2 GDP's envisioning of ultimate goals and regional development strategies/round two (January 1st - December 31st, 2016)

In 2016, extensive sustainability analyses were conducted, depicting the environmental, social, and economic states of GDP Corridor's regions and their future threats. These analyses were used to facilitate meso planning of the corridor tailored to the needs of the GDP corridor, to result in GDP's ultimate goals and regional development strategies. The goals and strategies were inscribed within two documents: the Integrated Infrastructure Development Plan (IIDP) final report, and executive summary.

The GDP's ultimate goals were envisioned within all three sustainability dimensions. In the environmental dimension, the ultimate targets were to conserve cultural and marine tourism objects, address the traffic congestion in the southern regions, reduce the open dumping waste system, and minimize groundwater use. In the social dimension, the goals were to improve the quality of settlements' infrastructures, including providing clean water and sanitation, and uplifting Bali's local identity and wisdom. Within the economic dimension, the goals were to facilitate and develop economic activities in the western and eastern regions of Bali, improve the connectivity to and from Bali (nationally and internationally through the facilitation of ports/harbors accessibility), and realize a robust agropolitan sector that supports the regional and national food security.

These ultimate goals were further translated into the GDP's regional development strategies (see Table 10) to answer specific sustainability issues. In the environmental dimension, programs were appointed to address the issues of: 1) solid waste management, to answer to the overcapacity landfill issues in Denpasar City while at the same time trying to reduce the overall waste piles in Jembrana, Badung, Klungkung, and Karangasem Regencies; 2) drainage system, to prevent any inundations that commonly threaten the Sarbagita Metropolitan Regions; 3) traffic congestion, to manage the regional connectivity that has been problematic, particularly in the southern part of the corridor; 4) natural disasters, to mitigate damages caused by floodings, and the erosion/coastal abrasions that threaten nearly all coastlined regions.

The GDP's regional development strategies also addressed challenges in the social dimension, including 1) sanitation issue, to provide sanitation infrastructure in urbanized and settlement areas with a service target of 100% coverage; 2) access to affordable housing to improve the quality of urbanized area through the development of public housings that mitigate the presence of slums in high-density areas; 3) provision of clean water, to enhance the drinking water service coverage with a target of 100% in the whole regions of the corridor.

Lastly, the GDP's regional development strategies were appointed to address issues in the economic dimension, which include: 1) regional connectivity, to improve the

accessibility to and from Bali Island that favors the logistic and tourism sectors; 2) local connectivity, to enhance the accessibility between strategic nodes (urbanized node, strategic tourism areas, hinterlands, airports/seaports) as well as to connect the vibrant southern regions with the lagging northern regions; 3) sustainable tourism, to support the emerging throughout the whole regions in the corridor; 4) the availability of water resources to ensure the availability of raw water needed for the production of crops (accompanied by the development of dams and irrigation system); 5) accessibility of ports, to facilitate the logistics movement within the corridor and to push the tourism and maritime industry.

The outcomes of the GDP's regional development strategies displayed a push in the environmental dimension of this round, done by addressing the extensive issues of solid waste, traffic congestion, natural disasters (particularly flooding and coastal abrasions), and the environmental quality of settlements. At the same time, the economic focus highlighted in the first round remains to push the connectivity between growth nodes and accelerate the growth of potential tourism, agricultural, and maritime sectors.

While outcomes in the environmental and economic dimensions were robust, those in the social dimensions still received less attention. Various social issues remain unaddressed, particularly in the western region of Jembrana and the eastern regions of Karangasem and Klungkung. As explained in the analysis, Karangasem, Klungkung, and Jembrana Regencies had the lowest HDI in the corridor, with HDI numbers of 66.49, 70,90, and 71,65, respectively. The average HDI in Indonesia in 2018 was 71,39. Although attempts were made to improve people's living quality by providing access to clean water and sanitation infrastructures, the HDI also depended upon the education index. In 2018, Karangasem alone had the highest rate of people who never attended school (no educational background) and those who did not complete their primary education. At the same time, the region had the lowest rate of those who attended college.

Sustainability Dimension	**Strategies**	**Sustainability Issues addressed**
Environmental measure	Improve the environmental quality of urbanized areas in Sarbagita (southern regions) as the corridor's primary economic and urbanized node.	Solid waste, flooding, groundwater, and air pollution
	Mitigate the natural disaster issues in all regions, especially in Klungkung, Karangasem, Jembrana, Tabanan, Badung, and Gianyar Regencies.	Natural disasters of coastal abrasion and flooding
	Improve the environmental quality of housing and settlements in Jembrana, Badung, Klungkung, and Karangasem.	Solid waste, flooding, groundwater pollution

Social Measure	To reach 100% coverage of wastewater service in all GDP regions	Access to sanitation
	To develop livable public housing and reduce/eliminate the slums in high-dense population urban areas	Access to affordable housing
	To enhance the drinking water service coverage of 100% in the corridor	Access to clean/drinking water
Economic Measure	Support the growth of the agropolitan regions of Jembrana, Tabanan, Badung, Gianyar, Klungung, and Karangasem.	Support to food crop production
	Support the fisheries activities in Jembrana, Tabanan, Badung, and Gianyar, especially realizing Karangasem as a Minapolitan Area.	Support for the maritime sector
	To push the growth of sustainable tourism, particularly in Jembrana, Sarbagita, Klungkung, and Karangasem	Support for the tourism sector
	Enhance the accessibility for tourism and logistic activities in all GDP regions.	Regional connectivity
	Support the development of Badung as the central transportation hub (airport/seaport) of Bali.	Regional connectivity
	Support the accessibility to the North of Bali, with Badung as the gateway to the North.	Local connectivity
	To improve the development of ports in Jembrana and Karangasem	Support for tourism, fisheries, and logistics

Table 10. GDP's Regional Development Strategies
Source: GDP's IIDP final Report (MPWH, 2016a)

4.2.3 GDP's programs prioritization and implementation round/round three (February 2016 - December 2019).

Unlike the previous round of corridor development that focused on the appointment of macro to mezzo and micro planning of the corridor, outcomes in this round focus on prioritization and implementing programs on a micro-scale. This means specific programs were implemented to address certain environmental, social, and economic issues in certain areas, segments, or blocks (see Annex 5).

<u>Measures to address environmental issues</u>

Regarding outcomes in the environmental dimension, the first type of measure discussed here is programs for the solid waste issue. As explained in the environmental analysis of Section 4.1, regions in the South (Sarbagita Metropolitan regions) with the highest density and population produced abundant waste managed in Suwung landfill (situated in Denpasar City). However, the landfill could

no longer perform optimally due to its limited capacity. Therefore, Suwung landfill revitalization program was introduced in Denpasar City (2017 to 2019). The program was supported by other measures that addressed waste issues in other regions in the corridor, including the optimization of the existing landfill of Linggasana in Karangasem Regency from 2017 to 2018); and the development of landfills with an integrated reduce-reuse-recycle system in Denpasar and Tabanan in 2017, and in Gianyar, Klungkung, and Denpasar, all in 2018.

The second mitigated issue in the environmental dimension relates to traffic congestion predominantly found in the southern regions of Sarbagita. The four regions of Denpasar, Badung, Tabanan, and Gianyar are the center of the urbanized node of the corridor, with vibrant tourism activities. However, insufficient public transportation and inadequate road infrastructures could not cater to the movements in the South, hampering activities in the area. Thus, road infrastructure development was appointed to relieve the most trafficked area and shorten the travel time between regions.

The traffic congestion measure attempt resulted in three programs. The first program was the development of Simpang Tugu Ngurah Rai underpass (2017-2018). Simpang Tugu was one of the most trafficked areas in Bali as it functioned as a meeting point between Ngurah Rai International Airport, Bali Mandara Highway, and the point that connected Denpasar center with the Nusa Dua area. This program was expected to reduce traffic in the area by up to 50% (CNN Indonesia, 2018). The second program was the widening of Denpasar - Tuban segment (2017-2018) to ease traffic congestion in the Tukad Teba area (Denpasar City). The third program was the development of Mengwitani - Singaraja shortcut (2018-2019), which was expected to reduce the travel distance between Denpasar City in the South to Singaraja in the North from 2.5 hours to 1.5 hours.

The third measure within the environmental dimension addressed various natural disasters. Bali is a small island where regions, apart from Bangli Regency, are situated with their coastline. This means regions in the corridor are prone to high tide and coastal abrasions. Therefore, programs were appointed, including the coastal safeguard development/ maintenance/rehabilitation in Jembrana, Klungkung, Gianyar, Denpasar, Badung, and Buleleng Regencies, as well as a beach conservation program in Denpasar City and Karangasem Regency. Both programs spanned from 2017 to 2019.

Meanwhile, regions in the east (Karangasem and Klungkung Regencies) were prone to volcanic eruptions of Mount Agung, which have been displayed in recent years. Therefore, programs were implemented, including the periodic maintenance of Mount Agung, sediment/lava control, and the normalization of the river basin (to provide a track for the cold lava if the mountain erupted). All these programs were carried out from 2017-2019. Lastly, the urbanized areas of Denpasar City, Negara

(capital of Jembrana Regency), Semarapura (capital of Karangasem Regency), and Singaraja (capital of Buleleng Regency) were prone to flooding. For this reason, programs were allocated within those four regions through the development/maintenance/operational routines of a flooding control infrastructure and a program of urbanized drainage system development conducted between 2017 and 2019.

Measures to address social issues

Measures in the social dimension were unlike those in the other environmental and economic dimensions because they comprised programs that directly involved local communities. Such programs aimed to improve their living quality, including the provision of clean water and sanitation and the quality improvement of housing for low-income households. Moreover, outcomes in this dimension also addressed the presence of slums and limited access to public housing commonly found in cities with high urbanization rates. Additionally, the issue of limited access to education was unresolved in the previous round of discussion. Thus, this section will closely examine extensive programs that answer the mentioned issues.

First, outcomes that mitigated access to clean water (drinking water) challenges. The MPWH set a target of 100% coverage from the previous 67% in Denpasar City, 76% in Badung Regency, 70% in Gianyar Regency, 79,9% in Tabanan Regency, 55,7% in Jembrana Regency, and 47% in Karangasem Regency before related programs were initiated (MPWH, 2016). The program of Community-Based Clean Water Provision (Pamsimas) realized this goal.

According to Afrilya et al. (2014), Pamsimas was a participatory program that required community initiatives and engagement to actively participate in deciding, planning, preparing, implementing, operating, and maintaining the built infrastructure facilities. This program initially focused on rural areas of Gianyar and Tabanan in 2017, followed by more programs in Gianyar, Jembrana, and Tabanan in 2018, and continued in Karangasem, Gianyar, Jembrana, Tabanan, and Klungkung in 019. Meanwhile, since the target to address the clean water provision was 100% coverage, a regional drinking water system development program was implemented for Buleleng Regency (North region) from 2017 to 2019.

Second, outcomes that were related to measures for sanitation access. Such measures generated four types of programs: the wastewater treatment plant in Tabanan Regency in 2017 and Denpasar City in 2017 to 2019; the rural community-based wastewater program in Gianyar and Buleleng Regencies in 2019; the Installation of the Sewage Treatment Plant in Karangasem Regency and Denpasar City in 2017; as well as the agropolitan rural settlements infrastructure in Tabanan Regency in 2017 to 2019.

Third, outcomes that mitigated the poverty issue, since there were low-income households or people within the unemployment group living in the slum areas. This round delivered three programs: 1) the quality improvement of the slum settlements program in Tabanan, Jembrana, Bangli, and Buleleng Regencies in 2017. The same program continued in Tabanan, Denpasar, and Klungkung Regencies in 2018; 2) the development of public housing (flats) in Klungkung Regency in 2018; and 3) the self-assist home stimulant aid program in Denpasar City in 2017, followed in sequence by Tabanan and Karangasem Regencies in 2018, and Denpasar and Jembrana Regencies in 2019.

Fourth, outcomes were influential towards regions' human development index, particularly the education rate. As mentioned previously, Karangasem, Klungkung, and Jembrana had less access to educational facilities than Sarbagita Regions. This issue was mitigated through the establishment and renovation of public schools in the three lagging regions in 2019. Additionally, a polytechnic development program was executed in Badung Regency within the same year.

Measures to address economic issues.

The outcomes in the economic dimensions were focused on programs that accelerate the growth of regions and potential sectors. Bali's development theme highlights tourism, agriculture, and maritime sectors.

The first outcome in this round concerns the push in the agricultural sector. The outcomes were delivered through several programs, including socio-economic infrastructure development targeting productive agricultural areas. This program aimed to provide infrastructure that could help farmers boost crop production and distribution while improving the basic infrastructure of their settlements. This program was appointed in Jembrana, Tabanan, Gianyar, and Karangasem Regencies in 2018 and continued in Tabanan, Gianyar, Klungkung, Karangasem, Bangli, and Buleleng Regencies in 2019.

Another program for the agricultural sector was the development of an agrotourism market/a traditional market to provide the local farmers, local entrepreneurs/business owners, and small to medium enterprises with proper trading facilities that would enable them to compete with the modern market. Such a market was expected to connect farmers with regional and international markets. The program was delivered in Tabanan and Gianyar Regencies in 2019. Additionally, a dams/reservoir development program was executed to safeguard crop productivity and food security in Bali. The program included the development of Sidan Dam from 2017 to 2019 (covering Badung, Bangli, and Gianyar Regencies), Tamblang Dam from 2018 to 2019 (covering Buleleng Regency), Adegan Kangin Reservoir in 2018, and Nusa Penida Reservoir in 2019 (situated in Klungkung Regency). These programs were supported by the provision of a raw water supply

system and irrigation systems in Gianyar, Tabanan, and Buleleng Regencies in 2017, which continued in Karangasem, Gianyar, Tabanan, and Buleleng Regencies in 2018.

The second outcome was meant to boost tourism in the western region of Jembrana and the fishery industry in Pengambengan, known for its fishery port. This was achieved through Smart Travellers' Plaza (STP) development program. STP was an incubation area inspired by the presence of Michi No Eki in Japan. Such a facility was situated in Rambut Siwi, adjacent to the national road. STP catalyzed the local economy by empowering the local community. It promoted local products and functioned as the meeting point between tourists and local producers. The STP building featured facilities such as a local commodity market, cultural gallery, amphitheater, restaurants, shops, workshops, and green open space. Its development spanned from 2017 to 2019.

Lastly, the third outcome was designed to benefit the tourism sector through a variety of programs, including the revitalization of tourism strategic areas/tourist destinations. The program was aimed to facilitate and enhance tourists' experiences while stimulating the economies of local communities. This program was situated in Karangasem Regency (Pusaka Catus Patha), Gianyar Regency (Tampak Siring Palace and Petulu), and Tabanan Regency (Pinge Tourism Village) in 2017-2018; and in Jembrana Regency (Jagatnatha Botanical Garden) in 2019. Moreover, to facilitate the movement of tourists and ensure their safety, there were routine programs of road preservations, rehabilitations, or reconstructions that improved the quality of the local and regional roads.

4.3. Conclusion on the GDP's Sustainability

This section presents four key conclusions derived from the GDP's sustainability outcomes.

First, outcomes in the early planning process not only framed measures in the next rounds, but also contextualized them. Outcomes in each of the SDR conceptualization round (round one), the envisioning of the GDP's goals and strategies round (round two), and the prioritization and implementation round (round three) were delivered in different scales. Outcomes within the earliest round were general corridor concepts that function as a macro guideline for the next planning process. In the following rounds, the general concepts needed to be translated further throughout a mezzo to micro planning to result in outcomes tailored to GDP characteristics, potential, and needs. Thus, sustainability outcomes became more detail-oriented throughout rounds. The general SDR principles and strategies initially applied to every SDR corridor were then specified into the GDP's ultimate goals and strategies, and further contextualized into prioritized infrastructure programs implemented in regions.

Second, there was a notable shift in sustainability focus over the rounds from predominantly economic to more sustainable. In the initial round, sustainability outcomes were centered on the corridor's economic purpose. These objectives were incorporated into the SDR illustration, principles, and delineations, primarily emphasizing agglomeration benefits and the connectivity of growth nodes.

In the second round, the circumstances changed. While consistently delivering outcomes that benefitted the economic dimension, the corridor's ultimate goals and regional strategies were also directed to strengthen the environmental dimension. Sustainability outcomes became contextualized, as measures were directed at regions with problematic issues of traffic congestion, solid waste, natural disasters, and the poor environmental quality of urbanized areas and settlements. In the third round, unaddressed social challenges in rounds one and two were answered through various social programs. These measures included the development and renovations of schools, the provision of infrastructure in rural settlements, and self-assist home stimulant aids.

Third, the corridor idea was substantiated. Even though in the second round, one of the GDP's regional development strategies was to develop the North-South axis to link the advanced southern regions with the lagging northern regions outside the corridor's delineation, development within the corridor remained prioritized.

The SDR strategy (of round one) initially aimed at competitive regions was specified in the second round within the GDP's regional development strategies. The strategies were to improve regional and local connectivity, enhance accessibility and the development of transportation hubs, and support the agriculture, tourism, and maritime sectors. These strategies were focused on regions in the corridor. In the third round, while connectivity between the South and the North was implemented through the development of the Mengwitani-Singaraja Road, more programs were allocated to strengthen the corridor's idea, for example, through the development of Smart Travelers' Plaza as an incubation area of the corridor in Jembrana Regency.

Fourth, many environmental issues are still unaddressed. For example, an environmental issue regarding land conversion, which, according to various respondents, was problematic, particularly in the South of Bali (such as Canggu area), due to the high demand for land for housing and tourism activities. To address the issue, more commitment to protect the agricultural lands from every city/regency is needed, such as regulating it within their Regional Detailed Spatial Planning Law, which appoints the regional land use for 20 years timeline.

Another environmental issue was traffic congestion in the southern regions. Even though there were attempts to appoint various road infrastructure programs to ease the congestion in Denpasar and Badung, the corridor still lacks adequate public transportation facilities to support the vigorous activities in the corridor. The

existing programs were still focused on short-term solutions, as criticized by a transportation expert interviewed in this study. Instead, a more long-term measure is needed, for example, by using Transit Oriented Development Strategy, a concept that focuses on the effectiveness of an integrated public transportation system to cater to activities of residential, commercial, and business areas), or by improving the coverage of the existing Trans-Sarbagita buses system as parts of the GDP's Ultimate Goals designed in Round two. This effort can further be strengthened by enforcing a law that favors the climate change measure attempting to reduce the use of fossil-fuel vehicles and providing an incentive that supports the use of electric transportation on Bali Island.

Fifth, even though social and economic measures in the environmental and social dimensions were enhanced in the later rounds, they were limited due to the corridor's predominant economic focus that prioritized development in regions with growth nodes. This economic focus led to GDP delineations that were deemed problematic by regional and local actors, as the delineations did not address the ongoing inequality and disparity issues on the Island. Consequently, it overlooked the contextual challenges of Bali itself as one Island with robust socio-cultural links among its regions.

Sustainability outcomes were also limited due to the overemphasis on hard infrastructure programs, which sidelined the importance of soft infrastructure. Local communities needed more empowerment activities to optimize the use of local resources through their local wisdom and knowledge. This approach not only has the potential to improve the local economy and combat poverty but also ensure the sustainability of their resources for future generations. Balancing both hard and soft infrastructure is essential for achieving holistic and long-lasting development in the region.

As an overall conclusion, the analysis of the sustainability outcomes within the YSS Corridor provided valuable insights into its developmental dynamics. These insights not only offered a lens through outcomes influenced the formulation and contextualization of measures in subsequent rounds, but also underscored the transformative journey of sustainability outcomes. This evolution shifted from a predominant economic focus to a more comprehensive and sustainable approach and showed the persistence of the corridor's overarching idea throughout its development. However, the analysis also revealed a number of sustainability issues that remained inadequately addressed, on account of two reasons: firstly, the emphasis on bolstering strong regions, often overlooking issues of inequality, and secondly, the focus on hard infrastructure, eclipsing the significance of broader environmental and socio-environmental considerations. As we pivoted to the governance chapter, it became clear that understanding how these governance factors and interaction process have shaped these outcomes is essential to unraveling the intricate tapestry of the YSS Corridor's developmental trajectory.

CHAPTER 5
GOVERNANCE OF THE GILIMANUK - DENPASAR - PADANGBAI (GDP) CORRIDOR

This chapter analyzes the GDP Corridor's governance by zooming in on the interaction process of its actors and the governance factors that influence the process, to explain how they influence GDP's sustainability outcomes. The analysis is crucial to answering the second and third sub-research questions regarding the way the interaction process of the corridors evolved and the constellation of governance factors in the various rounds of corridor development.

As the sustainability analysis was detailed in Chapter 4, this section provides a summary of the findings, focusing on the extent to which environmental, social, and economic measures have been achieved. The GDP's sustainability analysis shows that the main issue of the GDP Corridor revolves around the uneven distribution of economic opportunities and development, resulting in stark disparities between the Southern regions, particularly the rich metropolitan regions of Denpasar, Badung, Gianyar, Tabanan (known as Sarbagita Metropolitan Regions), with the lagging Western and Eastern regions. Sarbagita serves as Bali's main economic hub, with bustling tourism, trade, and services activities, with well-connected infrastructure. In contrast, the Western and Eastern areas of Jembrana, Klungkung, and Karang Asem Regencies experience inadequate infrastructure investment and development, leading to high poverty rates, low human development indexes, and inadequate access to essential services despite their (unexplored) sectoral potential in fishery, agriculture sectors, marine tourism, and agritourism activities. At the same time, Sarbagita Regions are experiencing predominant environmental challenges, from land conversions, waste disposal, traffic congestion, coastal erosion, the presence of slums, and poor quality of settlements.

The sustainability analysis further shows how the GDP Corridor was initially designed as a transport corridor with an economic focus, directing the MPWH infrastructure as an engine of growth to accelerate economic development in growth centers. This situation shifted in the second and third rounds as the environmental and social dimensions strengthened. However, the transition towards a sustainable corridor was only partial. There are sustainability concerns that the initial economic delineation of the corridor remains and that the implementation measures were predominantly infrastructure-focused, with limited attention to (technological) innovation, human resource development, and other soft infrastructure. An infrastructural focus is unlikely to fully address sustainability challenges. This section presents how sustainability was

shaped/constrained by the governance factors and process throughout the three corridor development rounds.

Meanwhile, the analysis on governance delves into the interaction process of actors of the GDP Coridor and the governance factors. The interaction process embarks on a systematic exploration of the successive rounds that define the interaction process, particularly on how each round commences and concludes. The analysis also comprises the identification of key actors participating in each corridor development round, and their composition in the decision-making process, and how the strategies they employ to influence the corridor's outcomes. As for the governance factors analysis, this chapter uncovers the values of the factors across different stages of the corridor's development. It is done by scrutinizing the corridors' visions and the particular attention to their nuanced perspectives on sustainability dimensions, the diverse governance mechanisms being employed, the array of actors representing various agendas and resources, the types of knowledge shaping decision-making processes, and the presence of rules, procedures, and platforms that frame the corridors' planning process.

5.1. Round One: The Conception Round (October 2014 - December 2015)

This section presents governance of the first round, when the corridor was conceptualized in the MPWH 2015-2019 Strategic Plan document.

5.1.1 Interaction process of round one

The governance in this round was marked by the appointment of Mr. Basuki Hadimuljono as the Minister of Public Works and Housing on October 27th, 2014. As one of his first actions in leading the ministry, Mr. Hadimuljono set up a new body within MPWH called the Regional Infrastructure Development Agency (RIDA).

Before the establishment of RIDA, infrastructure planning and programming functions within MPWH were carried out through coordination between sectoral units of MPWH (conducted by Directorate of Program Development and Bureau of Planning and International Cooperation). After the formation of RIDA within the ministry, the new agency became the single institutional response that integrates and synchronizes various technical policies (national and regional) and the strategies of MPWH sectoral Units of Organizations (Directorate General of Water Resources; Directorate General of Roads and Highways; Directorate General of Human Settlements; Directorate General of Housing), at Echelon I level. For those challenging tasks, the previous Prime Minister of MPWH 2009-2014, Hermanto Dardak, was appointed to this newly established agency.

Mr. Hadimulyono appointed five other officials from MPWH sectoral units as directors within RIDA. They were: Mr. Dadang Rukmana, from Directorate General

of Spatial Planning as Secretary of RIDA; Mr. Hadi Sucahyono, from Directorate General of Human Settlements as Head of Infrastructure Planning; Mr. Haris Batubara, from Directorate General of Highways as Head of Programming and Synchronization of Integrated Infrastructure; Mr. Rezeki Peranginangin, from Directorate General of Spatial Planning as Head of Strategic Area development; and Mr. Kuswardono, from Ministry of Housing as Head of the Urbanized Area Development). In this way, perspectives and knowledge from different sectors were incorporated within RIDA to arrive at an integrated approach.

One of RIDA's early tasks from the Minister was to prepare the MPWH Strategic Plan 2015- 2019 document. The purpose was to set up a guideline that directs the planning and programming of the different MPWH Units of Organizations simultaneously to realize the goals within Mid-Term National Development Plan's agenda (a higher hierarchy of national planning policy) to push the competitiveness of regions.

To realize the task above, Mr. Dardak envisioned the need for a planning innovation that can provide added value to the resources within regions, done through the regional development approach (RIDA, 2015b). To do so, Mr. Dardak and five RIDA directors initiated Strategic Development Regions (SDR) Corridors. They envisioned SDR Corridors as a mechanism to integrate sectors within regions, as well as regions, into the national and global economy. SDR Corridor's establishment marked the separation from the sectoral approach toward regional development, as Respondents 4 and 1 shared.

> "Before SDR, MPWH had many sectors: roads, water resources, and human settlements, that executed programs. Then, MPWH set up RIDA to integrate the sectoral programs based on specific locus. We (RIDA) determined the locus with the potential to grow, so that sectors can have infrastructure investment together with the expectation to boost the growth…. Before RIDA, investment in sectors went everywhere. But now, in defined places, for bigger impact"- Respondent 4.

> "What we saw was how to eliminate the history in the past where the nature of development was partial, sectoral, without the base of regions/area, which was why the problem in the past was answered in a partial/sectoral way. Since 2015 SDR was born in 2015, there has been no more sectoral, but integrated area development" - Respondent 1.

> "The initial concentration was still sectoral. Then, by incorporating SDR within MPWH Strategic Plan, the technical Units of Organizations became obliged to develop the infrastructure on a regional base. That was what I understood. So, back then, the sectoral ego was still

> present. After SDR, they started using the regional concept" - Respondent 3.

To define the delineations of the corridor using a regional development approach, MPWH adopted a strategy to prioritize infrastructure development in regions by identifying the substantial economic nodes and the economic linkages between regions. The strategy was shared by Respondent #8. Respondent #4 further mentioned that RIDA identified the nodes through Pareto principle. Pareto's approach, also known as the "80/20 Rule, was introduced by an Italian economist, Vilfredo Pareto (1987), who sets out a principle in which 80 percent of a project's benefit comes from 20 percent of the work. Thus, 20% of investments in growth nodes and joint actions among MPWH sectors are expected to give 80% of the result.

> "The National Spatial Plan, if I am not mistaken, has 88 National Tourism Strategic Areas (NTSA), with no prioritization within. We must prioritize because it is impossible (to be executed) within the mid-term. For example, in five years, we need to support all 88 of them. It is impossible, right?. So, we prioritized certain areas while we coordinated and built the criteria. Now, in the Island Master Plan, we produce, for example, some 30 out of 88 National Tourism Strategic Areas, which we will implement within 5-10 years, as industrial areas……. So, the content of SDR in those areas, are being prioritized"- Respondent 8.

> "To determine SDR was not easy because of its delineation. Delineation points out where the fast-growing locations/areas are. So, MPWH and MPWH sectors teamed up to analyze the regions, hoping that sectors could invest together. Previously, it was everywhere. Now, with joint action in certain areas, there will be more impact. Besides, SDR is expected to give Pareto results. So, not for all regions in Indonesia… SDR is for growth centers where we invest a little, trigger a little, and give fast results…Pareto means we invested 20%, came the result of 80%. So, there is a function of efficiency, and integration. The bottom line is, we select certain regions to be SDR"- Respondent 4.

The strategy to delineate the corridor was stated further within MPWH Strategic Plan, through "the presence of growth centers, manufacturing industries, food industries, maritime industries, and/or tourism" (MPWH, 2015.p53. Additionally, apart from the economic ambition, SDR was meant to address the environmental and social dimensions, as mandated by the National Development, to achieve sustainable development. This idea was applied through one of the main principles of SDR to carry out regional development that underlines the carrying and support

capacities of the defined regions. Such desired condition was shared by Respondents 3 and 4. Following the formulation of SDR concept and delineation, MPWH Strategic Plan 2015-2019 was promulgated on April 8th, 2015. Not long after, the institutional position of RIDA was formalized within Ministerial of Law of Public Works and Housing No.15 Year 2015. Afterward, throughout the rest of 2015, RIDA continued sharpening the profile of every SDR corridor, as shared by Respondent 6.

> "The purpose was to leverage the economy and also to maintain the carrying capacity and support capacity of the environment. So, to improve the economy without degrading the environment"- Respondent 3.

> "SDR must give attention to the environmental support capacity of regions. Indeed, it has a purpose to boost the economy, but what needs more attention is the supporting capacity of the environment"- Respondent 4.

> "In 2015, when the formulation of MPWH Strategic Plan was an ongoing process, we infused it with the regional development approach, which was SDR. That was when we brainstormed its core principles, including the delineation of the corridors…… Once the delineation was fixed, while processing the legalization of the ministerial law from the Strategic Plan, we sharpened the delineation of the profile, the size, the population, the GRDP, the location of harbors, its type of class, etc. All units in RIDA were involved in this" - Respondent 6.

In this round, RIDA was aware that the planning process of every SDR corridor should continue. It is why RIDA designed a new program called the Integrated Infrastructure Development Plan (IIDP) and planned an adaptation to the existing coordination platform called Pre-Regional Consultation Forum to set the stages in the following rounds. The planning processes within IIDP and Pre-RC were detailed within IIDP's Terms of Reference and Pre-RC guidelines.

5.1.2 Sustainability outcomes of round one

MPWH Strategic Plan 2015-2019 document had a strong economic focus, with a mandate from the National Mid-Term Development Plan's agenda that called for 'competitive economic development' (MPWH, 2015. P.44). The following statement indicates its infrastructural and economic focus:

> "Public work infrastructure development of every SDR is directed to accelerate the physical development in economic growth centers by maximizing the agglomeration benefit, the potentials of the region, and efficiency of infrastructure provision in regions" (MPWH, 2015. p.53).

SDR principle aimed for the “benefits within the economics of scale” (MPWH, 2015, p.53) with its strategy to push the development of growth centers, accelerate development in the lagging regions, and strengthen the region's competitiveness and economic contribution (MPWH, 2015, p.54). Thus, the strategic plan subsequently selected the delineation of the corridor in a relatively affluent East-West region of Bali and prioritized potential leading sectors (MPWH, 2015. p.53) in accordance with Bali’s development theme that directed Bali as the nation's food security, and the gate to the world's best tourism destination, the leading of industrial and national service sectors, and the maritime-based economy (MPWH, 2015. p.53).

While not neglected, the other two pillars of sustainability received less attention. MPWH Strategic Plan explicitly directed the public work infrastructure development to ‘not only function as an engine of growth but also synergized with the environmental sustainability and address disparity, urbanization, and urban sprawl issues (MPWH, 2015).

5.1.3 Governance factors of round one

The five governance factors in this SDR conception round can be elaborated as follows:

The first factor was the vision of a corridor as a regional development strategy that persisted throughout the rounds, gave direction to activities, and determined the scope of the process. It succeeded in overcoming and adapting existing institutional divides and practices. Sustainability was initially outbalanced by economic considerations, but the mention of sustainability in the original vision opened the door for discussion and revision in the later rounds. Over time, the influence of alternative visions like the New Urban Agenda and the adoption of annual Pre-RC themes contributed to the gradual change in the vision toward a sustainable corridor.

The second was the mode of governance as the second factor displayed that the concept emerged hierarchically, initiated by a new Minister, and further elaborated within a new agency of RIDA within MPWH that was authorized to devise a plan that coordinated sectoral approaches of other agencies. This hierarchal approach gave little room for other opinions to be heard. The combination of hierarchical governance with a strong, urgent, vague economic and infrastructure-driven vision can be pinpointed as the successful start of corridor development. It provided macro planning on a national scale and directed the future development of Public Work Infrastructures.

The third factor was the subsequent constellation of actors involved in preparing SDR concept. SDR was developed by RIDA, led by five high-level officials (who

assisted Mr. Dardak) as the main decision-makers in RIDA. Three of these officials had civil engineering and urban/regional planning backgrounds, while the two others specialized in environmental engineering and law. The same circumstance applied to RIDA's staff, dominated by technical majors in civil engineering, architecture, and urban/regional planning. As an implication of the second factor, where only the central government accounted for the formulation of SDR principles and delineations, SDR was established without a thorough assessment of its environmental and social impacts.

The fourth factor was also closely related, as the team within RIDA utilized mainly technical and economic knowledge of regional development theory, Pareto concept, and gravitational model. The first knowledge focused on using infrastructure investment and exports to boost the competitiveness of regions. The second knowledge explored how investments can be aimed for big impacts (20:80). The latter identified the strong economic linkages of regions formed between Bali's western, southern, and eastern regions (Respondent 1, 3, 4, and 6). There was little room for other development theories, which placed environmental and social sustainability at the fore, nor was there much discussion on uncertainties associated with trickle-down models of regional development.

The fifth factor was the institutional setting, characterized by the newly attained institutional position of RIDA, creating a niche at the top of the Ministry, sidelining existing institutional rules and positions of other bureaus, and allowing for the development of an integrated and new approach that otherwise would have been dashed by the existing bureaucratic mechanisms. RIDA, with its authority, set up the following planning processes involving the design or adaptation to the new/existing rules, procedures, and platforms codified within the Integrated Infrastructure Development Plan's (IIDP) Term of Reference (TOR) and the Pre-Regional Consultation's (Pre-RC) guideline.

Despite the predominant economic approach of RIDA, the environmental and social dimensions were not entirely neglected. The vision that guided the process enunciated the meaning of sustainable development inspired by Brundtland Report (MPWH, 2015. p2). This provided the scope to counteract the one-sided economic focus caused by the combination of hierarchical visioning with a bias of actors and knowledge involved in the strategic planning process. As a result, environmental and social sustainability had a foot in the door in the next planning process.

5.2. Round Two: Envisioning of GDP's Goals and Strategies Round (January 1st - December 31st, 2016)

In the second round, RIDA used the strategic plan developed in round one as a guide to design an implementable Integrated Infrastructure Development Plan (IIDP) for

the GDP corridor. This round follows the standard procedures of the ministry. Its core decision is to decide on an integrated plan for the corridor.

5.2.1 Interaction process of round two

As mentioned in the sustainability analysis chapter (Chapter 4), the second round of corridor development played a crucial role in determining the tailored planning process of the GDP Corridor towards sustainability through the execution of IIDP. IIDP was planned by RIDA in 2015 and conducted in 2016. IIDP was planned as a contractual program, which means the execution was outsourced to a third party, a planning firm and their team of experts, to deliver the planning of the GDP Corridor.

The chosen firm was PT. Perentjana Djaya. The firm was selected through two qualification processes. In the first process, criteria of the administrative qualifications included the validity of the company's license, their number of experiences with similar projects, and the quality of experts according to the criteria of IIDP's Term of Reference (TOR) made by RIDA. In the second process, RIDA assessed seven firms with the highest scores, 80% from the project proposal and 20% from the budget spending proposal.

Eleven experts were directly involved in the execution of the program as part of the bidding results. The experts specialized in various fields, including environmental engineering, urban/regional planning, civil engineering, architecture, law, and geography. The team leader, Mr. Rizal Budiawan, is a practitioner in urban and regional planning with a public policy background. According to IIDP's Term Of Reference, these experts' main activities involved a data collection of Bali's corridor profile; fieldwork and survey (conducted in May 2016); the organization of two Focus Group Discussions or FGDs (in June and October 2016) and a workshop (in November 2016). The process of delivering IIDP's outputs was shared by Respondent 6.

> "The process (to deliver IIDP output) was quite long. First, the consultants collected secondary data, for example, statistical data. Afterward, following a short desk study, they went for fieldwork to collect the primary and additional secondary data. The data were formulated into the draft of Master Plan and Development Plan (which consisted of the corridor's ultimate goals and regional development strategies). ……The draft was brought to the regional government for further discussion and underwent Focus Group Discussions to get input from regional governments. Then they brought the results (of FGD) to the center (Jakarta), to be revised and discussed in Jakarta" - Respondent 6.

> "They (consultants) also conducted interviews (with the regional agencies and other sectoral ministries). So, for example, they initially obtained some data that was incomplete, or maybe they needed further confirmation due to some doubts about the validity of the data. This way, they interviewed the sources (those with data) directly because sometimes the data was not up to date: - Respondent 6.

The monthly activities of the team were monitored and supervised by Center of Strategic Area Development (CSAD) of RIDA, a division that designed IIDP TOR. The sub-unit was led by Mr. Rezeki Peranginangin, an official with an environmental engineering background. The experts' progress in delivering IIDP output was documented by the team in a monthly report and reported to the stakeholders in a preliminary draft report meeting (May 2016), Mid-term report meeting (August 2016), and final report meeting (December 2016).

Unlike in the first round, the regional actors were involved in this second round within the FGDs. The regional actors were invited to the FGDs (see Figure 11) through an official letter signed by Mr. Peranginangin after the team of experts discussed the list of invitees beforehand with CSAD. The involved regional actors were those with the capacity to provide related environmental, social, and economic data, the capacity of local knowledge regarding the sustainability issues in the region, and the capacity to do interventions according to the region's strategic issues.

The involved regional actors were Provincial Government of Bali and Local Governments of all seven cities/regencies in the corridor, represented by each Regional Planning Agency, Regional Public Work Agency, and Regional Tourism Agency; and private stakeholders were represented by Regional Water Utility Company and Pengambengan Port.

Fig 11. Documentation of the FGDs
Source: RIDA (2016a)

The FGD allowed regional actors to participate in the discussion and the decision-making process on the GDP Corridor. As a result, information regarding the principles behind the corridor establishment and the various sustainability

challenges of the regions were discussed. Nevertheless, in the first instance, perceptions of actors in the corridor development between the central and the regional actors differed widely.

The regional actors perceived the corridor idea as a new planning guideline for the regions as a confusing idea due to the presence of other spatial planning policies, as shared by Respondent 14. However, the central government actor, represented by Respondent 6, shared that SDR concept had been synchronized with other spatial planning documents (both at the national and regional levels. Respondents 11 and 14 reported that the lapse in the circulation of knowledge and information in the first round resulted in the regional actors being oblivious to the overall SDR concept.

> “The first time I heard about SDR was, "How come there was another spatial program?". That was our question. Within the regional spatial planning, we (the provincial government) had many layers of planning for the areas (regions within the GDP). So many different plans. How come there was another more?”- Respondent 14.
>
> “SDR did not go against Regional Spatial Plan (RSP). On the contrary, it is more detailed planning. SDR was very much related to or in line with the RSP. The RSP only reached the program indications level. On the other hand, SDR translated its program indications into a more detailed public work infrastructure program. So actually, SDR was in line (with the RSP)”- Respondent 6.
>
> "I became familiar with SDR concept after all those activities (FGDs) conducted in Bali. We were involved throughout coordination” - Respondent 11.
>
> “At that time, we did not obtain enough information (about SDR)” - Respondent 14.

Apart from various existing national and regional spatial planning policies, another issue that hindered the trust of regional actors regarding the SDR concept was due to numerous spatial concepts introduced by the central government that only lasted for a short period, only within a programming phase, without concrete implementations (and allocation of funding) for the regions. This perception was shared by Respondent 8. In addition, the regional actors did not approve of the delineation of the GDP Corridor, as it excluded the lagging northern region that needed to be balanced by the fast expansion of regions in the South. Meanwhile, the regional government planned to develop Bangli and Buleleng Regencies by planning for new airport development in the North that stimulated the economy of the secluded northern regions. The objection to the GDP’s delineations was shared by Respondents 14 and 15.

> “Honestly, in my opinion, their initial response was fifty-fifty because the national government tends to have variations in policy from A to Z that are still within a planning phase. So basically, what is concrete for the regions? When we first brought the concept to them, there were rejections, but then they were okay because, after all, it is a program by the national government that the approach is still a top-down”- Respondent 8.

> “My question at that time was, how come there was a new regional concept that only comprises the South, while we had been echoing a balanced development between the North, South, West, and East of Bali because what is happening now is that all development is piling up in the South. That is our question” - Respondent 14.

> “Our expectation was, of course, that our concept came from our regional planning documents and that we always mentioned the need for balanced development. In reality, the southern part was overburdened. Meanwhile, we saw the potential in the North of Bali. So even though the plan (to develop the North) did not match the GDP concept, we stuck to our idea. We will deliver the development towards the North. One of which was by developing an airport in the North. That would be the starting point, with the hope that the airport can trigger the development on the and enhance the welfare of the people” - Respondent 14.

> “There was jealousy as to why the program was only for the South. Maybe there is a purpose as to why the delineation is only in the South….. Unlike other provinces in Java, Bali has one ecosystem and one province within one island. Meaning, we cannot separate those regions' - Respondent #15.

Despite the objection towards the GDP’s delineations, the central government remained with the prioritization strategy. However, as shown in the sustainability outcomes of round two, within the GDP’s regional development strategies, the central government supported the idea of connecting the regions in the South with those in the North to cater to the development of the planned new airport in the North, as they perceived the idea would also benefit the corridor. The circumstance was explained by Respondent 3. At the same time, the regional government projected a dual strategy. On the one hand, they stated their support for the corridor idea; on the other hand, they would also continue to stimulate the development of the northern regions. Such a strategy was projected by Respondents 12, 11, and 14.

> “Those not within the working area (delineations of SDR) would still receive some programs because even though they may not be within

the delineations due to the presence of criteria. However, they (the excluded regions) also had the potential to end up supporting the corridor"- Respondent 3.

"We (the provincial government) had a big mission at the regional level on how the establishment of GDP could implicate the growth and equality to the whole Island of Bali, to the North and the South. So, we do not assume that the development of SDR is only for the southern regions, as to why they were strategic. Not everything is about that. So, the strategic areas are in the South, and the "cake" (benefit) also goes to the North'"- Respondent 12.

"I see it positively that after coordination and socialization of that matter (SDR concept), we as the officials in the province are grateful that the national government made a program that is for the interest of Bali in general and specifically for Bali. Therefore, the expectation is that our mindset in Bali can switch according to this program. To my knowledge, the agencies of MPWH here in Bali have been supportive. However, it slowly needs more socialization because several parties may feel that their activities are being taken away" - Respondent 11.

"We are looking at the circumstance positively, that the idea and the concept (of GDP) was good. However, as I mentioned, it only focused on the South. Now, to mitigate issues in the South, more or less, it will be covered by the GDP corridor. This would certainly become a part of our implementation plan. So, we combined the concept. Which ones are feasible and possible? That we will support. We realized we had limitations. Provinces and regions could not develop on their own. We need help from the central government. The central government must act according to the planning that they had. So, either we are willing or not, we had to study and paid attention to it (the GDP concept), and utilized it"- Respondent 14

5.2.2 Sustainability outcomes of round two

In IIDP, economic goals once again received the most attention. The agreed GDP's Ultimate Goals (MPWH, 2017. P. III-137-138) aimed to improve the connectivity within the corridor, the economic activities in the western and eastern regions, the accessibility to/from Bali nationally and internationally, and the production of agropolitan commodities.

Such economic focus reflected the initial economic ambition worded by the Minister and translated into an economic transport corridor, as seen in programs within the GDP's Regional Development Strategies that aimed to improve access between Core Urban Centers and the National Tourism Strategic Areas, and the

corridor's logistics flow (MPWH, 2016. P. III-140-141); and to support the development of transportation hubs in Jembrana (West), Badung (South) and Karangasem (East) (MPWH, 2016. P. IV-94-104).

However, IIDP also included the construction of connectivity from Badung (South) to Buleleng (North) as one of the GDP strategies where the new northern airport will be developed (MPWH, 2016. P. IV-98). This adaptation was included by arguing that it improved the environmental sustainability of the corridor by diverting the development away from the overly saturated southern regions and adding an additional gateway as part of the corridor. It also partially addresses the social disparity between northern and southern Bali.

Compared to round one, the environmental goals receive considerably more attention in the Ultimate Goals, as these included attempts to conserve cultural and marine tourism, enhance the development of sustainable infrastructures that provide environmental measures and support the livelihood of people, and ease the traffic congestions on the western-eastern and northern-southern axes. In contrast, the social goals received somewhat more attention through the preservation of the local wisdom and identity of Bali. These ambitions were reflected in a statement within the IIDP final report:

> "It is concluded that the regional development in Bali, specifically the GDP Corridor, must be based upon Bali's culture that has its own norms, tradition, and local wisdom…to realize a harmonized and sustainable development of Bali" (MPWH, 2016. III-39)

The environmental measures as one of the GDP's Ultimate Goals were specified in the Regional Development Strategies as landfill development and natural disaster mitigations, for example, through the development of flooding control, coastal safety, water damage control, and landslide mitigation infrastructures. In the social dimension, while measures of the provision of clean water and sanitation and the removal of slums were appointed, various issues related to the disparity gap, including access to education and affordable housing, were still problematic.

5.2.3 Governance factors of round two

The governance setting during the second round can be typified as follows.

First is the formulated GDP Vision. One of the activities within IIDP program was to formulate a contextual vision. The regional actors remarked on the uneven economic opportunities due to the centralization of infrastructure development and investments in the southern regions that led to a disparity gap, the environmental degradation of the southern regions, and the natural disaster threats in all GDP regions. Thus, before determining the GDP's Ultimate Goals and Regional Development Strategies, actors formulated a vision that faded away the dominant economic focus in the previous round. The vision was:

> "to realize a GDP Corridor as a sustainable, reliable, and equitable corridor that enhances the balance of natural resources and environmental sustainability, alleviates the disparity between regions, and improves the development of infrastructures for natural disaster measures" (MPWH, 2016.B-24).

Second, the mode of governance shifted from hierarchical to a mix of top-down, bottom-up, and collaborative governance in an account of the process management and process design that guided the interaction process of actors. As a top-down approach, RIDA was responsible for designing the IIDP Program, appointing consultants, and coordinating the execution of the program. Through process management, RIDA selected and invited various regional/local actors with different resources to be involved in the planning process of the corridor development. The regional/local actors became involved in shaping the GDP's goals and regional development strategies along with RIDA and experts, which displays the use of bottom-up and collaborative governance.

Through process design, RIDA facilitated their interactions within a new platform of Focus Group Discussions. RIDA also designed IIDP procedure where the team of IIDP experts needed to conduct surveys and fieldwork, allowing those experts to meet the regional government and introduce SDR concept informally. This opportunity built an early connection required among actors. The procedure in IIDP also included the congregation between RIDA, a team of experts, and the selected regional/local actors. The objectives of regional actors were incorporated into corridor plans, and objections against its delineation were somewhat accommodated by allowing measures outside the corridor area to be discussed and negotiated.

Third, due to the shift in governance mode, the constellation of actors widened as the process to produce IIDP's output was joined by experts, provincial and local governments, and regional non-government actors representing different sustainability dimensions. The involvement of Regional Planning Agencies (RPA) of Bali and RPAs of seven GDP regencies was essential because of their authority in managing regions' environmental planning, natural resources, human development, social welfare, and economy, as projected upon their organization structures. However, the network was still missing experts from the social field, as were agencies with specific authorities in the environmental/social sector (i.e., Regional Environmental Agency, Regional Environmental and Forestry Agencies, Regional Disaster Management Agencies, and Regional Social Agency). Likewise, there was also an absence of environmental/social NGOs as non-governmental actors that could have infused the GDP's planning with environmental/social points of view.

The fourth factor, the use of knowledge, was of core importance at this stage due to the role of the data-driven and fact-based sustainability analysis conducted by the consultants (RIDA, 2016). In formulating the ultimate goals and the regional development strategies, various forms of knowledge were used, e.g., ecological analyses including the corridor's landscape, climate, hydrology, land-use, waste system, and disaster-prone areas; social analyses of demography, human development index, access to basic infrastructures; and economic analyses, including the identification of strategic nodes, transport infrastructure, energy and electricity, GRDP, local commodities, and Gini Index Ratio.

Fifth, the institutional setting shifted as a new planning process started within IIDP with FGDs as actors' coordination platforms. RIDA adapted to the existing bidding procedure for experts to conduct thorough environmental, social, and economic assessments, surveys, and FGDs (that require the involvement of regional/local actors) and document the progress of their activities. RIDA continued the planning scope of round one, stating that the corridor should address the environmental carrying and support capacities of regions (RIDA, 2016, p.1), which also led to the sharing of the GDP's sustainability vision in round two. Thus, RIDA succeeded in guiding the actors' interactions, coordination, and negotiations within the corridor development idea and ensuring experts to deliver output in accordance with IIDP TOR.

To sum up the governance factors in this round, the process management and process design of factors in round two allowed the corridor concept as the leading discussions of actors in FGDs (as directed by SDR vision) where more diverse actors were present. FGDFGDs, as the formal face-to-face coordination platform among actors, contributed to the discussion of a sustainable corridor, as actors shared information regarding the sustainability challenges of regions and brainstormed ideas for suitable infrastructure programs to address the challenges. Within such interactions, sustainability knowledge (local, tacit, and codified) enriched the decision-making process of the GDP's ultimate goals and regional development strategies. As a result, environmental measures received more attention, particularly on establishing a healthy living environment in urbanized areas and settlements. However, the omission of actors coming from non-public actors shows how the focus of the implemented regional development strategies was on what public infrastructure could do to address the local challenges, not so much on enhancing the human capital's quality and innovation activities.

5.3. Round three: GDP's Program Prioritization and Implementation Round (February 2016-December 2019)

In this prioritization and implementation round, actors congregated to determine the priority of programs to be implemented.

5.3.1 Interaction process of round three

The section analyzes the coordination of actors within Pre-Regional Consultation (Pre-RC) Forum. Pre-RC was an existing annual forum used by MPWH to assemble all MPWH agencies and provincial government actors to discuss the strategic issues and consolidate priority programs of the region to be implemented in the following year (N+1). Thus, Pre-RC meeting in 2016 determined the implemented programs for 2017, and Pre-RC meeting in 2017 defined the implemented programs for 2018, and so on. Since 2016, following the establishment of SDR concept, this forum has been utilized by RIDA to discuss programs related to corridor development. Therefore, this study analyzed the Pre-RCs held in February 2016, March 2017, and February 2018 to analyze the implemented programs (outcomes) from 2017 to 2019. In 2019, the author collected the data for this study.

The provincial government was represented by Regional Planning Agency (RPA) of Bali, and Regional Public Work Agency (RPWA) of Bali. The reason for the involvement of these agencies was because RPA was the one with direct authority to coordinate the planning among various regional agencies and the authority to design the spatial planning at the regional level of regions; while the involvement of RPWA was due to their close alliance with MPWH to implement public work infrastructures in the region. The participation of the national public work programs and the regional public work programs ensured coordination between them. The involvement of these regional actors was described by Respondent 8.

> "When discussing Regional Consultation (Pre-RC), we invited those representing the province and the regencies. We prioritized the invitation to Regional Planning Agency (RPA) because they governed the regions. So, we attempted to synchronize the development vision with the regions. Usually, there was the Regional Public Work Agency (RPWA) and other related regional agencies, but it is limited to those connected to the MPWH. The hope of having those representatives was that the programs we proposed could be executed, in line with the regional vision, and that the regional government could also synchronize its program with ours. With such engagements, the expected outcomes could be optimized" - Respondent 8.

The importance of Pre-RC was confirmed by Respondents 1 and 35, who described that Pre-RC allowed the meeting up between the top-down and bottom-up mechanisms and made it possible for the central and regional actors to come together to discuss and negotiate infrastructure programs which were executed in the following year after Pre-RC meeting took place (N+1). Respondent 6 added that the discussions of the infrastructure programs within Pre-RC came from the proposed programs formulated in the previous round.

> “The key is in the regional consultation….. We invited regional institutions, the regional spatial planning agency, and others. So, the channeling of top-down and bottom-up met up” - Respondent #1.

> “In the regional consultation, the bottom line is that we, as the ministry that plans MPWH infrastructure development, need confirmation on programs that we formulated. Programs that have gone through various discussion stages many times beforehand'- Respondent #35.

> “Every year, the output from the Master Plan Development Plan becomes the base for the pre-regional consultation of the following year or N+1 in MPWH” - Correspondent #6.

Each year, Pre-RC started with RIDA’s adaptation of the platform for its annual theme, time, location, the flow of activities, and expected output, done by Center for Programming and Evaluation of Integrated Infrastructure of RIDA. The primary regional actors were Provincial Regional Planning Agency (RPA) and Provincial Regional Public Works Agency (RPWA). RPWA was involved because of its role as the coordinator of regional sectoral agencies and its authority to direct regional planning. It integrated the planning and implementation of regional public work infrastructures.

Regional governments played an essential role in this round, as every program that would be implemented should meet a set of four Readiness Criteria before it could be funded by the state funding, delivered by the regional government. The four readiness criteria were: 1) Feasibility Study of the program (including socio-economic impact of the program); 2) Environmental impact assessment document; 3) Detailed Engineering Design; 4) Land acquisition. The environmental impact assessment document mentioned in point 2 comprised of Environmental Impacts Assessment (AMDAL) used for large-scale/complex/large impact programs; or Environmental Management Effort-Environmental Monitoring Effort (UKL-UPL) for small-scale programs with non-significant impact (see Annex 6 and 7).

Amdal comprised the physical analysis of regions (land structure, geology, and landscape), chemical analysis (of land, water, and air pollutions), biological analysis (impacts on flora and fauna), and social analysis (impact on people’s welfare, economy, culture, and health). UKL-UPL included the type and volume of produced waste, the negative consequences resulting from the program, and any changes that could alter the physical condition of the regions. These documents aimed to safeguard the environmental dimension, avoid societal conflicts, and uphold sustainable development principles (Bospedia, 2018). The importance of such assessments was confirmed by Respondents 35 and 12.

> "Every infrastructure development would have an impact on the environment. To minimize its negative impact, there is a requirement to formulate environmental documents. There are different kinds, AMDAL and UKL/UPL, as the readiness criteria for infrastructure development" - Respondent 35.

> "Within society, many aspects are involved, like cultures and environments. So, the assessment for the environmental document, or any kind we do, has a purpose. One is to identify the benefits of the program we planned. Two, to make the people comprehend the different paradigms. So, if they reject the program, we make them understand the purpose that we aimed for. Third, to make them aware of its impact" -Correspondent 12.

The fulfillment of the readiness criteria projected the commitment of regional actors to support the implementation of programs, as the delivery of readiness criteria was time-consuming. For instance, an environmental assessment document must be prepared and approved by AMDAL commission in Ministry of Forestry and Environment or Regional Environmental Agency. In addition, the criteria for land acquisition require a solid funding proposal.

There were three sessions held within every Pre-RC. They were the plenary, panel, and desk sessions. In the plenary session, MPWH Secretary-General directed all Pre-RC actors to focus on programs they should prioritize within Pre-RC. In the panel session, led by RIDA directors and RPA/RPWA heads, each party presented its development priorities. Afterward, the actors were divided into two parallel desks led by RIDA heads of departments. One desk discussed the proposed infrastructure programs for water resources and road development, and the other desk discussed the infrastructure of settlements and public housing provisions. The last session (desk session) included negotiations on each proposed program's timeline to fulfill the Readiness Criteria, prioritizing compliant programs as the strategic programs for the following year. Additionally, at the end of the desk session, actors were expected to deliver a list of priority programs called the baseline list. As mentioned, each appointed program had to meet all readiness criteria described by Respondents 35 and 3.

> "In a desk session, RIDA and provincial government and other MPWH sectors sat together and discussed each of the programs individually……. We confirmed the completeness of the readiness criteria and the preparedness of every program" - Respondent 35.

> "The regional consultation was held every year. In regional consultation, we discussed the programs ready to be executed the following year. The requirement was that the program had fulfilled its readiness criteria. It had the feasibility study, the environmental

> documents such as the environmental impact analysis document, or, if it was within a conservation area, it should have the Permit of Forest Area Use, and there should be the land for it because when it is ready to be built, the land should be available, and there should be the Detailed Engineering Design (DED). The document of the DED must also be discussed in the regional consultation, so everything had to be ready for the program's execution" - Respondent 3.

> "We studied the readiness criteria of each program and translated those that could be implemented in the first year, the second year, the third year, by looking at its readiness criteria …….When a program was not ready, but the readiness criteria would be prepared later, like DED and FS, in N+1, then the program was categorized as a stock program. These will come into existence in the coming year(s). " - Respondent 35.

Programs appointed in Pre-RC were picked by negotiations during the desk session, instead of the majority vote of actors. The negotiations were based upon the urgency of the program (whether it addressed the strategic sustainability issues of the regions, or if it was in line with the national/regional interests). Respondent 35 stated that Pre-RC did not rule out the possibility of the regional actors coming in with their political agenda (commonly based upon the political promises of mayors/governors). Respondent 35 added that there were cases where regional actors came to propose new programs not indicated in the previous round. According to respondent 35, programs would be accepted in this situation should the regional government provide valid objectives for their urgencies, along with the availability of state funding. He added that any biased programs would be rejected without objective reasoning.

> "It was possible for a political drive in the region, the political promises of the regional government as they were nominated or becoming the ruler in the region. However, we look at it in a way that when they give certain promises, there should be reasoning. Because maybe, they saw areas that were lacking in certain infrastructure investments, so they raised them as political promises. In my opinion, not all of these (proposed programs) were bad. We could do a crosscheck (assessment) on the programs that became the political issue as they proposed it. Sometimes, they would propose it to us, and we checked. We crosschecked together if the justifications were fit or not..... We controlled it through reasonings if the program was appropriate or not" - Respondent 35.

> "So, in a hierarchy, the proposed programs from RIDA were prioritized, as they had been discussed throughout the previous

> planning process that involved the regional government and sectors… For the new proposed program (by regional actors), we often could not oversee it because they brought it up during the desk session. Perhaps due to political reasons. It is okay. They could propose new programs. But again, we need to look at the capacity of our budget. Not everything can be catered"- Respondent 35.

The analysis of this study shows that through the opportunity for face-to-face interaction within Pre-RC, actors enacted their strategies and looked for ways to arrive at agreements. This enhanced the acceptance of the idea of the GDP Corridor by the majority of the regional actors of government and increased their trust in the central government's intention to bring positive changes to regions. These expressions were shared by Respondents 10 and 12.

> "SDR was born as a tool for synergy in planning so that it can be more integrated, to ensure the synchronization can deliver a more efficient work (implementation of programs). Therefore, the relationship between the national and regional governments' plans can be accomplished within one target to reach the outcomes as fast as possible"- Respondent #10.

> "Even though we had the Island Master Plan of Bali, why did they (RIDA) come up with the GDP corridor? Of course, there were strategic issues in Bali that needed to be secured by the national government, like the logistic path that goes from Gilimanuk to Padangbai. So, the corridor did not only connect (different parts of) Bali but also Java and Bali, and Bali with West Nusa Tenggara. The corridor also passes through the southern areas nationally known as National Strategic Urbanized Area of Sarbagita. Therefore, the strategic interests of central government needed to be secure in Bali. That was why SDR was present" - Respondent 12.

Within this round, not only did the regional government show their growing acceptance of the GDP Corridor, but they also mentioned the positive impact of SDR concept on the integrations between MPWH sectoral programs initially envisioned by MPWH Minister. Such impact was shared by Respondents 10 and 14. Nevertheless, some prejudiced regional respondents remained skeptical that sustainability was unobtainable without an amendment of the GDP's delineation to include the northern lagging regions.

> "From the target of SDR, the integration (between MPWH sectors) had improved. Sectors became familiar with what they needed to do"- Respondent 10.

> "Based on my perception, I saw it (SDR) as a concept that mapped the regions (potentials). It became a helping tool that accelerated the end goal of development, which can, of course, prosper the society"- Respondent 14.

> "Nevertheless, the GDP Corridor is situated in Bali. The GDP did not incorporate all regions in Bali; therefore, we still connect (plan) the development plan of Bali as a unity' - Respondent 12.

> "When formulating the regional mid-term development plan, we accommodated the vision and mission of our governor by looking at the potential and the issues of the regions. Therefore, we customized our planning (the regional spatial plan). It may not be specific that the GDP Corridor became our main guideline. However, the corridor idea was considered as part of our planning. We did not accommodate the development of the GDP regions entirely. Not like that. But only some parts of it. Thus, we are looking at the corridor in a positive way. It is just that (the issue is) the corridor, only highlighting the southern regions" - Respondent 14.

5.3.2 Sustainability outcomes of round three

The outcomes of this round were the implementation programs selected through Pre-RC forums.

Figure 12 visualizes the ultimate goals of the GDP Corridor. Some have been implemented, primarily road works in all seven cities/regencies to support the tourism and logistic flows between the western and eastern regions; Sidan Dam, which provides water for tourism facilities; and Smart Travelers' Plaza in Rambut Siwi as the corridor's incubation area that supports the fisheries activity in Jembrana Regency.

More economic programs were also approved, for example, through the development of traditional agro-markets in Tabanan and Gianyar Regencies (famous for their agriculture production) and the revitalization of tourism areas in Gianyar, Karangasem, Tabanan, and Jembrana. In addition, and somewhat contradicting the concept of an east-west corridor, the implementation plans included measures in the North (Figure 15) through the development of the Mengwitani-Singaraja road connecting Sarbagita Metropolitan Regions (South) with the northern regions. These latter measures blunted the sharp edges of the North-South divide and mitigated the economic bias while preserving the core principles of an economic transport corridor.

The selected MPWH programs also included environmental and social measures along the corridor. Some notable programs were Suwung Landfill revitalization to address the waste issue in Sarbagita; Ngurah Rai Underpass in the area with the

most traffic in Denpasar; the rehabilitation of Nusa Dua Beach; and measures against natural disasters such as coastal safeguards, flood-control infrastructure, urbanized drainage system, beach conservation, and sediment/lava eruption- and flood-control programs.

The social measures received considerably more attention than in Rounds 1 and 2. They encompassed various basic infrastructure provisions (community-based clean water, wastewater treatment, sewage treatment plant, and agropolitan rural settlements infrastructure), and programs that addressed the poverty issue (quality improvement of slums, public housing development, home improvement aid, and the establishment/renovation of schools). However, issues related to land conversions and traffic congestion remained problematic in the corridor, together with the poverty and inequality/disparity gap issues that can be seen between the rich southern regions and the poorer regions in the West, North, and Eastern parts of Bali.

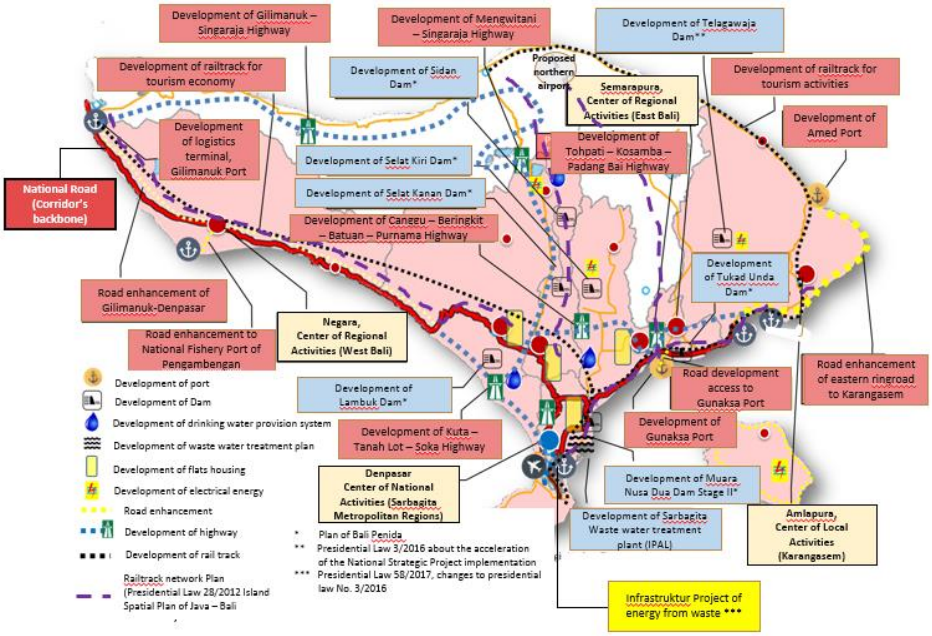


Figure 12. Ultimate Goal of Infrastructure Development
Source: MPWH, 2016a

5.3.3 Governance factors of round three

In this section, the governance setting of the GDP Corridor's third development round is described.

Firstly, the vision in this third round retained its focus on transforming the GDP as a transportation corridor as envisioned in the first round and the additional environmental aim of the second round. In this round, the decision-making process in Pre-RC was also guided by central government's recent commitment to the UN's New Urban Agenda, an international agenda to apply Sustainable Development Goals so that cities are safe, inclusive, resilient, and sustainable (RIDA, 2016c). The New Urban Agenda offered an additional vision, strengthening the emphasis on sustainability.

Secondly, the mix of hierarchical, bottom-up, and collaborative governance persisted in this round as RIDA set up the process management and process design for the Pre-Regional Consultation (Pre RC) forum. Hierarchically, RIDA once again managed the scene where other actors could contribute to the corridor development. With process management, RIDA continued the involvement of Regional Planning Agency and Regional Public Work Agency in the forum, who were known for their local knowledge and implementation capacities in regions. The process design allowed the two provincial actors to interact to discuss and negotiate programs that would be implemented and, at the same time, define actors' roles in Pre-RCs, including the regional actors' role in delivering five Readiness Criteria. Discussions and compromises among actors were part of the planning process before priority programs were adopted, which projects bottom-up and collaborative governance.

Thirdly, regarding the constellation of actors, participation in Pre-RC forum was more restricted than in round two. Participation was limited to officials from MPWH, RPA, and RPWAs, given their authority to decide upon implementation programs and their practical and local knowledge of the regions. In Pre-RC, regional governments' actors proposed strategic programs, that were (partially) outside the initial vision of the corridor. Environmental/social experts and local actors were not directly involved, although they might be involved in projects aimed at meeting the readiness criteria.

Fourthly, knowledge regarding the environmental and social dimensions of sustainability was used to meet the Readiness Criteria of the Environmental impact assessment required, for instance, knowledge on how road construction might lead to the loss of vegetation and topsoil from land cleaning, noise, and air emissions, and visual intrusion of infrastructure into natural and cultural landscapes. Feasibility studies required the means to identify potential socio-economic and cultural impacts of land acquisition and/or resettlement (MPWH, 2017). Within Pre-RC panel and desk sessions, the provincial governments of Bali (represented by RPA and RPWA) used their local and tacit knowledge to discuss strategic programs necessary to address regions' environmental, social, and economic issues.

Fifthly, the process in this round took place in an institutionalized setting, with an existing planning process, platform, procedures, and rules. The planning process to approve the implementation - of micro programs, is detailed in RIDA's annual Pre-RC guidelines. Pre-RC, as a coordination platform, following the adoption of the New Urban Agenda, had procedures in which regional/local actors, with their environmental and social perspectives, revealed their strategies and discussed proposals in the panel session and desk session of Pre-RC. The planning process also includes rules that require programs in the corridor to adhere to the Readiness Criteria (MPWH, 2017b). Pre-RC's annual themes set by RIDA also influenced the scope of probable proposals. These themes highlighted the social aspects of poverty, disparity, and equality, thereby offering an additional reason for round three to push the social dimension more than rounds one and two.

To sum up the governance factors in this round, RIDA set up the process management and process design to congregate actors and direct their interactions within the Pe-RC forum, allowing the use of top-down, bottom-up, and collaborative governance. This time, the provincial government received more roles as their local and tacit knowledge capacities were needed in the sustainability discussions during the panel session and negotiations during the desk sessions, together with their capacities to implement the readiness criteria (as part of Pre-RC rules). Such discussions and negotiations were guided by sustainability themes of Pre-RC (that were in line with New Urban Agendas and the GDP's Ultimate goals developed in the second round). While regional actors were involved in the decision-making process of prioritized programs, and experts were included in the environmental and social assessments of readiness criteria, the planning process of Pre-RC itself was not so inclusive. Similar to the first round, non-government actors, including local communities, academics, NGOs, and private societal, were absent as government actors determined the region's infrastructure projects. This circumstance hindered the sustainability of the corridor, in which sustainability measures needed to be enriched with long-term programs, and soft-infrastructure programs that can complement the implemented hard-infrastructure programs, conducted by non-government actors (who hold such capacities).

5.4. Conclusion of the GDP's Governance

In conclusion, the GDP Corridor case study analysis demonstrates a gradual shift from a predominantly economic-focused transport corridor towards a more balanced development encompassing environmental, social, and economic dimensions. This shift can be attributed to several key factors.

The first factor is the establishment of Regional Infrastructure Development Agency (RIDA) in the early development stage, aimed to integrate and synchronize the policies and strategies of different MPWH sectoral units. RIDA's inclusion of

personnel from various sectors allowed for an integrated approach and incorporation of diverse perspectives toward the planning of regions. This led to macro conceptualization of SDR corridors' principles that involved sustainability ambition, shaping each SDR corridor's planning scope to address its environmental, social, and economic sustainability challenges.

The second factor is the changing of governance factors' constellation across various rounds, favoring actors' collaboration within an interaction process to enhance sustainability measures. The changes encompassed shifts in vision, modes of governance, involvement of sustainability representatives, utilization of sustainability knowledge, and transformation of the institutional setting. An overview of how the corridor governance factors shifted throughout different rounds of corridor development can be explained as follows.

Initially, the GDP Corridor primarily focused on its role as a transport corridor but was also complemented by sustainability goals due to its sustainability vision. However, during the Integrated Infrastructure Development Plan (IIDP) execution in the second planning round, sustainability ideas were strengthened within a new GDP vision. This shift was driven by a national sustainability mandate and the active participation of experts and regional/local sustainability representatives, who contributed their sustainability knowledge to various discussions and negotiations. In the third round, the sustainable corridor vision was further translated into the annual Pre-Regional Consultation (Pre-RC) themes, specifically addressing Indonesia's sustainable development goals. This further enhanced environmental and social aspects in the subsequent planning process.

The third factor is the switch in the governance modes from a top-down approach to one that embraced the active participation and capacities of regional/local actors in envisioning the corridor's future. Such modes strengthened sustainability vision, which was made possible due to Process management and process design as they activated a collaborative setting. Process management successfully extended the corridor's network to multiple actors, while process design enabled adaptation to existing procedures, rules, and platforms, creating opportunities for meaningful participation and sustainability knowledge exchange among stakeholders to push for contextual planning and the integration of the three sustainability pillars.

The fourth factor is the incorporation of sustainability knowledge in the decision-making process itself, which evolved throughout the GDP Corridor's development. Initially, decision-making heavily relied on codified economic knowledge from technical planners. However, in subsequent rounds, the scope expanded to encompass a more comprehensive range of sustainability knowledge, including codified, tacit, and local knowledge, facilitated through the involvement of experts and regional sustainability representatives. This transition allowed for a more

nuanced and holistic approach to addressing sustainability issues within the corridor.

The fifth factor is the changes in governance mechanisms and the establishment of coordination platforms that played important roles in addressing the complexity of actors' interaction process. Initially, GDP's delineation had been a contentious issue, particularly regarding the exclusion of the lagging northern region. Regional/local actors perceived the corridor's delineation as a problem and emphasized the importance of balanced development and inclusion of the northern regions in the corridor's planning. Through enhanced communication, information sharing, and opportunities for discussion and negotiation of programs between central and regional actors, their understanding and acceptance of the corridor improved. The concern raised by these actors was catered to within the GDP's regional development strategies, which included programs to connect the northern regions with the more affluent southern regions. This attempt aimed to open up the secluded regions and provide better accessibility for various activities.

While the collaborative mechanism promoted the involvement of more sustainability actors, there were limitations to sustainability outcomes as the inclusiveness of the planning process was limited and overlooked the involvement of regional/local non-public innovation actors. This oversight occurs due to a tendency to rely primarily on established public sector entities and traditional planning approaches. By neglecting the involvement of non-public actors such as local communities, small businesses, research institutions, and non-governmental organizations, valuable sources of innovation and local knowledge were left untapped. As a result, planned programs mainly focused on what public actors could deliver, such as the development of roads, housing, dams, and settlements' infrastructure, with less support given to alternative technologies, practices, or innovative solutions that could foster regional/local creativity.

In the initial planning process of the GDP Corridor, a critical factor often overlooked was the contextual factors of the regions involved. The top-down approach to delineation, which primarily focused on economic considerations, led to the conception of the corridor that set aside the unique contextual factors present in each region, as regional and local sustainability actors were excluded in the planning process. This omission had significant implications for the corridor's sustainability. Different regions had distinct environmental, social, and economic challenges and opportunities that required tailored solutions. The failure to consider these contextual factors from the outset resulted in a one-size-fits-all approach during the initial planning process. Consequently, the corridor faced difficulties in achieving a comprehensive and nuanced approach to sustainable development, particularly in its early stages. The GDP Corridor's delineation prioritized regions with abundant growth nodes. It overlooked the sociocultural and historical linkage between regions, leading to the exclusion of the lagging northern

regions despite their sociocultural linkage with other GDP regions, which exacerbated the gap between affluent southern regions and the lagging northern ones, leading to a corridor that struggled to address the disparity gap and inequality issue of Bali Island.

Only as the planning process evolved and embraced a more inclusive and collaborative approach did contextual factors begin to receive attention. Nevertheless, while subsequent rounds of planning and development efforts were made to incorporate sustainability goals driven by a national sustainability mandate and the involvement of experts and regional/local sustainability representatives, the initial imbalance created by the top-down delineation remained a challenge.

In addition, the planning of the corridors had a conventional focus on traditional infrastructure development, which tends to prioritize established methods and technologies, but not so much on the rapid advancements offered by green technologies in the transportation sector. This circumstance hinders the GDP Corridor's potential to optimally reduce environmental impacts, improve energy efficiency, and promote sustainable mobility in regions.

To close this chapter, the analysis of the GDP Corridor governance underscores the importance of a holistic and inclusive approach to sustainable transport corridor development. The shift towards a more balanced development was driven by key factors such as sustainability vision, collaboration of stakeholders with different capacities, the incorporation of sustainability knowledge, and the presence of rules, procedures, and platforms that favor sustainability. These factors facilitated contextual meso and micro planning that enforce more balanced environmental, social, and economic outcomes. While those factors contributed to more balanced sustainability dimensions, the empirical analysis shows limitations within the planning process, such as the lack of involvement of non-public. Regional/local innovation actors and exploration of alternative technologies, that, if managed to be addressed, may help unlock the full potential of the sustainable corridor approach.

CHAPTER 6
SUSTAINABILITY OF THE YOGYAKARTA - SOLO - SEMARANG CORRIDOR

This chapter analyzes the extent to which outcomes are sustainable for the Yogyakarta - Solo - Semarang (YSS) Corridor, as the second case study in this research. It examines the study's dependent variables in order to answer the study's first research question.

The chapter first presents the profile of YSS Corridor, which encompasses the environmental, social, and economic states of YSS regions, using data obtained by the author in 2019 during the study's fieldwork. Following the profile analysis, the study investigates the sustainability outcomes delivered during different stages of YSS Corridor development. It is done by investigating the different types of sustainability measures delivered within different planning processes of corridor development, the issues they addressed/unaddressed, and the proportion of programs within each sustainability dimension. In addition, the analysis includes the availability of funding representing specific sustainability dimensions.

The Yogyakarta - Solo - Semarang corridor, located on the island of Java, Indonesia, is a vital and bustling transportation route - stretching from the historic city of Yogyakarta in the South to Solo/Surakarta City in the East, further North to Semarang City, and Magelang City and Magelang Regency to the West. These prominent regions collectively contribute to the social and economic fabric of the country, in which each possesses a distinctive cultural heritage, which attracts domestic and international visitors seeking to explore Java's history, traditional arts, and culinary offerings. Thus, the corridor stands out for it comprises regions that are deeply rooted in the country's history. Additionally, Tanjung Emas Port also plays a crucial role in facilitating trade and commerce, establishing a vital link between YSS regions and international markets. The corridor, therefore, is pivotal in fostering economic activities, cultural exchanges, and tourism within Java's heartland.

Despite its cultural heritage and economic prowess, the Yogyakarta - Solo - Semarang Corridor faces the imperative need to enhance regional connectivity and improve its transportation infrastructure. Simultaneously, regions in the corridor face challenges stemming from rapid urbanization and infrastructure development. Concerns over environmental degradation, air pollution, and the repercussions on local communities underscore the necessity for meticulous planning and implementation of sustainable development.

6.1. YSS Corridor Sustainability Profiles

6.1.1 Overview

The YSS Corridor, commonly known in Indonesian as Koridor Joglosemar, has four major urbanized nodes: Semarang City, Yogyakarta City, Surakarta City, and Magelang City (together with Magelang Regency). Semarang City is situated to the north and is known as the capital city of Central Java Province, with its identity as a trade and services city. Yogyakarta City, situated to the South of the corridor, is the capital City of Special Regions of Yogyakarta Province. The city has gained recognition as a tourist city, with the Sultan as the head of the provincial government. Surakarta City, located on the East of the corridor, is known as one of the main cities in Central Java for trade and services activities. One more node is Magelang City and Magelang Regency, merged as one urbanized node on the West of the corridor.

The YSS Corridor comprises five more regencies besides the four regions mentioned above (See Figure 13). They are parts of the Central Java Province, namely Salatiga City, Semarang Regency, Klaten Regency, and Boyolali Regency. Another region, the Sleman Regency, is in the Special Region of Yogyakarta Province. Central Java Statistics (2020) and Yogyakarta Statistics (2020) noted that the corridor had an overall size of 4.820,340 km2 (4.213,02 km2 in Central Java Province and 607,32 km2 in the Special Regions of Yogyakarta Province) and a population of 8.805.679 people (in 2019). The highest population was in Semarang City, with 1.814.100 million inhabitants, and the least was in Magelang City, with 121.100 inhabitants.

Among the ten regions of the YSS Corridor, Yogyakarta, Surakarta, and Magelang Cities (Ibid.) had the smallest size of regions with the highest densities. Yogyakarta had an area of 32,5 km^2 with 13.154 inhabitants/km2. Surakarta had an area of 44 km^2 with 11.762 inhabitants/km2, and Magelang had an area of 18 km2 with 6726 inhabitants/km2. The YSS population, according to the population projection analysis for 2026 (MPWH, 2016), would rise to 16.189.972 people, and 30% of its residents would inhibit Semarang City, which had the fastest growing population.

Fig 13 Delineation of ten cities/regions within the YSS Corridor
Source: RIDA (2016)

Based on National Spatial Plan of Indonesia, Semarang City and Semarang Regency in Central Java are parts of Kedungsepur Metropolitan Regions (see Fig.14). The two regions are simultaneously designated as a National Activity Center (NAC) and a National Strategic Area. In addition, Yogyakarta City and Surakarta City, in Special Regions of Yogyakarta Province, function as the National Activity Centers of Indonesia. Five other cities/regencies of Boyolali, Klaten, Salatiga, Magelang, and Sleman are inducted as the Regional Activity Centers.

YSS Corridor activities are dominated by the tourism sector (see figure 15 and 16), as found in the presence of four National Tourism Strategic Areas and the increased number of foreign and domestic tourists in Central Java and the Special Regions of Yogyakarta. Government Regulation No.50 Year 2011, regarding the National Tourism Development Master Plan, appointed four tourism areas within the YSS Corridor as the National Tourism Strategic Areas (NTSA). Those NTSAs are: 1) Borobudur and its surroundings; 2) Prambanan - Kalasan and its surroundings; 3) Kota Yogyakarta and its surroundings; and 4) Merbabu-Merapi.

Borobudur and Prambanan-Kalasan NTSAs are situated in Central Java Province. Both were inscribed as World Heritage Sites by UNESCO in the category of cultural landscapes. On the other hand, Yogyakarta City NTSA and Merbabu-Merapi NTSA are nationally and internationally recognized as urbanized areas with vibrant man-made cultures. Yogyakarta City has various tourism destinations, including Sultan Palace and Beringharjo traditional market (a center for Batik art acknowledged by UNESCO as an intangible cultural heritage of humanity). The city is also known as the center of leather puppets and Javanese culinary. The last NTSA, on the other hand, is situated in the Special Regions of Yogyakarta and functions as the rehabilitation center and the national protected area (promoted by UNESCO as a biosphere reserve).

Central Java Statistics (2020) shows how many tourists visited Central Java Province. It was estimated that 388.143 foreign tourists visited the province in 2013, rising to 677.168 people in 2018. Meanwhile, the number of domestic tourists rose from 29.430.609 in 2013 to 48.943.607 visitors in 2018. The number of foreign visitors thus increased by 74% within the last five years, while the number of domestic visitors increased by 66%.

Apart from tourism, the YSS Corridor is also vibrant with agricultural activities. According to Regional Spatial Plan of Java (RIDA, 2016), the development of food crop agricultural centers, supported by the presence of the processing industry and food crop product service industries, was focused in Magelang Regency, Boyolali Regency, Klaten Regency, Semarang Regency, Semarang City, and Sleman Regency. In addition, these six regions, together with Semarang City and Surakarta City, are also directed at developing the fishery sector (fisheries product and processing

industry), with Boyolali, Magelang, and Sleman appointed as the center of Minapolitan Regions (Ibid.)

There are several transportation hubs within the YSS Corridor to support the sectoral activities mentioned above (see Figure 14). They are International Airport of Adi Sucipto in Sleman Regency (with a capacity of 1.2 million passengers/year), Ahmad Yani Airport in Semarang City (with a capacity of 1.782.453 passengers/year), and Adi Sumarmo Airport in Surakarta City (with a capacity of 1.5 million passengers/year). The YSS Corridor City only has one port in Tanjung Emas, situated in Semarang City, that functions as a passenger port and for cargos.

The operation of Adi Sucipto Airport itself was beyond its usual capacity at 8.4 million passengers/per year (Bisnis, 2019). Consequently, a new airport called the International Airport of Yogyakarta was developed in Kulonprogo. While Kulonprogo is situated outside the YSS Corridor, its presence has a 14 million passengers/year capacity. It caters to the tourism movements to the South (Sleman Regency and Yogyakarta City) and the West of the corridor (Magelang City and Magelang Regency). Additionally, the connectivity in the YSS corridor was strengthened by seven train stations in Poncol, Tawang, Solo Jebres, Solo Balapan, Klaten Station, Tugu Yogyakarta, and Lempuyangan. Combined, these air, land, and sea transportation hubs function as the corridor gateway that spreads on the North, East, and South of the corridor.

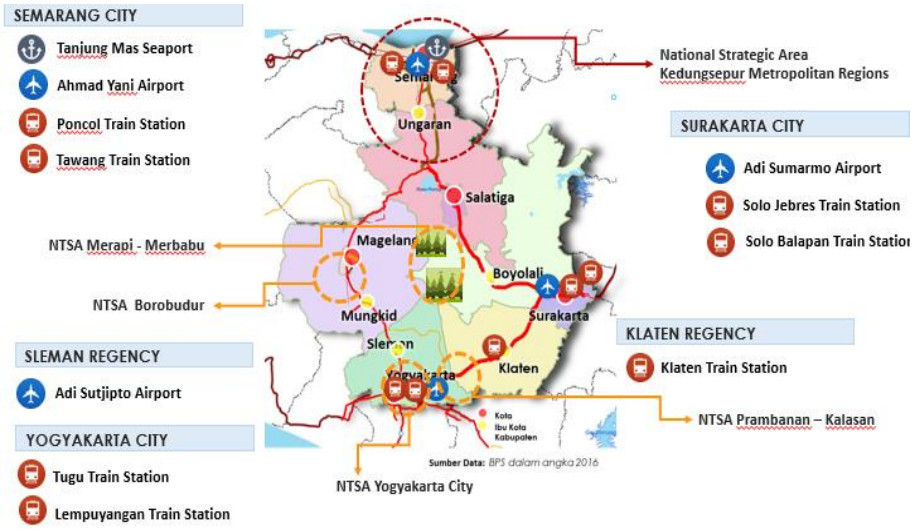


Fig 14. National Strategic Areas and transportation hubs in the YSS Corridor
Source: MPWH (2016b)

Fig 15. Tourism destinations within the YSS Corridor
Source: Author (photos retrieved from google images)

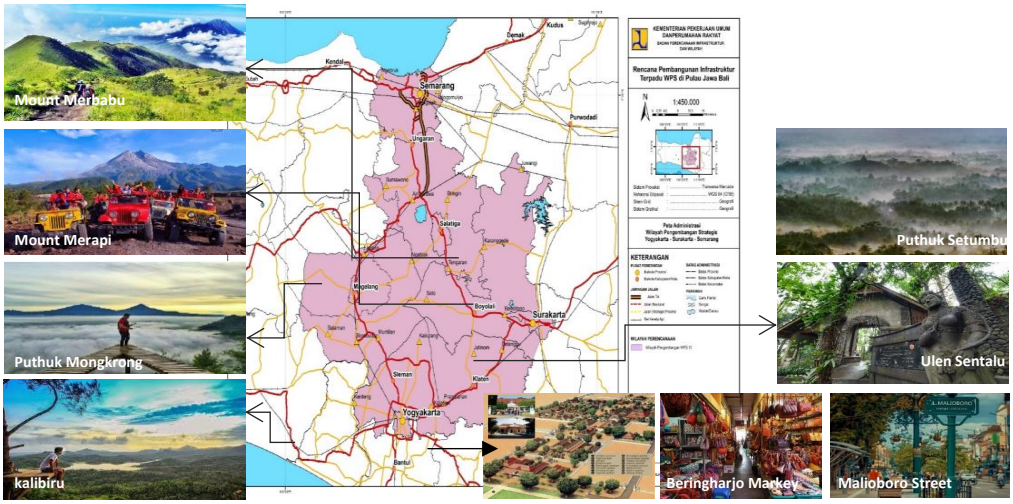


Fig 16. Tourism destinations within the YSS Corridor
Source: Author (pictures retrieved from google images)

YSS's environmental profile

The YSS corridor has regions with different identities: Semarang City as a trading and industrial city, Yogyakarta City as a tourism city, and Surakarta City as a service city. Other regions, such as Klaten, Magelang, Boyolali, Sleman, and Semarang Regencies, are known for their agricultural activities.

Central Java itself is one of the leading producers of crops that supported national food security for five years in a row from 2014 to 2018 (MPWH, 2016). Central Java's second largest sectors contributing to its GRDP were the agriculture, forestry, and fisheries sectors, followed by the manufacturing industry (Central Java Statistics, 2019). Thus, the availability of land (for farming purposes) became crucial to support agricultural productivity. Nevertheless, the growing populations, urbanization, and rising demand for land settlements, infrastructure, and industries have been threatening the presence of agricultural lands. A combination of data taken from Central Java Statistics and Special Regions of Yogyakarta Statistics (see Table 11) displays that the role of Java, as one of the leading producers of paddy crops, is threatened by the declining paddy fields in all regions in the corridor. Between 2015 and 2019, the top four rice crop producers of Klaten, Magelang, Boyolali, and Semarang Regencies (all located in Central Java) lost most of their paddy fields, in which the worst conditions found in Magelang and Semarang Regencies. The circumstance is due to a turnover of the land functioning from paddy fields into non-agriculture land, leading to decreased soil absorption capacity.

Moreover, the land conversion issue will likely be fastened by a few infrastructure projects in the corridor. First, by a highway that connects Yogyakarta City with Surakarta City. It is planned on the eastern side of the corridor. Second, a highway that links Yogyakarta City with Bawen in Semarang Regency, situated on the western part of the corridor. Both highways are planned to cater to logistics movements and link the tourism nodes in the corridor for a more efficient travel time, thus expected to stimulate the growth of regions (Suara Merdeka, 2019). The Yogyakarta - Bawen highway is planned with a length of 67.6 km which 73% of the project will pass through the Magelang Regency (Detik, 2020), which has the second-largest paddy field land and is currently suffering from many land conversion issues.

The same circumstance can be applied to the Yogyakarta- Solo Highway, with a size of 96,574, comprising the Sleman Regency, Klaten Regency, Boyolali Regency (all in YSS Corridor), and Karanganyar Regency, Bantul Regency, and Kulonprogo Regency and Purworejo Regency (Not part of the corridor). Tribun Jogja (2020) stated that the highway project would predominantly require land acquisition in Klaten Regency, the region with the most extensive rice field land in the YSS Corridor. The concern regarding this issue was shared by Respondents #23 and #29:

> "One of the issues is Solo- Yogya highway because it is a very fertile (soil) corridor, it will affect the size of agriculture fields because so many of them will get the impact from that highway….The corridor of Solo - Yogya has Klaten Regency and Boyolali Regency, the big food barns in Central Java, and the Bawen - Yogya is the same; there are many rice fields" - Respondent 23.

"Yogyakarta - Solo will pass through areas that are supposed to be for LP2B (Sustainable agriculture land program); one of them is Klaten Regency and its surroundings, which is a food barn. It does not only supply (crops) to their own area but also to Yogyakarta and Central Java Provinces. So there will be an impact. The highways will trigger more development, and sometimes there is no anticipation. Secondly, the development of highways will also exploit natural resources. Making a highway required the filling soil, and it is going to need the iron and cement" - Respondent 29

City/ Municipality	Paddy Field (in Ha)		Production of paddy (ton)		Non-Paddy Field (in Ha)		Production of non-paddy field (ton)	
	2015	2019	2015	2019	2015	2019	2015	2019
Semarang City	6.817	4207	42.555	22.386	171	-	400	-
Semarang Reg.	41.281	27.643	263.313	150.815	434	1.330	1.823	5.073
Salatiga	1.354	690	9.035	3.946	-	-	-	-
Surakarta	195	45	1.352	288	11	-	26	-
Magelang City	525	163	2.946	968	-	-	-	-
Magelang Reg.	59.084	38.973	364.198	210.268	-	-	-	-
Boyolali	48.950	46.751	279.253	269.955	3.026	2.503	8.444	8736
Klaten	66.472	62.115	425.181	358.638	74	10	441	45
Yogyakarta City	62	unknown	unknown	Unknown	17	unknown	unknown	unknown
Sleman	21.907	unknown	unknown	unknown	20.771	unknown	unknown	unknown

Table 11. table of paddy and non-paddy fields size and production
Source: Central Java Statistics, 2015-2019 DIY Yogyakarta Statistics, 2015-2019

Another environmental challenge of the YSS Corridor is the processing of waste, as shared by respondents 31 and 27 (see Figure 22). The challenge is most visible in YSS's major cities and tourism destinations, especially in Yogyakarta City, Semarang City, and the surroundings of Borobudur Compound (Magelang Regency). Yogyakarta City has one landfill of Piyungan located in the Bantul Regency as a final waste processing center that receives waste from three regions of the City of Yogyakarta, Sleman Regency, and Bantul Regency (See Fig 21). According to Statistics DIY (2019), this landfill catered waste from 2.079.101 residents living in the three mentioned regions, as well as from the growing tourism in Yogyakarta City, with an overall waste that reached 630-650 tons/day (dprd.diy, 2020).

Similarly, Semarang City (the center of Kedungsepur Metropolitan Regions and the capital of Central Java Province) does not have an adequate waste processing facility to independently process waste produced on a city scale from households, industrial, and trade activities. Semarang Environmental Agency (2017) recorded that the amount of waste produced by the city increased yearly, from 1189 tons in 2012 to 1229 tons in 2014, and 1270 tons in 2016. The waste of Semarang City had been directed to the 46 Ha size of the Jatibarang Landfill. This landfill is a sanitary landfill system. Since 2011, it has processed 20-30% of the waste daily, which is

transformed into organic fertilizers. However, such a method was ineffective to cope with the quantity of waste piling in the landfill. Therefore, in 2018, a plan was to transform the landfill into a Waste Powerplant to produce electrical power for the city. Such method processes waste through the utilization of methane gas in electrical sources (Suara Merdeka,2018).

Additionally, Borobudur Compound is experiencing a common issue. Suara Merdeka (2017) reported that based on their observations, there had been piles of garbage seen along the road spilled on the road on the north side of Borobudur Temple Tourism Park Complex (part of the main route for tourists to enter the temple area). The reason is that not all of the villages surrounding Borobudur have an efficient system for waste management, except the villages of Karangrejo dan Giritengah. Meanwhile, the Borobudur Compound's waste issue has been a longtime problem due to the tourists' malicious behavior. Many tourists left behind their waste, even on the temple itself. Detik News (2011) reported that UNESCO had threatened the government of Indonesia to remove the status of Borobudur from World Heritage Site list should the government of Indonesia could not address the issue. In addition, the waste issue is also affecting Magelang Regency (location of the temple). Currently, Banyu Urip Landfill, the only landfill within the Magelang Regency whose capacity has exceeded, serves not only Magelang Regency alone but also the City of Magelang.

> "We are facing the impact. All these times, the waste was taken by a waste truck and dumped in the landfill in Piyungan, which does not belong to Yogyakarta City. It is in Bantul Regency…. For the past two weeks, the trash in the whole city has not been picked up because the trucks that carry the waste were blocked, and the portal into the landfill was closed by the Bantul residents. They no longer want to receive waste coming from the Yogyakarta people. We, the residents, got confused because our population is only around 400,000. It is not a lot. What is a lot is the tourists" - Respondent 31.

> "Many people are visiting; then we reap the benefit, but the context to maintain and manage the environment regarding the waste has been neglected. Several times we went there, heaps of plastic waste were found in several areas where the management had not managed the waste in the villages" - Respondent 27.

A third environmental challenge is the risk of natural disasters in the whole regions of the YSS. The region is located between three major plate junctions of the Eurasian Plate, Australian Plate, and Pacific Plate, accompanied by two volcanic mountains of Merapi and Selamet. Therefore, the corridor is prone to earthquakes and volcanoes, apart from other types of disasters, including landslides, hurricanes, floods, abrasion, and drought.

In the past, there had been a significant earthquake in the YSS Corridor. The first was in the Special Regions of Yogyakarta Province on May 27th, 2006, with a size of 6.2 Richter scale that caused the death of 170.000 people and damaged 3824 buildings and infrastructures, including Adisucipto Airport and Prambanan Temple. The earthquake also cut the telecommunication line in Yogyakarta city and Bantul Regency. Then, on October 26th, 2006, the corridor experienced another massive disaster due to Merapi Volcano Mountain eruption, which caused the evacuation of 350,000 people and the death of 277 people in Yogyakarta and 109 people in Central Java. It was reported that the mountain experienced smaller eruptions in 2018 and 2020.

In addition to the above threats, Semarang City is vulnerable to high tides, abrasion, drought, typhoons, floods, and landslides. At the same time, Semarang Regency is susceptible to floods and landslides. Boyolali Regency is prone to drought and typhoons, and Surakarta is threatened by flooding. Klaten Regency is subject to landslides, earthquakes, typhoons, and flooding, and Yogyakarta City is vulnerable to earthquakes and volcanic eruptions, as is the Sleman Regency. Lastly, the Magelang Regency is prone to volcanic eruptions and flooding. An example of how infrastructure development in a particular area in the corridor can push the natural disaster in the corridor, such as Bedah Menoreh (situated between Yogyakarta and Magelang), was shared by Respondent #20.

> "At the moment, between Yogya and Magelang, there is Bedah Menoreh, and if infrastructure takes place in it, it will give a burden. Menoreh is prone to landslides. Every year during the rainy season, there are many. With new access to Menorah, in the context of Indonesian development, every new road infrastructure will trigger growth in its surroundings, becoming a burden. During the dry season, there is also a water crisis in that area. When the burden becomes too high, more land became open (for development), increasing the risk of disasters" - Respondent 29.

<u>YSS social profile</u>

The YSS Corridor experiences disparity issues between regions, as seen in the gap between the Human Development Index, the poverty rate, and the education level between the big cities in the YSS Corridor (Semarang City and Yogyakarta City) with the rest of its smaller regions in between. Table 12 below shows that among cities/regions within the YSS Corridor, the two regions of Yogyakarta and Sleman, located in the Yogyakarta Province, had higher Human Development Indexes (HDI) than others. Meanwhile, the position for the third-highest index was occupied by Semarang City, the capital of Central Java Province. The data also shows that regions that experienced the lowest HDI were all situated in Central Java Province. They are the Magelang Regency, Boyolali Regency, Semarang Regency, and Klaten

Regency, situated on the West and the East of the corridor. The average HDI rate in 2018 was 71.12 among all the cities/regions delineated in the corridor. Only the index of Magelang Regency was far beyond the average index due to the low expectancy of birth rate, the expected and the average years of schooling rate, and the annual expenditure rate that shows the social vulnerability of the region.

City/Municipality	Life expectancy at birth	Expected years of schooling	Average years of schooling	Expenditure/ person/ year	Human development index
Semarang City	77,23	15,50	10,51	14.895.000	82.72
Semarang Regency	75,62	12,85	7,88	11.807.000	73.61
Salatiga	77,11	15,00	10,40	15.464.000	82.41
Surakarta	77,11	14,52	10,53	14.528.000	81.46
Magelang City	76,72	13,80	10,31	11.914.000	78.31
Magelang Regency	73,47	12,48	7,57	9.028.000	69.11
Boyolali	75,79	12,16	7,55	12.758.000	73.22
Klaten	76.67	13,13	8,24	11.738.000	74.79
Yogyakarta City	74.45	17,05	11,44	19.698.000	86.11
Sleman	74.69	16,71	10,66	13.886.000	83.42

Table 12. Human Development Index (HDI) and poverty rate by Regency/Municipality in YSS Corridor in 2018
Source: Statistics Central Java and Statistics Yogyakarta, 2019

Apart from the low HDI index, regions of Magelang Regency (West), Klaten Regency (East), and Boyolali Regency (East) had the highest percentage of poor people (see Table 13), with a number of 12.96%, 11.23%, and 10,04% subsequently. At the same time, these three regencies experienced the highest poverty gap. Magelang Regency and Boyolali Regency also had the lowest poverty line compared to the other cities/regencies. The condition contrasts with the YSS Corridor's major cities. Yogyakarta's poverty line was at the highest, followed by Magelang City, Surakarta City, and Semarang City.

Similar to the poverty indexes, regions of Magelang, Klaten, and Boyolali Regencies that experienced the lowest human development index also had an education issue (see Table 14). The worst region with a minimum percentage of people attending college was Magelang Regency, with the most population not completing primary school. The region with the second-lowest percentage of the population attending university was Boyolali Regency, with the highest percentage of people who never attended school, followed by Klaten Regency, which had the second-highest percentage of people who had never attended any education.

Table 16 also projects how the number of people who went to college access in the four regencies was less than half of the numbers attributed to Yogyakarta City, or Semarang City, as the capital cities of the two provinces.

Regions	Poverty gap index 2017	Poverty Severity Index 2017	Poverty line 2017	Number of poor people in 2017	% of poor people in 2017	Poverty gap index 2018	Poverty Severity Index 2018	Poverty line 2018	Number of poor people in 2018	% of poor people in 2018
Semarang City	0,54	0,12	402.297	80.900	4,62	0,58	0,12	427.511	73.600	4,14
Semarang Regency	1,10	0,25	317.935	79.700	7,78	1,51	0,45	341.567	75.700	7,29
Salatiga	0,85	0,21	359.944	9.600	5,07	0,69	0,13	380.856	9.200	9,60
Surakarta	1.87	0,44	448.062	54.900	10,65	1,47	0,35	464.063	47.000	9,08
Magelang City	1.30	0,32	450.908	10.600	8,75	1,07	0,21	476.582	9.600	7,87
Magelang Regency	1,67	0,31	281.237	157.200	12,42	1,55	0,34	298.327	143.400	11,23
Boyolali	1,96	0,53	293.405	116.400	11,96	1,26	0,25	304.575	98.200	10,04
Klaten	2,46	0,61	376.305	165.000	14,15	1,72	0,38	397.447	151.700	12,96
Yogyakarta City	1,58	0,48	423.815	32.200	7,64	1,38	0,20	467.061	29.750	6,98
Sleman	1,23	0,28	351.331	96.750	8,13	0,98	0,34	370.127	92.040	7,65

Table 13. Table of poverty index in the YSS Corridor, 2017-2018
Source: Statistics Central Java and Statistics Yogyakarta, 2019

City/Municipality	Percentage of Population 15 Years of Age and Over by Educational Attainment and Regency/Municipality in Bali Province, 2018					
	Never Attending School	Not Complete Primary School	Primary Education	Lower Secondary Education	Secondary Education and Above	College
Semarang City	2,71	14,33	13,01	16,00	36,25	17,71
Semarang Regency	4,38	17,32	23,22	21,48	25,69	7,91
Salatiga	2,69	7,74	17,48	15.42	39,62	17,06
Surakarta	2,86	7,81	17,24	18,09	37,90	16,10
Magelang City	1,83	7,70	19,52	16,76	38,70	15,49
Magelang Regency	5,47	14,86	36,32	21,16	17,37	4,83
Boyolali	9,47	12,37	24,97	21,20	25,56	6,43
Klaten	8,29	10,84	24,11	17,18	30,66	8,92
Yogyakarta City	unknown	unknown	25,19	20,38	23,44	20,41
Sleman	unknown	unknown	9,06	7.72	8,00	17,20

Table 14. Percentage of the population above 15 years old and the academic access rate by Regency in YSS Corridor, 2017
Source: Statistics Central Java and Statistics Yogyakarta, 2019

The presented numbers raise a concern, particularly in the western and eastern regions of the corridor. The most severe condition was observed in Magelang Regency on the West. The regency experienced the lowest human development index and the poverty line, with the second-highest percentage of poor people and the lowest higher education access rate. Only 4,83% of its population attended

university. The regency is where Borobudur Temple Compound, part of UNESCO Heritage Site and National Tourism Strategic Area, attracted private investments such as hotels/resorts in the surrounding area of Borobudur. As a result, the local community experienced poverty, which is worse than the other cities/regencies in the corridor. Thus, the presence of Borobudur itself failed to deliver a spread/trickle-down impact to its surroundings.

Respondent #31 added that many luxury resorts are situated in Magelang Regency, near the Borobudur Temple and attract international tourists. Nevertheless, this cultural site's presence and upscale accommodations did not benefit its surrounding areas and local communities. The majority of Magelang residents work in the agriculture sector. There is a crisis with all the fast-growing tourism activities, especially luxury tourism, through the development of star hotels and resorts in the surrounding villages. The locals tend to switch their source of income from performing agricultural activities to tourism without further knowledge on how to become sustainable and essential actors in the tourism field. Such a condition was described by Respondent 18. Thus, many locals who used to be farmers worked as street vendors selling mass-production souvenirs within and near the temple's compound.

Another reason is that tourists see Borobudur as one of the stops among their varied tourism destinations. Most international and domestic visitors who visit the temple stay at accommodations in Yogyakarta City due to the presence of its international airport and the wide variations of accommodation, instead of spending the night in the Magelang Regency. At the same time, tourists receive minimum information regarding the potential of the surrounding villages of Borobudur, even when the villages have various tourism destinations and activities to explore, such as the rural landscape view of Puthuk Setumbu, the performance of traditional dance shows, workshops on local handcrafts (batik, rattan, pottery), and local culinary activities are a few examples.

> "What I see is that there are many beautiful hotels there (Magelang Regency). Amanjiwo hotel's rate is around one,000 euro per night, and David Beckham goes there" - Respondent 31.
>
> "Because there is a poor social character, back then, the people there worked as farmers, and they got left behind from the desired condition because the economic growth in it is pro to society that has the money for investment capital" - Respondent 18.
>
> "People in that area work in agrarian actors. Do not turn the farmers into tourism actors. That has to be guarded. The farmers must be prevented from embracing the tourism industry. It must be about how to integrate their crop production so that it can supply the existing eco-tourism. Thus, when tourists visit, they can enjoy what was produced

by the local communities in the villages and their surroundings. It is extensive homework to integrate it all. In many cases, the farmers sell their crops outside, not for their surroundings as a tourism area. On the other hand, if it were well managed and well-integrated, the crops' price would be higher to fulfill the particular demand in the area" - Respondent 29.

The last social challenge is the region's drinking water and sanitation access gap. The central government has a 100% target for the provision of clean water and sanitation facilities as part of Indonesia's commitment to the Sustainable Development Goals to establish a healthy living environment for society, which had yet to be achieved in YSS Corridor. Statistics Indonesia (2018) reported that the Special Regions of Yogyakarta Province had more sanitation facility access than Central JavaProvince, in which the former ranked second nationally (88.92%), while the latter ranked 10th (74.04%). Regarding drinking water access, Yogyakarta ranked seventh nationally (80,62%), and Central Java was ranked 10th (78.16%). Table 15 shows that Magelang Regency, Semarang Regency, Magelang City, Boyolali Regencies, and Klaten Regency had the most inadequate clean water and sanitation facilities. Their conditions are the opposite of the main urbanized nodes of the corridor, Yogyakarta City (which had reached its 100% target) and Semarang City (with 91.08% coverage).

City/Municipality	Access to Clean Drinking Water 2017	Access to sanitation 2017	Access to Clean Drinking Water 2018	Access to sanitation 2018
Semarang City	91,08	91,02	91,13	93,11
Semarang Regency	84,09	63,10	85,26	76,71
Salatiga	89,57	94,66	92.83	97,47
Surakarta	84,11	83,20	83,30	84,84
Magelang City	92,05	76,36	90,18	82,11
Magelang Regency	79,45	58,94	71,59	71,64
Boyolali	65,80	83,49	73,49	86,75
Klaten	72,06	84,89	71,22	91,98
Yogyakarta City	100	100	100	100
Sleman	98,64	96,07	unknown	97,12

Table 15. Percentage of access to clean water and sanitation facilities in 2017 - 2018.
Source: Statistics Central Java and Statistics Yogyakarta, 2018, 2019

YSS economic profile

The social profile highlighted the disparity between the prosperous regions of Semarang City (North) and Yogyakarta City (South) with regions on the West and East of the YSS Corridor. The disparity is associated with economic growth rates and unequal infrastructure development (Rammelt, 2018). At the same time, there is

uneven infrastructure development between those mentioned regions, as seen from how the main transportation hubs (international airport, seaport, and rail stations) are located in the north and the South of the corridor, as seen in Table 16.

Table 16 presents the contrasting Growth Regional Domestic Product (GRDP) between regions in the YSS Corridor. The table shows that Semarang City, the capital city of Central Java, had the most significant GRDP than other YSS regions, with a steady growth of 6% each year from 2013 to 2018. Subsequently, regions with the highest GRDP in sequence were Semarang Regency, Surakarta City, Sleman Regency, Yogyakarta City, and Klaten Regency. On the other hand, the western and eastern regions of Magelang City, Magelang Regency, Boyolali Regency, and Salatiga City had the lowest GRDP rates. At the same time, Magelang City and Regency had the lowest economic growth percentage among the 10 YSS regions. Table 16 shows that Yogyakarta City and Sleman Regency had a higher gini ratio index. This means regions in Special Regions of Yogyakarta Province had more significant inequalities than those in Central Java Province.

Lastly, the Regional Spatial Plan of Central Java 2009-2029 designated regions in the western and eastern regions of the corridor (Magelang, Boyolali, Klaten, and Semarang Regencies as hinterlands with various agricultural potential. Centra Java Statistics (2019) mentioned that these regions were the leading producers of paddy, and other agricultural products, including maize, soybeans, peanuts, cassava, sweet potatoes, and onions. In addition, they also produce various fruit commodities (melon, orange, avocados, banana, pineapple, etc.); medicinal plants (ginger, cardamom, kencur, turmeric, galingale, lempuyang, etc.); livestock (cattle, goats, sheep, chickens, and pigs); and fisheries (inland water fish and brackish water pond fishes).

Regencies	**GRDP at constant prices by regencies (in billions of Rupiah)**			**The growth rate of GRDP based on constant market price (in %)**				**Gini Ratio of cities/reg.**
	2015	**2017**	**2018**	**2013**	**2015**	**2017**	**2018**	**2015**
Semarang City	109.110	123.279	131.317	6,04	5,82	6,70	6,52	0,31
Semarang Reg.	28.768	32,.002	33.855	5,97	5,52	5,65	5,79	0,31
Salatiga	7.759	8.624	9.127	6,30	5,17	5,58	5,84	0,35
Surakarta	28.453	31.685	33.506	6,25	5,44	5,70	5,75	0,36
Magelang City	5.247	5.820	6.138	6,04	5,11	5,42	5,46	0,36
Magelang Regency	18.864	20.974	22.082	5,91	5,18	5,50	5,28	0,34
Boyolali	18.170	20.248	21.406	5,83	5,96	5,80	5,72	0,30
Klaten	22.558	24.993	26.360	5,96	5,30	5,34	5,47	0,36
Yogyakarta	22.393	24.768	26.128	5,47	5,09	5,24	5,49	0,45
Sleman	28.098	31.140	33.139	5,89	5,18	5,34	6,42	0,39

Table 16. Percentage of GRDP and Growth Rate of GRDP Based on the constant market price.
Source: Statistics Central Java and Statistics Yogyakarta, 2018, 2019, 2020

6.1.2 Summary of the YSS Profile

The Yogyakarta-Solo-Semarang (YSS) corridor encompasses regions with distinct identities and challenges, evident from the environmental, social, and economic profiles. In the North, Semarang City and Semarang Regency formed the corridor's main industrial hub. Meanwhile, the Southern regions prioritize their tourism sector and creative industries, including Yogyakarta City, Sleman Regency, Surakarta City, and Magelang Regency. Magelang Regency and Magelang City, Klaten Regency, Boyolali Regency, and Salatiga City constitute the corridor's hinterlands.

However, amidst the diversity, the corridor faces significant environmental, social, and economic sustainability challenges. Notably, there exists a disparity gap and inequality between the affluent Southern and the Northern regions, with the hinterland regions on the West and East facing particular hardship. Despite playing a crucial role in Indonesia's food security system, the Western and Eastern regions suffer from inadequate clean water accessibility, sanitation facilities, and education provisions.

Magelang Regency, home to the revered Borobudur and other renowned tourist destinations, faces the most severe social and economic sustainability challenges. Despite the presence of upscale resorts, the surrounding communities experience extreme poverty and a glaring disparity gap compared to other regions within the corridor. Meanwhile, the Northern and Southern regions share common socio-economic issues such as waste disposal capacity, traffic congestion, poor urban environmental quality, and slum settlements.

As the corridor looks to the future, all regions confront the pressing issue of land conversion. The hinterland regions encounter this issue due to planned road infrastructure connecting Semarang City and Yogyakarta City through their territories. The primary urban nodes, Semarang City and Yogyakarta City, grapple with the same problem due to growing commercial activities and increased demand for housing facilities. Moreover, various infrastructure projects may adversely impact existing habitats and ecosystems. Additionally, given Java's tectonic and geological settings, all regions face the looming threats of natural disasters, such as flooding, earthquakes, and volcanic eruptions.

In the next section, we delve into how the YSS corridor aims to address these sustainability challenges through various development measures. By recognizing each region's unique challenges, implementing targeted strategies, and fostering collaboration among stakeholders, the YSS corridor endeavors to pave the way toward a more sustainable future for all its inhabitants.

6.2. Sustainability Outcomes of The YSS Corridor Development Rounds

In this section, the study identifies the sustainability outcomes within the three corridor development rounds, the SDR conception round, the envisioning of YSS goals and strategies, and the YSS prioritization and implementation.

This section shows that sustainability outcomes in the first round were delivered within the MPWH Strategic Plan 2015-2019, which enlisted the overall SDR concept and strategies. In the second round, outcomes became more specific, delivered within the YSS Integrated Infrastructure Development Plan final report in the form of YSS ultimate goals and YSS regional development strategies. Lastly, the nature of the third round differed from the first two. In the latter round, outcomes became realized as public work infrastructure programs (through state funding) selected and appointed by the YSS actors were implemented.

6.2.1 SDR conception round (October 2014 - December 2015)

The sustainability measures in the conception round of the YSS Corridor started at a macro scale as the SDR concept and strategies applied to every SDR Corridor, including the YSS Corridor. The SDR concept had a predominant economic focus on improving the connectivity between strategic nodes in Central Java and Special Regions of Yogyakarta Province to facilitate the movement of people, trade, and services and accelerate growth (MPWH, 2015). It is why the YSS delineation comprises regions that function as primary urbanized nodes and regions with nodes in the potential tourism/agriculture/fisheries/industrial sectors, connected by the national road as the corridor's backbone. The SDR concept and strategy were formulated to realize Java's development theme as the national food security, the gate to the world's best tourism destination, the drive to the industrial and national service sectors, and the acceleration of the maritime-based economy (Ibid.).

The economic ambition of SDR Corridors was further projected by the formulated SDR strategies, which were focused on catering to the growth of economic growth centers, pushing the economy of lagging regions, and intensifying the competitiveness of regions within the corridor (Ibid.). It is why the SDR was illustrated in the MPWH Strategic Plan as the means to push the development of economic growth centers by maximizing the agglomeration benefit, the potentials of the regions, and the efficiency of infrastructure provision in the region (MPWH, 2015. p.53).

In this round, the MPWH Strategic Plan also described the term sustainable development as an effort to fulfill the present needs without sacrificing the fulfillment for the future generation that is implemented within the three pillars of the social, economy, and environment (MPWH, 2015. p.2). The statement was further translated, as the strategic plan directed the importance of infrastructure development that not only performs to drive economic growth within regions but

underlines the equal importance of establishing a synergy with environmental sustainability (MPWH, 2015. p.50). This sustainability idea complemented the initial SDR economic strategies, which directed the need for the corridors to address the natural disaster issues, address the environmental carrying and support capacities of regions, and fulfill the provision of essential infrastructure services in the less invested/lagging regions, and the elimination of slums.

Therefore, while the economic mindset was used to envision the development of the transport corridor, the additional sustainability ideas incorporated in the initial SDR concept and strategies allowed the presence of more detailed sustainability measures according to the needs of the YSS Corridor.

6.2.2 Envisioning of YSS's ultimate goals and regional development strategies round (January 1st - December 31st, 2016)

Sustainability outcomes in the YSS's second round were the YSS's ultimate goals and programs formulated within YSS regional development strategies, delivered through the Integrated Infrastructure Development Plan Program. Measures resulted after experts conducted a series of sustainability analyses to snapshot regions' environmental, social, and economic states and their sustainability future. The environmental analyses included regions' morphology and topography, hydrology, land use, the waste system network, and the types of natural disaster threats to every region in the YSS Corridor. The social analysis encompassed regions' demography and social condition, including population, growth rate, density, human development index, education rate, poverty index, housing ownership, access to drinking water, and sanitation system. The economic analyses involved the identification of existing potential economic nodes, regions' GRDP rate, their income per capita, local commodities, the Gini Index Ratio, the presence of public work infrastructure, and the coverage of infrastructure for energy and electricity.

The sustainability outcomes analysis of round two found that the YSS's ultimate goals and regional development strategies project the persistent focus of the YSS Corridor as a transport corridor with its economic ambition. However, compared to round one, measures were appointed at a mezzo to micro-scale, directed to address issues in the environmental and social dimensions. The former received more attention than the latter.

As a result of the mentioned sustainability analyses, the YSS's ultimate goals were mainly envisioned towards a well-connected growth node of the YSS Corridor and the push in public work infrastructure implementation to support various economic activities in the regions. The goals were complemented with the objectives to answer to the extensive environmental issue of natural disasters, solid waste disposals, and poor urban and settlement quality, particularly in big cities; and addressing social issues such as accessibility of the locals to clean water and

sanitation and the elimination of slums. The strategy would address the bottleneck issues like what was found in the Magelang - Bawen segment and improve the logistics and tourism movements in the corridor.

YSS regional development strategies were formulated to realize those goals (see Table 17). The strategies were to strengthen the economic urban growth of Semarang, Surakarta, and Yogyakarta and enhance their economic linkages. It is planned through a transportation system network development of the Bawen - Surakarta highway, Bawen - Magelang - Yogyakarta highway, the Kulonprogo Airport development in Yogyakarta province, and the expansion of Ahmad Yani Semarang airport. Another strategy in the economic dimension was to direct Semarang as the main gateway of the corridor, for it has both facilities of an international airport and a seaport (Tanjung Emas Port). The economic strategy was also to facilitate the growing agriculture activities of the western and the eastern regions, the fisheries activity in Semarang City (North), the creative industry in Yogyakarta City and its surroundings, and tourism.

Furthermore, more measures were found in the environmental dimension than in the previous round, addressing an extensive environmental issue of the corridor. The strategies included the necessity to enhance the living quality of urbanized areas and the settlements, such as improvements to the environmental-based settlement's infrastructure; prepare vulnerable regions for upcoming natural disaster threats; and ensure the sustainability of the hinterlands' regions, which are known as the food barns of Indonesia.

While the YSS regional development strategies allocated programs to address the social dimension issues, they received less attention than the economic and environmental ones. The social strategies were to eliminate slums in the city, provide decent settlements for low-income housing, and reach the 100% goal for clean water and sanitation facilities, particularly in the lagging regions.

The economic strategies displayed the nuance of the economic aspect, dominantly within various road infrastructure plans. While the plan could facilitate logistics, tourism, trade, and service movements and open up the secluded regions to be connected with the more prominent regions, the plan also raised a certain concern. The study analyzed a decline in paddy fields surrounding segments of the hinterland regions, especially in Magelang, Boyolali, and Klaten Regencies. Further economic urban growth may contribute to a rapid land conversion in the corridor. Thus, it became crucial for any corridor program to carefully assess the environmental carrying and support capacities of the area before it can be executed. In addition, programs in the social dimension still need to be improved, particularly to lower the gap in the human development index, for example, by providing educational facilities in Magelang Regency, Boyolaly Regency, and Klaten Regency, which had the most inadequate access to such facilities.

Sustainability Dimension	Strategies	Sustainability Issues addressed
Environmental Mitigation	To develop a sustainable settlements infrastructure that enhances the living quality of people through coastal protection and flooding mitigation in the Semarang Urbanized area	Natural disaster mitigation
	To develop infrastructure facilities to mitigate natural disasters through sediment control in Yogyakarta	Natural disaster mitigation
	Establish infrastructure that supports tourism activities by developing landfills in Yogyakarta City, Semarang Regency, Magelang Reg, Surakarta City, Boyolali, and Klaten Regencies.	Waste issue
	To establish the sanitation infrastructure that supports tourism activities through the development of a drainage system in Yogyakarta	Natural disaster mitigation
Social Mitigation	To develop a sustainable settlements infrastructure that enhances the living quality of people by developing self-aid housing in Semarang Regency,	Slums removal
	To establish sanitation infrastructure through the development of wastewater installation in Semarang City, Semarang Regency, Magelang Regency, Boyolaly Regency, and Surakarta.	Access to sanitation
	To establish an environmentally based settlements' infrastructure that supports tourism activities by developing public housing in Surakarta City and Yogyakarta City	Improvement of living quality
	To establish the drinking water infrastructure that supports tourism activities through the development of a drinking water supply system (SPAM) in Semarsalat (Semarang Regency, Salatiga City), Wasosukas (Surakarta), Kertamatul (Yogyakarta City, and Sleman Regency).,	Access to drinking water
	To establish the drinking water infrastructure that supports tourism activities through the development of a drinking water supply system (SPAM) in Yogyakarta	Access to drinking water
Economic Mitigation	To enhance the infrastructure condition in the industrial area that supports the processing industry in Semarang City through the road widening/reconstruction in Semarang City - Semarang Regency- Salatiga City segments, Secang - Prigsurat, Pringsurat, Temanggug, and Urip Sumoharjo.	Economic (logistics and tourism activities)
	To enhance the road infrastructure capacities in Semarang Outer Ring Road, Semarang - Bawen, Bawen - Bts Salatiga/lingkar Salatiga, and Bts Salatiga - Boyolali.	Economic (logistics, tourism activities)

	To establish new road development of logistics support road network for Ahmad Yani Airport, Tanjung Mas Port, and the North Coast Route; and Tans Java Semarang - Solo.	Economic (mobilization of logistics, tourism activities)
	To develop the water management infrastructure by establishing the raw water system of Semarsalat (Semarang Regency), Magelang Regency, Sleman Regency, Wasosukas, and Boyolali	Support for food crop production and lower the GRDP gap
	To establish the road infrastructure for tourism areas that support tourism activities by developing the Solo- Yogyakarta highway and improving the road capacity improvement of the Magelang-Salatiga.	Traffic congestion
	To establish the irrigation network in Boyolali Regency and Klaten Regency	Support for food crop production and lower the GRDP gap

Table 17. Regional development strategies within the YSS Corridor's Ultimate Goal
Source: Author, based on MPWH, 2016b

6.2.3 YSS programs prioritization and implementation round (February 2016 - December 2019).

In the third round, sustainability outcomes were delivered in the form of public work infrastructure programs appointed for specific regions/areas/blocks/segments to address various environmental, social, and economic challenges of the regions. The programs were appointed within the annual Pre-Regional Consultation forum, cutting across environmental, social, and economic pillars of sustainability (see Annex 8)

The analyzed programs show that the YSS Corridor was primarily developed to function as a transport corridor, with 12 types of programs assigned, emphasizing the improvement of connectivity between growth nodes (urbanized nodes, sectoral nodes, transportation hubs), facilitation for tourism and logistic movements, agricultural and fisheries productivities. At the same time, programs were also allocated to address the environmental and social dimensions.

There were 13 types of programs delivered in the environmental dimension, focusing on issues related to solid waste disposal, natural disasters, traffic congestion, pollution, and land conservation. In the social dimension, 23 types of programs were implemented. The programs addressed the lack of access to clean water and sanitation, improvement to low-income households' housing conditions,

access to education and affordable housing, and quality improvement of the rural settlements.

While more types of programs appeared to be delivered in the social dimensions, significant funds were allocated towards the economic and environmental dimensions. This funding has been invested in economic programs such as the raw water system development/rehabilitation and the development of dams for agricultural purposes, agro-markets, road infrastructure, and the revitalization of tourism destinations. A large sum of funds has been invested in the environmental dimension in programs such as the development of final landfills, diversion of river channels and sand pocket constructions, and flooding control infrastructure. Meanwhile, programs in the social dimensions were prioritized toward community-based programs, encouraging the community to look after its settlements through community-based sanitation programs, community-based settlement development programs, and Self-assist Home Stimulant Aid Quality Improvement. More detailed sustainability outcomes in the three sustainability dimensions are presented in the following.

Measures to address environmental issues

The first mitigation that will be discussed in this section is regarding the waste issue. Annex 7 shows how the waste issue in Semarang City was addressed through the development of the Jatibarang landfill in 2018, which was planned to incorporate the technology of the waste power plant to transform waste into an electrical source for the city. Temporary landfills with an integrated reduced-reuse-recycle method were also developed in Klaten Regency, Salatiga City, Semarang City, Magelang City, and Sleman Regency in 2017 and Magelang Regency and Semarang Regency in 2018. Nevertheless, as analyzed in the previous section, a significant issue occurred in Yogyakarta City, where the Piyungan Landfill experienced an overcapacity to facilitate the city's waste. This concern had not been managed in this round.

For the land conversion issue, MPWH established a Green City Development Program, which encouraged the establishment of green open spaces within cities to slow down the conversion of land use from agriculture into settlements or commercial activities. The program was appointed in Magelang and Sleman Regencies and spanned from 2017-2019. However, the main challenge of the land conversion issue was how the agricultural land remains threatened by the planned highway infrastructure programs of Yogyakarta - Solo, and Yogyakarta - Bawen, which may pass through extensive paddy fields in Boyolali, Klaten, and Magelang Regencies. The implementation of the highway construction had not taken place when this case was analyzed. However, several sustainability actors (as the respondents of this research) raised their concerns about how the corridor's development could threaten the presence of those rice fields.

Moreover, this round of corridor development presented various programs dealing with natural disaster issues. For this, a diversion channel was constructed in Magelang Regency in 2017 to address issues related to flooding, erosions, and landslides. Such program was one of the well-funded programs in the corridor, accompanied by the program of sand pocket construction in the Sleman Regency (in 2018) that functioned as a sediment control structure. For the flooding issue, programs took place as a flooding control infrastructure development in vulnerable regions. The program was allocated in Semarang City (in 2017-2019) and Surakarta City (in 2017-2018), together with the development of a drainage system in the urbanized area of Semarang City (in 2017) and Magelang Regency (in 2018), and drainage system development for settlements in Magelang Regency (In 2018).

Lastly, three environmental programs were implemented to address the traffic congestion issue in three municipalities. One was the Flyover Manahan in Surakarta City (in 2018), which was planned to manage the traffic in Surakarta City from the direction of Adi Sucipto and MT. Haryono Street toward Dr. Moewardi Street, and vice versa. Tribun News (2018) reported that this program successfully eased traffic jams from the Purwosari and the Nongko Market directions. The second program was Lemahbang U-turn in Semarang Regency, designed to ease the traffic congestion from Ungaran area to Bandungan, and from Bandungan to Bawen directions. The third program was Keuntungan Underpass in Kaliurang, which was planned to ease the traffic burden in Kaliurang area in Sleman Regency, as there were congestions in directions between Kaliurang and Padjajaran streets. MPWH (2019) reported that during rush hour, the traffic in the area would take about 40 minutes to cover a distance of 3 km, with queues that often reach 400-600 meters. With the new underpass, the time is expected to be shortened by half (20 minutes). In addition, Kentungan Underpass's presence facilitated access to the Kaliurang tourist area.

Measures to address social issues

Mitigations in the social dimension were unlike the environmental and economic dimensions because they had various programs that incorporated the involvement of local communities to improve their daily living condition (access to clean water and sanitation, low-income housing, and settlement quality). Programs in this dimension also dealt with slums and limited access to public housing, commonly found in cities with high urbanization rates. Additionally, there was limited access to education, which affected the poor human development index of the lagging regions. Therefore, this section presents the variety of programs that address these social issues.

The first delivered program was regarding access to sanitation, supporting a healthy living environment in the local community. Every household produces waste from their daily activities. Therefore, wastewater installation for the city and settlements

was essential to obtain clean, healthy, and safe cities. The sustainability analysis indicated that among all cities/regencies in the YSS Corridor, in 2018, Magelang Regency had the lowest access to sanitation (71%), which was behind Yogyakarta (100% access), nor Semarang City (93.11%). As measures, programs were directed to address the sanitation issues through Community-based Sanitation Program, or in Indonesian known as Sanimas. The program was executed in Magelang Regency in 2017 and 2018. The same program was also prescribed for Boyolali Regency, Magelang City, and Sleman Regency in 2017 and Semarang and Sleman Regencies in 2018. Meanwhile, an On-site Wastewater Infrastructure program was implemented in Sleman Regency in 2017, followed by an off-site wastewater management system in Sleman Regency in 2018. Surakarta City had the optimization of Faecal Sludge Treatment Plant, executed in 2017, followed by a program to optimize the settlement scale on-site wastewater management system.

As part of the provision of basic infrastructures, programs were held for clean water access. The sustainability analysis highlighted how, in 2018, Klaten Regency, Magelang Regency, and Boyolali Regency lacked clean water access, while other cities/municipalities in the corridor had accessibility of 83,30% to 100%. Therefore, from 2017 to 2019, Community-based Clean Water and Sanitation Provision Program (Pamsimas) was appointed for three consecutive years. The program was conducted in Semarang Regency in 2018 and Semarang City in 2019. Meanwhile, another program of Drinking Water Provision System (SPAM) development/optimization was executed in Surakarta City and Semarang Regency in 2017; in Surakarta City, Magelang City, Sleman Regency, and Yogyakarta City in 2018; and in Semarang Regency and Sleman Regency in 2019.

In addition, further programs targeting the provision of community infrastructure in settlement areas, both in urbanized and rural areas, were appointed. Such a program was found in the form of a community-based settlement development program for Surakarta City and Klaten Regency in 2018 and Boyolali Regency in 2019. A settlements infrastructure development program was also allocated in Yogyakarta City, Semarang Regency, and Sleman Regency in 2017; Yogyakarta City and Sleman Regency in 2018; Semarang Regency and Yogyakarta City in 2019. Rural infrastructure development and settlements development programs were also implemented in Semarang and Sleman Regencies in 2017, Semarang City in 2018, and Sleman and Magelang Regencies in 2019.

Apart from the above programs, some benefit social and environmental dimensions concerning slums and poverty. Such attempts can be found in the City Without Slum Program (KOTAKU) for Magelang City and Magelang Regency in 2017; Semarang Regency and Surakarta City in 2018; and Magelang Regency, Klaten Regency, Magelang City, and Surakarta City in 2019. The second program was the Quality Improvement of Slum Settlements, which took place in Yogyakarta City in 2017; Surakarta City and Yogyakarta City in 2018; Semarang City, Sleman Regency, and

Yogyakarta City in 2019. In addition, measures were designated for environmental health rehabilitation of settlements in Surakarta City (2017), accompanied by programs of Quality Improvement of Settlements in Semarang City (2017-2019), community-based settlements development in Klaten Regency and Surakarta City (2017) and Boyolali Regency (2019), self-assist home stimulant aid quality improvement in Semarang and Yogyakarta Cities (2017) and Sleman Regency (2018).

Apart from enhancing the quality of the living environment, programs were also directed at affordable (public) housing development in Semarang City (2017 to 2018), Surakarta City (2018), and Sleman Regency (2018). These regions had a high density and population. The program was complemented by the development of low-income household housing facilities in Magelang Regency from 2018 to 2019 (as a region with the highest percentage of poverty) and Sleman Regency in 2018. Despite the variety of mitigations in the social dimension, one issue remains concerning access to education, which was not found in the YSS Corridor except in one Regency of Sleman in 2019.

Measures to address economic issues

It was disclosed in the YSS profile analysis that the existing economy was centered in the North (Semarang City and Semarang Regency), South (Yogyakarta City and Sleman Regency), and the east part of the corridor (in Surakarta City). At the same time, the corridor also has the potential to grow in the tourism and agriculture sectors, especially with the emerging growth of crops and plantation productions, together with the fisheries industry. This is why different types of programs took place to stimulate growth in those sectors and address the inequalities in the lagging regions.

The first mitigation in the economic dimension was held through the socio-economy infrastructure development planned to stimulate the agriculture sectors in the rural regions. It is done by providing infrastructure that helps farmers distribute their crops effectively and efficiently. The program was implemented in Magelang Regency and Semarang City in 2017 and in Magelang Regency and Sleman Regency in 2018-2019. On the other hand, many people work in the agriculture sector as small to medium enterprises, which needs to be facilitated. It has been accomplished by developing traditional agro-markets intended to provide adequate facilities where the locals can gather to sell their local products and allow farmers to be linked to the higher chain network, stimulating the local economy.

A similar program was implemented in Semarang City from 2018 to 2019 for Johar Market and Yogyakarta City in 2019 for Prawirotaman Market. These developments were also enriched with dams and weirs to promote agricultural productivity. The program was executed in Semarang Regency in 2017, Semarang City and Boyolali Regency in 2018, and Semarang City in 2019. More programs of

operational/maintenance/rehabilitation of water resources were also executed in various areas in the corridor, including Semarang City, Klaten Regency, Yogyakarta City, and Sleman Regency in 2017; Semarang City, Yogyakarta City, Sleman Regency in 2018; Semarang Regency, Semarang City, Yogyakarta City, and Sleman Regency in 2019. To further enhance the facilitation in the agriculture sector, a program of water irrigation network was implemented in Klaten Regency and Sleman Regency in 2017; Semarang City, Sleman Regency in 2018; and Semarang Regency, Surakarta City, and Sleman Regency in 2019. In addition to this, there was also the development of water retention basins for Klaten Regency (in 2017), Sleman, Boyolali, and Magelang Regencies (in 2018), and Yogyakarta City and Sleman Regency (in 2019). Raw water provision development/rehabilitation in Semarang City complemented the irrigation program from 2018 to 2019.

For the tourism industry, outcomes took place in the form of road preservations/rehabilitations/reconstruction intending to improve local and regional connectivity, which linked various economic nodes to cater to the movement of people, goods, and services in the corridor. Such a program spurs the economy, addresses the inequality of regions, links the lagging regions to the advanced regions, and stimulates new investments in secluded areas.

The road infrastructure investment was executed in every city/regency in the corridor. However, significant funding was allocated in Semarang City, Semarang Regency, Boyolali Regency, Klaten Regency, and Surakarta City in 2017; followed by Surakarta City, Sleman Regency, and Semarang Regency in 2018; and Semarang Regency in 2019. This connectivity supports the tourism movement., together with the revitalizations of several tourist destinations in Surakarta City (for Kasunanan Palace and Ndalem Joyokusuman) in 2017; Magelang Regency (for Makam Joko Pekik tourism area) in 2017); Yogyakarta City (for presidential palace) in 2017); Semarang City (for Baiturrahman mosque compound) in 2018; Magelang Regency (for Mangunkoso Suspension Bridge area, Mendut temple tourism area, Pawon Temple tourism area, Gunungsari area, and Telemoyo Mountain) in 2018); Magelang City (for Kyai Dudan tourism area) in 2018; Magelang Regency (for Mbah Mangli tourism area) in 2019); Surakarta City (for Manahan Stadium and Palace of Mangkunegaran) in 2019); and Semarang Regency (for Bukit Cinta tourism area and Gedongsongo - Bandungan tourism area) in 2019.

6.3. Conclusion on the Sustainability of YSS Corridor

This section presents four main conclusions drawn from the sustainability outcomes analysis of the YSS Corridor.

First, different scales of outcomes were delivered in each round of the corridor's development, with measures becoming more contextual. The general SDR concept

established in the initial round serves as a macro guideline for the subsequent rounds, translating and tailoring the concept to regions' needs. As a result, sustainability outcomes became more detail-oriented throughout the rounds, with the initial SDR principles being specified in YSS's ultimate goals and strategies and further implemented in regions.

Second, there was a notable shift of sustainability focus in the outcomes over the course of the rounds. During the initial planning round, measures focused on the economic benefit of a transport corridor by catering to various sectoral activities and movements to accelerate growth. However, sustainability was enhanced in the later planning round, with YSS's goals and strategies incorporating extensive environmental measures through programs such as river channel diversion, flooding control infrastructure, development of landfills, the city without slums program, and green open space. Social programs received more attention in the implementation round, responding to previously unaddressed social challenges, encompassing initiatives like the development of educational facilities, affordable housing, and improvement of basic infrastructure in settlements, urbanized areas, and rural areas.

Thirdly, the corridor idea was implemented as YSS's core strategy through connectivity plans between the four main urbanized nodes, including Semarang and Yogyakarta highway development, via the lagging western regions of Magelang City and Magelang Regency. Such connectivity aimed to open up secluded areas to more economic opportunities. Magelang Regency itself, home to the iconic Borobudur compound, a UNESCO World Heritage Site, faced a disparity issue with limited access to education, clean water, and sanitation. While the connectivity plan between the primary urbanized node was dominant, the YSS strategy also promoted social programs in the lagging western regions through various community-initiative programs such as community-based clean water and sanitation programs (Pamsimas). In addition, the roles of the lagging regions, including Magelang Regency and Boyolali Regency, were strengthened by appointing them as the corridor's hinterlands. Consequently, more economic programs were directed to push productivity in the agricultural sector.

Fourthly, numerous environmental and social issues remain a concern. The good connectivity between Semarang City (North) and Yogyakarta City (South) via Surakarta (West) significantly shaped the development of the landscape of regions in Central Java and Special Regions of Yogyakarta, allowing these regions to experience vast growth and play a vital role in the Indonesian economy. However, this improved connectivity has not been uniform across regions. Those in the West, particularly Magelang Regency, have lagged behind, grappling with persistent social disparity. Magelang Regency, nestled between the vibrant Yogyakarta City and Semarang City, has been facing persistent social disparities, evident in the inequitable distribution of resources, job opportunities, and access to basic services

among its residents. Although various social programs have been introduced to alleviate this inequality, the desired outcomes remain elusive, as the corridor is still in its ongoing development phase. This situation is especially concerning given the potential of Magelang Regency to expand its various sectors, including tourism and agriculture.

A promising development for Magelang Regency is the new connectivity plan between Semarang City and Yogyakarta City via the western regions, known as the Yogyakarta - Bawen highway. This infrastructure project is expected to open up previously secluded areas in the western regions to more economic opportunities. By connecting these regions to major urban centers, it aims to address issues related to wealth distribution and social disparities.

However, amid economic development prospects, a pressing environmental concern about land conversion arose. The planned construction of the Yogyakarta - Bawen highway poses a significant threat to the western regions' agricultural lands and overall landscape. This issue is particularly challenging as it may jeopardize these regions' agricultural heritage and sustainability. The loss of fertile farmland due to land conversion can have far-reaching consequences, potentially leading to food security concerns, and disrupting the livelihoods of local farmers and communities. Additionally, large-scale infrastructure may also lead to the loss of biodiversity, disruption of wildlife corridors, or a decline in native species populations, altering the ecosystem. Therefore, more intervention is needed to include measures that prioritize sustainable land use, and engage in community consultations to ensure the project aligns with the needs and aspirations of local communities. In addition, investment in green infrastructure, or alternative transportation can be an essential step to mitigate the adverse effects of highway corridor development on the environment and society.

Fifthly, sustainability outcomes of the YSS Corridor mainly comprise hard infrastructure over soft infrastructure initiatives. While hard infrastructure is undeniably crucial for accommodating to the movement of activities in a corridor development, a holistic approach to sustainable transport corridors encompasses a range of strategies and considerations that go beyond physical infrastructure. Soft infrastructure programs can play a critical role in research and innovation to drive technological advancements, promote an eco-friendly society, support environmental conservation, encourage green practices, and foster a harmonious relationship between the corridor and the surrounding communities.

In summary, the sustainability analysis of the YSS Corridor presents the shift from an exclusive focus on economic gains to a more comprehensive sustainability outcomes, addressing the multifaceted environmental, social, and economic challenges of the regions. However, alongside this positive shift, persistent sustainability concerns have continued to pose significant challenges. One of the

notable issues resides in the hinterland regions, where land conversion remains a pressing environmental concern. In these areas, the demand for infrastructure projects and tourism activities has led to extensive land conversion, threatening not only the region's ecological balance but also the livelihoods of local communities. On the other hand, the urbanized northern and southern regions of the corridor grapple with their own set of environmental challenges, including waste management and traffic congestion. These persisting issues emphasize the need for more context-specific measures tailored to the unique challenges of each region within the corridor and necessitate more balance measures between hard and soft infrastructure.

To understand how sustainability outcomes were resulted, the next chapter (Chapter 7) of the YSS Corridor governance examines how governance factors and the interaction process influenced such outcomes, analyzing how the independent variables of governance and the intermediate variables of the interaction process promoted or hindered sustainability.

Additionally, this conclusion shows the predominant differences and similarities between the GDP Corridor (discussed in Chapter 4) and the YSS Corridor. The disparities in outcomes between the YSS Corridor and GDP Corridor result from their distinct geographical scopes, leading to differing delineations. The YSS Corridor encompasses regions in Central Java and the Special Regions of Yogyakarta, established due to the vibrant economic linkage between the primary urbanized nodes in the North and South of the corridor. Thus, YSS delineation was formulated to include the lagging regions between those urbanized nodes. In contrast, the GDP Corridor, confined to a single administrative island of Bali, was delineated by the presence of existing growth nodes along the western-southern-eastern regions, excluding the lagging northern regions. It is why, as part of the GDP strategy to address the disparity issue in Bali, a highway development program was appointed to connect the rich southern regions of Badung with Buleleng in the North in order to allow a spread/trickle-down impact of the corridor toward the poorer excluded regions.

The environmental contexts in these regions differ significantly, resulting in contextual sustainability outcomes. GDP regions face coastal abrasion threats due to their coastal location, while the YSS Corridor deals with more earthquake and volcanic eruption risks, reflecting Indonesia's geological diversity. Thus, environmental measures were directed to address those corridors' unique challenges. Additionally, measures were appointed based on regions' local potential. For instance, the GDP Corridor had a program with significant funding, the Smart Traveler's Plaza, serving as an incubation area for fishermen and locals to expand their production in the fishery sector. Meanwhile, through the Integrated Tourism Development Program, the YSS Corridor features more programs aimed at

promoting sustainable tourism, particularly in the Magelang Regency, Magelang City, Sleman Regency, and Yogyakarta City.

Despite these differences, both corridor developments share certain similarities. They prioritize significant hard infrastructure projects, especially road development, and the enhancement of basic infrastructure like clean water and sanitation facilities. Additionally, both corridors recognize the importance of natural disaster mitigation through their infrastructure initiatives. While both corridors are expected to impact socio-economic aspects, including wealth distribution and improvements in the quality of life, they also face potential environmental implications arising from their large-scale hard infrastructure projects, such as alterations in land use and habitat disruption. Consequently, the critical role of governance is highlighted in both cases to ensure the corridors are navigated toward their sustainability goals by implementing enhanced sustainable practices.

CHAPTER 7
GOVERNANCE OF THE YOGYAKARTA - SOLO - SEMARANG CORRIDOR

This chapter discusses the governance of the Yogyakarta-Solo-Semarang (YSS) Corridor by analyzing how governance factors and the interaction process influence sustainability outcomes throughout the rounds of SDR corridor's conception, envisioning of YSS's goals and strategies, and implementation of programs.

As elaborated in Chapter 6, the main sustainability issue of the YSS Corridor lies in the existing disparity among regions, particularly between the more economically robust Northern and Southern areas with the poorer Western and Eastern regions. While the primary urbanized nodes of Semarang, Solo, and Yogyakarta Cities benefit from well-established economic linkages that cater to the vibrant logistics, trade, services, and tourism activities in these regions, Magelang Regency in the West faces significant challenges with a high percentage of poverty, low human development index, and limited education access, despite being home to the renowned UNESCO's Borobudur Temple. Meanwhile, those advanced Northern and Southern regions share common environmental issues, including waste disposal, traffic congestion, the presence of slums, and poor quality of settlements. The corridor's sustainability profiles in Chapter 6 also revealed that all ten cities/regencies face various natural disasters like flooding, earthquakes, and volcanic eruptions due to Java's tectonic and geological setting.

Furthermore, the emergence of a vibrant tourism industry, and the thriving creative sector, bolstered by the strategic presence of major transportation hubs in the corridor, has raised a pressing concern in recent years. This concern revolves around the regional/local actors' demand to promote sustainable tourism practices within the corridor's western and southern regions. These regions' allure has attracted increasing visitors, creating both opportunities and challenges. Amidst ambitious plans for regional connectivity and large-scale infrastructural development plans to support those activities, there is a pressing need to address the issue of land conversion, as the western and eastern regions are directed as the hinterlands of the corridor to fulfill Java's goal as the national food barn that ensures the country's food security.

Notwithstanding the ambitious economic goals set for the YSS corridor, the complex environmental, social, and economic sustainability challenges necessitated a corridor planning that takes into account the unique characteristics of each YSS region, harnesses their local potentials, and ensures equitable development across all areas.

Chapter 7 delves into the role of governance factors and process in guiding the YSS corridor's development across various stages to allow the corridor development to

focus on sustainability. The interaction process analysis zooms into the sequential stages that characterize the interaction process, focusing on the initiation and conclusion of each phase. It also encompasses the identification of pivotal participants in each round of corridor development, their roles/positions, responsibilities, and involvement regarding the sustainability discussions of the corridor. The analysis also includes their objectives and strategies that influence the process and outcomes. In the realm of governance factors analysis, this chapter unveils the significance and dynamics of these factors throughout various stages of the corridor's development. This is achieved through examination of the corridor's sustainability vision and how it is paying particular attention to the nuanced perspectives on certain sustainability dimension(s), the diverse governance mechanisms at play, the diverse array of actors representing a spectrum of interests and resources, the types of knowledge that inform decision-making processes, and the presence of rules, procedures, and platforms that frame the planning process for the corridors.

7.1. Round one: Conception Round (October 2014 - December 2015)

7.1.1 Interaction process

The governance process of the YSS Corridor started with the ambition of the new MPWH Minister (elected on October 27th2014) to realize the National Development Plan mandate for competitive and sustainable regions through integrated planning.

To do so, the Minister first aimed to resolve the fragmented public work infrastructure development. His ambition led to the establishment of a new organizational unit called the Regional Infrastructure Development Agency (RIDA). RIDA was led by an influential MPWH official, Mr. Hermanto Dardak, the former vice MPWH minister. He was also the chief of several large organizations, such as the Association of Indonesian Engineers (2015-2018), the Road Engineering Association of Asia Australia, and the Honorary President of the Eastern Regional Organization for Planning and Human Settlements.

The main task of RIDA was to synergize the planning and programming of public work infrastructures. Therefore, the Minister appointed RIDA to devise a concept that integrates various regional sectoral plans. This led to the formulation of Strategic Development Regions (SDR) corridors that adopted a regional development approach. The approach strategically prioritized development within and outside regions.

For RIDA to perform its task, the Minister appointed five high-level officials from other MPWH organizations to chair the different development centers within RIDA. The presence of these officials had a significant role in formulating the SDR concept and its delineations. The five officials, assisted by experts from the Indonesian

Planner Association, formulated the SDR concept (including SDR principles and SDR strategies) as the core task in this round, with their different sectoral knowledge perspectives of road infrastructure, water management, spatial planning, human settlements, and housings provisions.

The core decision in this round was also to determine the boundaries of every SDR corridor. The SDR concept and delineations were incorporated within a document called MPWH Strategic Plan 2015-2019, which provided a legal background to the SDR. According to the Strategic Plan document, the idea behind the SDR was further strengthened by the focus of SDR development on "the presence of growth centers, manufacturing industry, food industry, maritime industry, and or tourism, and the benefit from the economics of scale" (MPWH, 2015, p.53). The SDR development, thus, explicitly prioritized regions that have the potential to contribute to the national and regional economy while at the same time aiming for a trickle-down effect on the larger region outside the corridor through investments (RIDA, 2015).

To come up with the SDR delineations, within six months (October 2015 to April 2015), RIDA conducted a profile analysis of Java Island that identified the presence of strategic nodes/areas within regions and policy analysis of related national/regional planning documents.

The analysis identified robust economic linkages between the four primary urbanized nodes of Semarang, Surakarta, Yogyakarta, and Magelang City due to a combination of tourism, trade, services, and logistics activities and movements. A national road knitted these nodes and regions together. More importantly, the policy analysis showed that the Yogyakarta-Solo-Semarang regions were part of an existing central government policy called National Priority Programs. In this policy, the central government had planned to link the primary urbanized nodes with fast highway connectivity that supports those regions' activities. The connectivity program of the National Priority Program was in line with the corridor idea, which aimed to strengthen the urban economic growth of those primary urban nodes, which needed to be strengthened with additional programs to function as a transport corridor. Thus, the YSS Corridor delineation was formed along the four mentioned Cities and the regencies in between, comprising two provinces of Central Java (Semarang City, Semarang Regency, Salatiga City, Boyolali Regency, Surakarta City, Klaten Regency, Magelang City, Magelang Regency), and Special Region of Yogyakarta.

The economic linkage between Central Java Province and the Special Region of Yogyakarta Province that formed the YSS Corridor was not the only one in Java Island. Apart from the YSS Corridor, RIDA delineated three more corridors in Java Island based on the strong economic movements between regions in five different provinces on the island. The corridors include Jakarta - Cirebon - Semarang Corridor, which connects the three different provinces of Central Java, Special Capital Region

of Jakarta, and West Java. Semarang - Surabaya Corridor, which links Special Region of Yogyakarta Province with East Java Province; and the Yogyakarta - Parigi - Blitar -Malang Province connects Special Region of Yogyakarta Province with East Java Province. The presence of these corridors confirmed that their delineations were economically focused, comprising regions with strong movements of different economic sectors and various economic nodes.

Moreover, Indonesian Law No.25 Year 2004, concerning the National Development Planning System, mandated each ministry/agency to prepare a five-year strategic plan that included the ministry's vision, mission, and strategies in accordance with its task and function. Since the SDR would become the formal planning instrument for all MPWH sectors, the ministry needed to incorporate the SDR concept and delineations within MPWH Strategic Plan 2015-2019. Such task was designated to the Center of Public Work Infrastructures Planning of RIDA as a department in charge of formulating MPWH strategies. The document was legalized by MPWH Minister himself on April 8th, 2015, as Ministerial Law No.13/2015.

Following the adoption of the SDR concept within MPWH Strategic Plan, on April 22nd, 2015, RIDA was formalized as part of MPWH organization structures after a series of coordination between MPWH with the Ministry of Administrative and Bureaucratic Reform through Ministerial Law No. 15/2015. The law distinguished five departments within RIDA according to their function and working unit scales. The departments were: Center of MPWH Infrastructure Planning (national scale), Center of Programming and Evaluation of MPWH Infrastructures (national scale), Center of Strategic Area Development (within and between regional strategic areas, including corridor scale), Center of Urbanized Area Development (city scale), and the Secretariat of RIDA.

With the departments' authority in place, the next phase of the corridor development was to continue with the detailed planning (regional scale) of the YSS Corridor. Nevertheless, RIDA was aware that mezzo-to-micro planning required local knowledge of the regions and thorough sustainability analysis to determine the appropriate interventions for the corridor. RIDA needed the involvement of other actors with such capacities. Thus, RIDA used the process design and process management to set up the governance settings and adapt/come up with new rules, procedures, and platforms for the whole planning process of the YSS Corridor.

The process design and process management were codified through Integrated Infrastructure Development Plan Program (for round two) and Pre-Regional Consultation Forum (for round three). To realize IIDP program, RIDA prepared the allocation for funding in this round, and the design of IIDP's program within IIDP's Terms of Reference document (TOR) before its execution in the following year. RIDA was also aware that the coordination of actors in the 2017 Pre-RC forum needed to be guided, in which they set up a document called Pre-RC guideline.

7.1.2 Sustainability outcomes of round one

Sustainability outcomes in this round can be found within MPWH Strategic Plan (SP) 2015-2019 document as a national policy that guides the general MPWH objectives, SDR principles, and the SDR strategies applied to every SDR Corridors, including the GDP and the YSS Corridors.

As mentioned in Chapter 6, the Strategic Plan document emphasizes the economic ambitions of the Indonesian Government for regions, as evident in Java Island's development theme, the SDR principles, and the YSS delineations. The Java Island development theme showcased the central government's economic ambition, as Java is envisioned to become the national food barn of Indonesia, the gate for tourism destinations, and the stimulator of Indonesia's industrial, national services, and maritime sectors (MPWH, 2015, p.52). Furthermore, one of the SDR principles aimed for the "benefits within the economics of scale" (MPWH, 2015, p.53). This principle can be observed in YSS Corridor delineations, which were formulated based on the presence of abundant growth nodes and good national connectivity in order to drive the development of growth centers, accelerate development in the lagging regions, and strengthen the region's competitiveness and economic contribution (MPWH, 2015, p.54). Hence, the delineations highlight the corridor's ambition for agglomeration benefits.

Apart from the economic outcomes, the SDR principles and strategies yielded macro sustainability outcomes in the environmental and social dimensions. The principles emphasized that the SDR development activities should not harm or degrade the environmental carrying and support capacities of regions nor disturb the balance of ecosystems (MPWH,2015. P.45). In the social dimension, the strategy stressed measures for the provision of basic infrastructures. This included measures for the provision of clean water and sanitation and the elimination of slums. Additionally, the Strategic Plan document outlines the responsibility of MPWH in establishing a balanced and synergized sustainable development (MPWH, 2015. P.2). This statement was translated into the formulation of three public work infrastructure objectives: to function as an engine of growth that triggers the establishments of new emerging growth centers (economic); to synergize with the environmental sustainability (environment); and to address the disparity, urbanization, and urban sprawl issues (social) (MPWH, 2015. P.50). These objectives illustrate the government's ambition to also obtain sustainability within regions.

Though overshadowed by the economic goal, these early sustainability ambitions laid the foundation for sustainability outcomes in later planning rounds, allowing the corridor to be directed toward a sustainable direction. The sustainability outcomes in round one were influenced by the constellation of governance factors described in the section below.

7.1.3 Governance factors of round one

In this conception round, five governance factors can be described as follows.

First, the economic vision of the SDR. It started with MPWH Minister's vision to enhance the competitiveness capacities of regions as mandated by the National Development Plan that simultaneously integrates the fragmented public work infrastructures. To realize this vision, the regional development approach was adopted to develop the SDR concept. The SDR concept was illustrated within MPWH Strategic Plan as "public work infrastructure development that is directed to accelerate the physical development in economic growth centers that maximize agglomeration benefit, potentials of the region, and efficiency of infrastructure provision in regions" (MPWH, 2015. P.53). This statement shows how the vision led to a development that put front the economic potential of regions.

At the same time, the strategic plan also envisioned public work infrastructures to cater to the needs of regions without sacrificing the needs of future generations by pushing the integration of three sustainability pillars (MPWH, 2015.p.2). Such early vision was in accordance with the world-renowned sustainability concept of the Brundtland Report, which allowed the environmental and social dimensions to set their foot on the door to continue the corridor development towards a sustainable direction.

Second, the top-down mechanism behind the establishment of the SDR. The SDR concept surfaced from the idea of an influential personality who led RIDA. The concept was then elaborated by RIDA officials with the help of planning experts without the participation of the regional actors. With only the central government that designed the policy, the SDR was established hierarchically as an MPWH policy to translate the mandate of National Mid-Term Development Plan, a higher-hierarchy planning document consisting of the president's vision and mission. Therefore, this top-down mechanism was used to steer the SDR concept economically.

With RIDA's awareness of the need to further tailor the programs of each SDR corridor according to the corridor's needs, in which regional/local actors' capacities are needed, RIDA initiated the use of a process management and process design for the settings of the whole rounds of the corridor development. Process management played its role in assembling relatable actors for the following planning process, allowing different actors with different knowledge and implementation capacities to participate in shaping the corridor's future. The process design guided the process of their interaction and facilitated their interactions within a coordination platform.

Furthermore, RIDA was also aware that following the detailed planning in the second round, programs eventually needed to be implemented within regions.

Thus, RIDA designed a process to introduce the SDR concept to the provincial actors through an existing forum called Pre-RC, which they intend to utilize further to direct the coordination of actors toward corridor implementation. Therefore, apart from setting up the start of IIDP Program, RIDA prepared for the design and execution of Pre-RC.

Third, the lack of environmental and social sustainability representatives. As an implication of the second factor, where only the central government was accounted for in formulating the SDR concept and delineations, the SDR was established without a thorough assessment of its environmental and social impacts.

RIDA's main decision-makers came from civil engineering, architecture, and urban/regional planning backgrounds, while few came from the environmental engineering major. The dominance of officials from the planning background was due to the nature of MPWH as a technical ministry that focuses on planning and implementing public work infrastructures (roads/highways, public housings, dams, irrigation systems, drainage systems, landfills, and others). Similarly, the staff within RIDA was also dominated by urban/regional planners. Thus, representatives whose interests and expertise were in the environmental and social fields were subsequently excluded. Their presence might, alternately, have led to a different notion of SDR principles and strategies, with delineations that took into account the corridor's broader sustainability impacts.

Fourth, the use of economic knowledge in the decision-making process. This type of knowledge was present due to the top-down mechanism adopted in this round, which led RIDA officials to elaborate on the Minister's vision for integrated regional planning of regions. Therefore, planning theories focused on the agglomeration benefit and the optimization of infrastructure development dominated the discussions. The theories included the regional development approach that highlighted the use of infrastructure investment to support the growth of potential areas to boost the competitiveness of regions; and the Pareto concept that maximized the investment in particular growth centers for an optimum outcome (80% outcome from 20% investment).

Fifth, the institutional setting in this round. It is marked by the positioning of RIDA as a new and powerful agency within the ministry that was responsible for the process design and management of SDR corridors.

The Minister appointed RIDA as the single coordinator of MPWH sectors. This situation switched the institutional setting of the ministry. It terminated the previous sectoral programming of other MPWH agencies because initially, the infrastructure planning and programming functions of MPWH were carried out by the working unit (Program Development Center) of each MPWH bureau/sector (Directorate General of Roads and Highways, DG of Housing Provisions, DG of Human Settlements, DG of Water Resources), together with Bureau of Planning and

International Cooperation. After the restructuring, RIDA became the institutional innovation that formulated, integrated, and synergized the technical policies and strategies of MPWH, as mandated by Ministerial Law 15/2015. Thus, other bureaus were given new roles as the executors of RIDA programs and as advisers to RIDA. This new institutional setting paved the way for a new integrated approach to regional development. Corridor

With its new authority, RIDA aimed to realize the Minister's vision for integrated regional planning by using SDR corridors as MPWH's planning tool. In order to do so, RIDA, with the process design, set up the overall planning process for corridor development together with the rules, procedures, and platform of IIDP and Pre-RC, which were needed to set the foundation for the interaction process of actors. The design included the planning scope for public work infrastructure development to consider the potential of regions, the sustainability of the living environment, and the existing local wisdom (MPWH, 2015.p. 50).

7.2. Round two: The Envisioning of the YSS's Goals and Strategies Round (January 1st - December 31st, 2016)

7.2.1 Interaction process of round two

The beginning of this round is marked by the starting of the Integrated Infrastructure Development Plan (IIDP) Program designed by RIDA to result in contextual planning of the Corridor.

The IIDP Program was designed as a contractual program. A third party held its execution through a bidding procedure. Thus, at the beginning of this round, RIDA designed the program's TOR as a guideline for the bidding process. Afterward, RIDA held the bidding process from January 2016 to March 2016. In the bidding process, the first selection was based on the participants' administrative qualifications, including the validity of the company's license, their number of experiences with similar projects, and the quality of experts they provided. The experts had to meet the minimum criteria stated in the program's Term of reference (TOR) regarding their academic majors, level of academics, years of working experience, and previous job positions. This process resulted in a list of seven firms with the highest administrative qualification points. Thereafter, the seven firms submitted their project analysis proposals (80% scoring) and their budget spending proposal (20% scoring), which RIDA assessed.

As a result, PT. Perencana Djaya was chosen, and the firm was given eight months, from April 2016 to December 2016, to execute the program. The YSS planning team was led by Mr. Wukir Sentosa, a practitioner and an academic in spatial planning, assisted by ten other experts from environmental engineering, urban planning, regional planning, civil engineering, architecture, law, and geographic backgrounds.

Similar to the GDP Corridor, the experts' main activities involved data collection (desk study) of the environmental, social, and economic characteristics of Central Java Province and the Special Region of Yogyakarta Province. The activity was followed by two survey activities (Mei 2016 and September 2016): two focus group discussions (June 2016 in Yogyakarta City, and October 2016 in Semarang City, see Fig. 17) and a workshop (November 2016 in Jakarta). These activities were also monitored by Center of Strategic Area Development (CSAD). In addition, the team's work progress was reported monthly to CSAD through a monthly report that specified the activities of each expert, another preliminary draft report meeting (May 2016), a mid-term report meeting (August 2016), and a final report meeting (December 2016).

Fig 17. Documentation of the first FGD.
Source: RIDA, 2016c

With IIDP's objective to deliver an integrated plan of the corridor, regional actors' involvement was needed due to their capacity for local knowledge and possession of recent statistical data. The congregation between the central and regional actors was supported by the experts through Focus Group Discussions (FGDs).

Four types of actors were involved in FGDs. They were: 1) Provincial Government of Central Java Province and Special Region of Yogyakarta Province, represented by each province's Regional Planning Agency, Regional Public Work Agency, Transportation Agency, Tourism Agency, Agriculture and Horticulture Agency, Industry and Trade Agency, Energy and Mineral Resources Agency, Environmental and Forestry, and Regional Disaster Management Agency; 2) Ten local governments of Semarang City, Yogyakarta City, Surakarta City, Magelang City, Salatiga City, Magelang Regency, Semarang Regency, Klaten Regency, and Boyolali Regency, and Sleman Regency. These local governments were represented by their own Regional Planning Agency; 3) an academic with a regional planning background from the Diponegoro University; 4) private actors from the PT. Taman Wisata Candi Borobudur and Prambanan dan Ratu Boko Temples manage the development of these tourism sites. The team of experts mediated these actors' involvement.

The analysis shows that the regional actors' inclusion in the network switched their perceptions toward the SDR concept. Initially, the SDR was established in isolation (top-down), as confirmed by Respondent 8. This means the regional government did not obtain sufficient information to comprehend the reasoning behind the prioritization of regions as a strategy RIDA chose. This circumstance was portrayed by Respondent 21. Additionally, the regional government doubted the SDR concept because of the inconsistency of previous MPWH programs, which got canceled before any implementation in regions ever took place, as explained by Respondent 8.

> "When the concept was first introduced (to the regional actors), I saw that in the beginning, there was pessimism. Yeah, I understand, this was a product of the central government, with a top-down approach" - Respondent 8.

> "There were some questions: what was wrong with the central government? If regions were already developing, just let them be. It is growing by itself, and we need to watch its environmental support capacity limitation. This means we have to develop others (non-developed regions), in phases, so that it can have inclusive economic growth, not just on the surface, but, within regions, for even distributions" - Respondent 21.

> "Central government tends to have variations in their policies, from A to Z, ended during the planning phase. So, the bottom line is, what is next? What is concrete for the regions?" - Respondent 8.

The FGD platform allowed the central government to explain the regional development concept adopted for the SDR to the regional actors. This circumstance helped switch the regional actors' perspectives after participating in two FGD sessions. For example, the new perception of the regional actors in Respondent 23's comment. Moreover, both regional governments knew that regions could not perform individually and needed to integrate to bring out the best of their potential and identity, as Respondents 18 and 22 shared.

> "From the spatial planning perspective, we see the YSS not just as a corridor but more as a regionalization. Because it is across provinces, we are hoping for an interconnection that can bring benefit to both parties" - Respondent 23

> "Once we turned a blind eye to each other, we are killing each other because Yogyakarta needs Central Java for the things that Yogyakarta does not have. Likewise, Central Java also needs Yogya, for example, so that we become one package"- Respondent 18.

> "I believe this (the YSS development) is good because we cannot function alone in Central Java. Central Java also needs a magnet; in this sense, it is the Special Region of Yogyakarta. So we must see Yogyakarta, Solo, and Semarang as one unity of a corridor for sustainable development" - Respondent 22.

> "We (The Regional Planning Agency) and the Governor (of Central Java) are attempting to develop the Joglosemar areas. Our colleagues in the regencies are also familiar (with this term), so they are aware that the development of regions cannot be performed independently, but it has to be integrated. In this sense, there is an attraction to it with different conditions and characteristics among regions. Solo is situated in the middle, and Yogyakarta dominates with its mountains, while Semarang is in the coastal area. We each have challenges to be developed according to our characteristics" - Respondent 22.

Unlike the GDP's delineation, which received a firm rejection from the regional actors, the YSS corridor delineation was somewhat accepted despite the regional actors' absence in the decision-making process of the first round when the YSS regions were defined. Three reasons caused this situation.

First, the regional actors were aware that the YSS, commonly known as the Joglosemar, was part of an older central government's National Strategic Project policy, as Respondents 18 and 23 mentioned. Joglosemar regions were planned to be connected by fast road connectivity, such as highways that link the primary urbanized nodes of Semarang, Surakarta, Yogyakarta, and Magelang. This plan had already gathered support from Central Java and Special Region of Yogyakarta Provincial Governments due to its ability to improve the tourism and logistic flows between regions. For example, the travel time between Semarang City and Borobudur takes approximately 3-4 hours. With the new connection, the travel time is expected to be 30 minutes (Business.com, 2020).

> "Everybody knows when we talk about Joglosemar (The Yogyakarta-Solo-Semarang"- Respondent 18.

> "Joglosemar is an old concept. It was part of the national strategic areas. In the National Spatial Plan, it is part of the national development focus" - Respondent 23.

Second, the regional government actors were aware of three other SDR Corridors' presence: 1) Jakarta - Cirebon - Semarang Corridor, 2) Semarang - Surabaya Corridor, and 3) Yogyakarta - Prigi - Blitar - Malang. Central Java and the Special Region of Yogyakarta Provinces are situated on Java Island, where economic linkages are formed not only between the two provinces but also with other administrative boundaries of West Java, the Special Capital Region of Jakarta, and

East Java Provinces. RIDA considered the importance of those connections and incorporated them within the SDR planning during the first round.

Third, the YSS Corridor policy did not conflict with Central Java Provincial Government's internal strategy, which is to direct their inner development within three axes: 1) North - North Corridor (that connects Bregasmalang - Petanglong - Kedungsepur - Wanarakuti - Banglor), 2) the South-South corridor (that connects Barlingmascakeb - Purwomanggung - Subosukawonosraten), 3) and the North-South corridors (that connects Bregasmalang with Barlingmascakeb, Petanglong with Purwomanggung, and Kedungsepur with Subosukawonosraten), as explained by Respondent 21. The YSS Corridor plan aligned with the North-South axis (the third regional corridor). In addition, Central Java Government's plan to conserve the areas of Merbabu and Merapi Mountains was also in line with the planning of the YSS Corridor.

> "In the regional development context, specifically in Central Java Province, there are three corridors to develop" - Respondent 21.

The above paragraph thus highlighted how the central and regional governments shared a similar strategy. However, there were additional challenges that the regional actors aimed to resolve through the YSS corridor development. The first challenge was the disparity gap between the more prosperous North and South regions, with the Western and Eastern regions, particularly in Magelang Regency. In the past development, investment had been focused on the wealthier regions, causing inequalities of economic opportunities, basic infrastructure, and educational facility accessibilities. Skilled laborers moved to those prosperous regions and left the rural areas in the West and East in poverty.

The second challenge was the extensive natural disasters threatening all ten cities/regencies within the YSS Corridor, which were also mentioned by the team of experts/consultants in IIDP report, as they identified various natural disaster issues in each city/regency). The third challenge was the land conversion issue. The YSS Corridor was envisioned as a transportation corridor to improve the connectivity between the four urbanized nodes. This means that road connectivity was planned to support the flow of activities of regions, notably the YSS plan to connect Yogyakarta and Bawen via Magelang (west corridor), and Yogyakarta to Surakarta (east corridor. Meanwhile, various sustainable agricultural land was located in the YSS regions, particularly in the West and the East, supporting the agricultural demand of the larger regions of Yogyakarta Province and Central Java Province.

With all those concerns, in December 2016, the team of experts submitted the IIDP final report of the YSS Corridor. The report not only incorporated the YSS profile analysis (from the environmental, social, and economic perspectives), but it also presented the ultimate goals and the regional development strategies that addressed the sustainability issues of regions.

7.2.2 Sustainability outcomes of round two

The sustainability outcome in the planning round was found within the Integrated Infrastructure Development Plan (IIDP) final report document as an output, which comprises the detailed planning of the YSS Corridor.

The economic measures in this planning round remained predominant. However, compared to round one, environmental measures were planned more extensively within the YSS's ultimate goals and the YSS regional development strategies. Meanwhile, the social measures received more attention than in the last round, but not as much as the other dimensions. Those measures are elaborated on below.

As economic measures, the YSS Ultimate Goals were formulated to: 1) improve the network system and connectivity between regions in the corridor to facilitate the growing tourism and logistic sectors, 2) develop a new transportation system network that directed the development of regions, 3) improve the facilitation of socio-economic infrastructures that supported the growth of agriculture, industrial, and tourism sectors (MPWH, 2017b.C4-9). These ultimate goals were translated into various programs within the YS regional development strategies through the connectivity plan between Semarang - Bawen - Surakarta, and Bawen - Magelang - Yogyakarta; agricultural facilities such as irrigation and raw water installation in Boyolali, Klaten, Sleman, and Magelang; development of transportation hubs (airport and seaport) in Semarang City as the primary economic node of the YSS Corridor (MPWH, 2017b. E1-5)

Moreover, considering the experts' and regional actors' remarks on the environmental threats and social concerns in various YSS regions, economic measures were accompanied by the necessary environmental measures. Such measures were appointed in the YSS's ultimate goals to address: 1) the natural disaster issues of volcanic eruption, flooding, high tides, and earthquakes; 2) the waste issue, particularly in an urbanized area with inadequate final waste facilities; 3) the improve the environmental and social living quality of people (MPWH, 2017b.C1-9). These environmental goals were translated into the YSS regional development strategies. The environmental strategies were to address the natural disaster issues in all regions (by developing coastal protection infrastructures and drainage systems.

These environmental goals were translated into YSS regional development strategies. YSS strategies were directed toward measures for natural disaster issues, including coastal protection and drainage system development. This program was allocated in Semarang City, Semarang Regency, Salatiga City, Yogyakarta City, Sleman Regency, and Magelang Regency. Another strategy was to improve the environmental quality of urbanized areas. It was executed by developing public housing, a drinking water system network, and temporary/final landfills in Semarang City, Semarang Regency, Yogyakarta City, Magelang City,

Magelang Regency, and Surakarta City. Lastly, the strategy was appointed to improve the environmental and social quality of housing/settlements. Such an attempt was made through the development of communal waste-water installation in Surakarta and Yogyakarta Cities (MPWH, 2017b. E1-5)

7.2.3 Governance factors of round two

The economic focus in this planning round remained dominant to support the economic ambition of the previous round. However, as actors from various backgrounds joined the network, the concept of an economic corridor began to switch towards a sustainable corridor as more attention was given to environmental and social measures, especially the former measures. This switch can be described from the governance factors below.

The first factor is the reformulation of the YSS vision. One of the activities within IIDP program was to prepare a new vision to guide actors' decisions for formulating YSS Ultimate Goals and Regional Development Strategies. Chapter 6 described that regions within the YSS Corridor have unique identities. Those in the North were part of the National Strategic Areas and the National Activity Center because many trade, services, and industrial activities occurred there. Meanwhile, the South and the West regions are the National Tourism Strategic Areas. On the other hand, regions in the Northeast, Southeast, and West are known for their agricultural productivity. Lastly, the cities of Surakarta (East) and Yogyakarta (South) are also part of the National Activity Centers.

With the above description, the YSS vision was contextualized to develop regions based on their specific characteristics, potentials, and functions within the national planning system hierarchy and to synergize the corridor development with other related/connected corridors (MPWH, 2016b. P.II-38-41). As a result, the YSS was envisioned as a corridor development that incorporates sustainability ideas. The idea was to enhance the connectivity and mobility of the Joglosemar, enhance the environmental dimension of metropolitan regions, mitigate natural disasters, improve the people's living quality, and push the equality of infrastructure investment of the lagging regions.

Second, the governance mechanism changed from top-down to a mix of bottom-up and collaborative governance, which was made possible using process management and process design arranged by RIDA. The process management allowed the top-down to be mixed with bottom-up and collaborative governance. These mechanisms brought different regional and local actors into FGDs platform. These regional/local actors were from the government party and non-government actors, including experts, academics from local universities, and the private sector. The changes in the governance mechanism made it possible for a team of consultants and regional/local actors to take part in producing the sustainability analysis and shaping the YSS planning. Their ideas and aspirations were catered to

within the YSS goals and strategies (as YSS sustainability outcomes), resulting in place-awareness planning and detailed sustainability outcomes. They brought different types of sustainability knowledge and perspectives into FGD's discussions and negotiations. Thus, the environmental and social sustainability of the YSS Corridor was enhanced.

The actors' roles in corridor development also altered with a change in the governance mechanism. The role of RIDA switched from that of a sole actor that determined the SDR outcomes in the first round to that of initiator and supervisor of IIDP program execution. The team of experts executed IIDP program, using the regional/local actors' knowledge to deliver a thorough sustainability analysis (as part of IIDP's output) and share the information with all stakeholders. Experts also took in the different ideas/objectives of central government and regional actors and aligned them, as catered within IIDP's goals and strategies. The regional actors acted as the primary resource of local sustainability knowledge (for the sustainability analyses) and advisors of the program.

Despite the increasing role of the regional/local actors and experts in FGDs, RIDA was the primary decision-maker who steered the direction of the corridor development. Programs were discussed and proposed by regional actors and chosen insofar as they benefit the initial RIDA's objectives of the corridor for integrated planning, acceleration of growth, and competitive regions.

Third, the presence of actors representing various sustainability pillars changed in this round. As an implication of the switch towards collaborative governance, the network consisted of experts and regional actors representing environmental, social, and economic backgrounds. An essential actor that strengthened the development of corridor's environmental and social dimensions in this second round was Regional Planning Agencies (RPA) of Central Java and Special Region of Yogyakarta, and RPAs of all ten cities/regencies of the YSS Corridor. RPA actors represented all sustainability dimensions since RPA had the authority to manage regions' environmental planning, natural resources, human development, social welfare, and economy, as projected upon their organizational structures. It was their task as part of the provincial and local governments to ensure that environmental, social, and economic aspects were all addressed and considered when developing regions.

Other new actors in FGDs were Regional Environmental and Forestry Agencies (REFA) and Regional Disaster Management Agencies (RDMA) of Central Java and Special Region of Yogyakarta. REFA deals with issues related to waste management, environmental pollution, forest management, watershed management, natural resources conservation, and enforcement of environmental law and forest protection (dlhk.jatengprov.go.id; dlhk.jogjaprov.go.id). Similarly, RDMA is

responsible for disaster management in regions, including disaster prevention, disaster emergency management, rehabilitation, and reconstruction of regions.

With their knowledge and implementation capacity, the YSS Vision and Regional Development Strategies were directed to improve the environmental quality in urban and settlements (including issues related to drain systems, waste systems, and traffic congestions), measures for natural disasters, and the provisions of basic infrastructure in the lagging regions. However, while new sustainability representatives became present in FGDs, the YSS Corridor network was still dominated by economic actors, especially provincial government agencies related to the prioritized sectors (tourism, agriculture, transportation, industries, trade, energy, and minerals) and the private actors from Borobudur-Prambanan management. The latter actors were invited into the network because the central government was interested in developing the surroundings of Borobudur and Prambanan Compounds as UNESCO's World Cultural Heritage and National Tourism Strategic Area (NTSA).

In addition, FGDs were also dominated by government actors without much from community representatives, environmental/social NGOs, or private actors representing various sectors of the corridor. In addition, there was only negligible involvement from academics from a regional planning background. These compositions mean that the YSS network representatives were not equal representatives of public, social, and civil actors. Therefore, the YSS planning did not optimally gain input from those with knowledge and authority to enrich the sustainability measures to deliver a sustainability balance. The lack of social representatives influenced the outcome in this second round, which was lacking in social measures.

Fourth, the knowledge of all three sustainability pillars was utilized in producing IIDP's output. With the data gained by the consultants from the data collection activities, the team generated a series of codified analyses that captured the corridor's profile in relation to the three sustainability dimensions. Within the social dimension, the analyses included demography, Human Development Index, Poverty Severity Index, and access to housing, education, and basic infrastructures. In the environmental dimension, the analyses concerned waste, traffic congestion, natural disasters, and conservation areas. In the economic dimension, the analyses were related to the GRDP, local commodities, energies and natural resources, economic linkages, public work infrastructures, and strategic areas.

These analyses, however, were insufficient to formulate the ultimate goals and the regional development strategies of the YSS Corridor, as they needed to be supported by the projection analysis of public work infrastructures. Thus, central and regional actors contributed their input during FGDs, which allowed the consultants to analyze the regions' need for public work infrastructures for ten

years, from 2016 to 2026. The analysis included the need for landfills, roads and highways, raw water capacity, clean water, sanitation, and public housing (MPWH,2016. III.13-24).

The consultants addressed four points within IIDP final report document. Firstly, based on the volume capacity ratio analysis and the tourism projection analysis, the corridor should expand its capacity to facilitate growing economic activities, especially for the trade and logistics movements in the North, and the tourism movement in the South of the corridor. Secondly, based on the raw water provision analysis and an irrigation projection analysis, the existing agriculture infrastructures were inadequate to support the YSS's ambition in the agricultural sector. Thus, an improvement in water resource development was needed. Thirdly, all regions in the corridor were prone to natural disaster threats. Measures were mainly needed for the City of Semarang, with its northern coastline facing abrasion, high tide, and flooding, and City of Yogyakarta, which faced volcanic eruption, earthquake, and landslide issues. Fourthly, based on the population projection analysis, the corridor would not be able to support the needs of the people for such infrastructures in 2026. To further support the improvement of people's living conditions, the team also highlighted the need for public housing provision and the upgrading of slums.

Moreover, to result in the regional development strategies of MPWH infrastructures, programs needed to be directed for specific regions, which required experts to consult the proposals with the regional actors, particularly during the second FGD. This means their tacit and local knowledge was crucial to IIDP’s output, which would become the Pre-RC planning process input. The importance of local knowledge was projected upon different types of programs in three sustainability dimensions. In economic dimension, there was a road capacity enhancement program of the Bataskota Salatiga - Batas Boyolali segment. In the environmental dimension, there was the sediment control infrastructure in Yogyakarta and Surakarta Cities. In the social dimension, there was the waste-water installation in Boyolali Regency and Putri Cempo in Surakarta Regency.

Fifth, the switch of institutional setting, as the corridor development entered a new arena of planning on a regional scale from the previous national scale, with existing institutional planning procedure and practice, in which the setting was further reshaped by RIDA to accommodate the corridor approach.

The institutional setting in this round started with RIDA's formulation of IIDP’s Term of Reference (TOR). Within the TOR, RIDA designed new rules, including the types and criteria of experts to execute the program, the roles of the actors, different kinds of activities throughout the program, and the expected output. The rules also included the planning scope, in which activities within the corridor must adhere to environmental capacities of the regions, and the environmental quality of settlements (MPWH, 2016b.p5). To facilitate the interaction of actors, RIDA also

planned a new coordination platform within the TOR, called the Focus Group Discussions, that allowed the sharing of information and brainstorming of ideas among different types of sustainability actors.

Following the formulation of the TOR, RIDA held a bidding process that used an existing "contractual program" procedure, with funding already allocated in the previous round, to select the most qualified firm according to the criteria of the TOR. This bidding process included an existing procedure of assessments of the company's validation, the quality of experts, and the budget proposal for the program execution.

By doing so, RIDA demarcated a sustainability boundary for the programs within the YSS corridor, supported the enactment of two-way interactions of actors, and allowed the bottom-up input from the regional sustainability representatives that were necessary for the formulation of vision, ultimate goals, and regional development strategies of the YSS Corridor. Thus, the boundaries are blurry and open up possibilities to bring in more sustainability issues.

7.3. Round three: YSS's Programs' Prioritization and Implementation Round (February 2016 - December 2019)

7.3.1 Interaction process

In the implementation round, actors from central and regional governments assembled and discussed the priority programs to be implemented.

The coordination of actors took place on a platform called the Pre-Regional Consultation (Pre-RC) forum. Pre-RC had pre-existed before the corridor establishment. It was used by MPWH to annually congregate MPWH sectoral actors with provincial governments to discuss the strategic issues within regions and each other's priorities before programs could be determined for the following year after each meeting was held (N+1).

Following the incorporation of SDR in MPWH Strategic Plan in 2015 and 2016, the platform was utilized each year to define sustainability measures related to the corridor development. Because this study's data collection was done in 2019, this research analyzes the Pre RCs held in February 2016, March 2017, and February 2018 and the implemented programs (outcome) throughout 2017-2019.

The core actors involved in Pre-RC meeting were RIDA, MPWH sectoral actors (from Directorate General of Water Resources, Directorate General of Roads and Highways, Directorate General of Human Settlements, and Directorate General of Housings Provisions), Provincial Government of Central Java, and Provincial Government of Special Region of Yogyakarta. Provincial governments were represented by Regional Planning Agency (RPA) and Regional Public Work Agencies

(RPWA) from both related provinces. Their involvement was due to their authority to intervene in the planning of regions. The RPA was involved due to its role as the coordinator among various regional sectoral agencies and its authority in regional planning, and the RPWA was involved due to its authority in implementing public work infrastructures in regions.

Within Pre-RC, central government attempted to circulate more knowledge on SDR concept and the background of its establishment, to gain regional actors' support and commitment toward the corridor implementation.

The commitment of the regional actor was crucial due to state budget limitations and the region's autonomy. Thus, the commitment was anticipated through the fulfillment of four readiness criteria. Readiness criteria are technical requirements in the form of a feasibility study, environmental assessment, detailed engineering design, and land acquisitions that must be presented before any physical MPWH programs can be funded and implemented by the state budget. Such circumstance was expressed by Respondent 8.

> "How do we incorporate regional government, to, come on, we have this big program for Joglosemar… Can the regional government support it by providing the land? To work for it (to happen)?" - Respondent 8.

Nevertheless, Respondent 35 explained that when the poorer regions had no sufficient funding to meet all criteria, the situation did not constrain the implementation of programs. When a local government has insufficient implementation capacity, but the proposed program is urgent or strongly impacts the region, the provincial government can take over the responsibility. Examples of high-level urgency programs can be found in the measures to address vulcanic eruptions or the fulfillment of central government's 100% target of clean water and sanitation provisions. Similarly, strong impact programs can be seen in the development of regional landfills, or public housing that can enhance regions' environmental and social sustainability. Such practice was approved if the program aligned with Provincial Spatial Plan. In addition, if Provincial government was also incapable of providing the funding for the criteria, the Governor proposed funding assistance to MPWH, through a letter to MPWH Minister, after the program was deemed strategic by MPWH sectoral actors during Pre-RC.

> "The readiness criteria can either be prepared by the local, provincial, or national governments. However, if the budget was from the national government, the program had to be very urgent"…" Not every program could be assisted by central government whenever a region could not fulfill it"….. "There were criterion and urgency levels, for example, if the class of the road was national level (but located in regional land). Normally, the regional government prepares the

> readiness criteria. But, without funding, they (Provincial government, through the Governor) proposed assistance to MPWH Minister for the project's land acquisitions" - Respondent 35

Moreover, since Pre-RC was an annual forum, RIDA arranged and produced a Pre-RC guideline every year, including its annual Pre-RC theme, the flow of activities, venue and time, and locations. The guideline formulation was assigned to the Center of Public Work Infrastructures Planning of RIDA, the department that designed MPWH Strategic Plan, with its authority to formulate technical policies and strategies for MPWH. The guideline was meant to be followed by all Pre-RC participants, and national and provincial actors to classify programs within two categories. The categories were: 1) baseline programs, for those that have met all readiness criteria and prioritized to be funded by the state budget and implemented in the following year, and 2) stock programs, for those that are still in the process of their readiness criteria completion and remarked by Pre-RC actors as strategic programs.

There were three sessions within Pre-RC. First, the plenary session, where Secretary General of MPWH and Head of RIDA gave a directory message to all Pre-RC actors concerning the focus of programs they should prioritize. Second, the sub-desk session, where Provincial governments of Central Java and the Special Region of Yogyakarta were divided into two separate desk sessions. The reason for this division was for regional actors to focus the discussion and prioritization of programs within their province. Each desk was led by a director of RIDA who presented the detailed MPWH strategy for the related province, including the vision and ultimate goals of the corridor followed by a presentation by the regional government, commonly held by the head of RPA, where they revealed their regional vision and strategy for the regions.

Lastly, the sub-desk session, led by a few Head of Divisions of RIDA, bridged the discussion between RIDA, MPWH sectoral actors, and Provincial government actors. Here, the actors were divided into two parallel desks. One discussed the proposed infrastructure programs for water resources and road development, and the other desk discussed the infrastructure of settlements and public housing provisions. The sessions included negotiations on each proposed program's timeline to fulfill the Readiness Criteria, prioritizing compliant programs as the strategic programs for the following year. As mentioned in Chapter 6, the fulfillment of readiness criteria takes time and a large amount of funding. Thus, its completion means that the program was prioritized and needed to address regional strategic issues according to the negotiations and agreements of the central and regional actors.

By incorporating the regional actors in the network in the decision-making process, the regional actors' perceptions towards the regional development concept behind

the establishment of the SDR were becoming more synchronized with the central government, as displayed by Respondent 30. In addition to this, their acceptance grew, which was projected upon their commitment, as shared by Respondents 18 and 8.

> "Strategic Development Regions is an instrument, or a tool founded by MPWH. Its basis is on regional infrastructure development within SDR Corridors… when translated, it is about the connectivity between the airport, stations, and surroundings - how other economic sectors, such as industrial areas, are connected. In short, how the regional infrastructure can be used to support the dominant sectors, depending upon which dominant sectors are in it" - Respondent 30

> "What does MPWH actually need here? The regional government will try to integrate our interests and those of MPWH because what becomes the interest of MPWH must represent the national needs that are part of a national program, despite the jealousy that might occur among regions. But because there is an interest (national interest) in it, it is no problem"- Respondent 18

> "Recently, I see the regional government has become serious about contributing according to their authorities…. In the beginning, there seems to be resistance. But in the past two-three years, they have accepted (the corridor)"- Respondent 8

Furthermore, in the previous round, the analysis revealed that each party recognized the importance of improving the connectivity between four primary urbanized nodes in the North (Semarang City and Semarang Regency), East (Yogyakarta City), South (Yogyakarta City), and West (Magelang City and Magelang Regency). However, throughout the implementation round, each type of actor appeared to develop another particular interest. The central government aimed to develop Borobudur compound as part of the National Tourism Strategic Areas (NTSA), as stated by Respondent 23. Meanwhile, the regional government of Yogyakarta aimed to enhance the tourism activities within Yogyakarta City and the larger area of the Special Region of Yogyakarta Province, especially since the new airport in Kulonprogo became entirely operated, as shared by Respondent 33.

> "About two months, there was a meeting (ratas) between the Governor and president, that for the Joglosemar, the priority is in Borobudur" Respondent 23.

> "Now, there is a plan for a highway from Magelang to Yogyakarta, to Sleman and Klaten. And then at the airport (Kulonprogo), there will be a train….meaning when the tourists are landing, they come to the front door of Yogya, which is the train station, drop out in Tugu

> (station), and we welcome them with Malioboro (tourism area in Yogyakarta City)" - Respondent 33
>
> "The airport has been built, and the highway is undergoing planning, so we developed the public areas and tourism destinations. We improved the infrastructure through a make-over of the main city square that used to be a slum, and to the North, we revitalized the pedestrian pathways. Then, we moved the street hawkers to the back area, renovated the Sultan's palace, and provided good access to the site…… we also conducted workshops and training for the local guides. We invited experts from the academics who have the capacity for such training. We also provided tourism packages like Tourism Village as an alternative to Yogyakarta City. We declared 17 tourism villages…..We are trying to become a tourism services city. Thus, we provided hotels, restaurants, spas, and all facilities that the tourists need. We developed Breksi, Merapi, Kulonprogo, Gunung KidulBeach, and Bantul Beach. We develop the tourism destinations… There must be a mutual relationship with the surrounding areas supporting Yogya City" - Respondent 33.

On the other hand, the regional government of Central Java was aware of the upcoming connectivity that would be developed from Semarang City to Yogyakarta via Magelang Regency. Apart from using this new development to improve the connectivity between Semarang City and Borobudur, it was in their strategy to improve the accessibility of the lagging regions along the route and spur economic growth, as mentioned by Respondent 20. In addition, with Central Government's plan to develop Borobudur Compound, there was an expectation that the program could improve the local community's socio-economic condition and address the existing environmental issues in Magelang Regency as explained by Respondents 21 and 22.

> "The expected benefit of that access (Semarang to Yogyakarta) is to open the accessibility of regions in the south" - Respondent 20
>
> "Borobudur got our attention because there are cakes from the development of Yogyakarta that can be distributed to Central Java... There will be new destinations surrounding Borobudur, known as Bedah Menoreh, that will be developed for tourism" - Respondent 23
>
> "We cannot develop Borobudur only. Instead, how can the surroundings be improved so that tourists can also enjoy the local culture and activities that tourists can enjoy?"- Respondent 21.

> "We try to develop Borobudur and tourism villages. So, we invite tourists to stay there (having accommodation in Magelang)". - Respondent 22

> "Magelang receives our attention due to its environmental support capacity. We cannot sacrifice everything for development because it will backfire on us if we do not have the raw water supply, then we do not have the needed resources to support the development. It will be embarrassing, we develop nicely, but we do not have water" - Respondent 22.

The analysis then shows how, apart from Central Government having a common interest with both provincial governments of Central Java and Special Regions of Yogyakarta, each had its particular interests. These actors shared a common interest in strengthening the connectivity among delineated regions. At the same time, Central Government aimed to advance the national tourism sector through the development of Borobudur and its surroundings; Central Java's Government planned to improve the socio-economic welfare of Magelang Regency; and Special Regions of Yogyakarta's Government strategy to develop the tourism within its own regions.

In 2018, Government of Indonesia and World Bank cooperated to launch a program that catered to the interests of these actors. The program was Indonesia Tourism Development Project (ITDP) of Borobudur - Yogyakarta - Prambanan, with RIDA as its Executing Agency. Central Government managed to push the implementation of this program since there was national interest in Indonesia to develop the area of Joglosemar as part of the national priority programs of Indonesia.

The delineations of the program involved the two provinces, with working areas that overlapped with those within the YSS Corridor. The regions within ITDP were: 1) Magelang Regency for Borobudur cluster, which includes temples of Borobudur (Pawon and Mendut); the sunrise spots of Punthuk Setumbu; Bukit Rhema, an abandoned prayer site; and the surrounding cultural villages. 2) Sleman and Klaten Regencies for Prambanan-Ratu Boko clusters included the Prambanan Temple and Ratu Boko. 3) Yogyakarta City for Yogyakarta cluster includes the Keraton, Sultan's residence, and a living museum; Water Palace; and Malioboro Shopping Street (MPWH, 2017).

The program catered to the strategies of those actors, as it had the objectives of increasing the number of foreign and domestic tourists, foreign exchange earnings, employment, GDP contribution, and tourism competitiveness while, at the same time, promoting sustainable tourism in the defined regions (RIDA, 2021). Even though ITDP and the YSS Corridor were established as individual programs, ITDP concept took the presence of the YSS Corridor into account. More importantly, as the executing agency of ITDP, RIDA was aware that ITDP execution would

contribute to realizing sustainability measures for the YSS Corridor, as ITDP program operated within the YSS delineated regions.

Due to the awareness of both provincial leaders (the Governor of Central Java Province and the Governor of the Special Region of Yogyakarta) of the necessity to establish good coordination between the two regions, in 2019, both parties formed Mutual Agreements. A discussion forum outside the FGD platform ensued to deliberate their common interests, address existing and potential conflicts, and synchronize planning, especially in the border areas, as Respondents 21 and 22 shared. Nevertheless, according to the regional actors, this agreement still has to be followed up by agreements between Regional Planning Agencies of both provinces as the coordinating function of the regions.

> "We, in the region, have initiated and attempted to build a regional relationship....It is an understanding between regions that, of course, needs to be translated into an agreement. This means that with this agreement, we are hoping for some things to be agreed upon…. Some are about the interest in regional development, conflicts on the borders, or the use of common infrastructure facilities together… There is also an issue about the synchronization of development" - Respondent 21

> "For a cooperation platform, we have a Border Coordination Meeting. In it, we recognize strategic matters for both Yogyakarta Province and us (Central Java Province). That is something that we raised (as a discussion) to develop Borobudur. Either multisector or sectoral tourism, transportation, and the environment. - Respondent 22.

7.3.2 Sustainability outcomes of round three

In round three, the sustainability outcome was found through the implementation of public work infrastructure programs.

Figure 18 shows the ultimate goals of the GDP Corridor. Programs in the economic dimension received the most attention in values (of funding) to support the realization of the YSS Corridor as a transport corridor while strengthening the identity of regions according to their potential tourism/agriculture/trade and services/industrial sectors. To support the tourism sector, tourism destinations were revitalized in the West, the East, and the South parts of the corridor (for example, the Mendut and Pawon Temples, the Kasunanan Palace, Mangkunegaran Palace, and Bukit Cinta). Meanwhile, for the agriculture sector, there were programs for the rehabilitation of traditional agro market, revitalization of tourism areas, the development/rehabilitation of dams and reservoirs, the development/rehabilitation of irrigation network and river network, the

development of retention basin, the development/rehabilitation of war water intake infrastructure.

Other economic programs of the road preservations, rehabilitations, or reconstructions were selected to connect various tourism destinations in the corridor and support the trade and logistics activities there. Examples to this were the development of Flyover Manahan and Sleman underpass. However, the extensive development of the Surakarta - Yogyakarta highway is still under construction, and the Bawen - Yogyakarta highway is still going through the process of fulfilling its readiness criteria.

Moreover, as explained in the governance process, ITDP program was initiated between the Government of Indonesia and the World Bank. ITDP was the Central Government's response to the disparity and backwash issues in Magelang Regency, and to support sustainable tourism development in Magelang Regency, Sleman Regency, and Yogyakarta City. The programs focused on improving tourism-relevant road quality and basic services accessibility, the local economy linkages to tourism, and promoting investment in the region (MPWH, 2017). However, since the program was only established in 2018, the outcome of the program was still limited to the development of the Integrated Tourism Master Plan (ITMP) of Borobudur - Yogyakarta - Prambanan in 2018-2019 that served as the future guideline for physical and non-physical interventions in the defined regions.

The ITMP was in the process of its legalization as a presidential decree. To support the program, three other programs were executed. Those programs were Market Analyses and Demand Assessments, UNESCO Program Consulting Service, and Tourism Development Program Management Support. ITDP itself is a program with a duration of 60 months, which started in May 2018. Thus, following ITMP, there will be non-infrastructure and infrastructure programs that were not implemented during the analysis of this study. The planned non-infrastructure programs were professional training for tourism stakeholders, training and development for online marketing skills, and tourism awareness campaigns for the community. Meanwhile, physical interventions were planned in the form of road infrastructure and basic services.

By now, we can see that the development of the YSS corridor was directed mainly for economic benefit, in line with its original design as a transportation corridor. However, compared to the first and second rounds, the third round had more measures destined to address environmental and social issues.

For natural disasters, examples of measures were found in river channel diversion, sand pockets, sediment control infrastructure, rehabilitation of Merapi volcanic areas facilities, development of flooding control infrastructure, and residentials' environmental drainage management system development. For the waste issue mainly afflicting Semarang City, the capital city of Central Java, Measures were

taken to develop a landfill. In addition, programs such as Green Open Space Development and Lake Revitalization appeared to enrich measures in the environmental dimension, which were not found in the previous planning round.

For the social pillar of sustainability, various measures were put forward for the provision of basic infrastructures through programs such as the waste-water system infrastructure and waste-water treatment plan development, community-based clean water and sanitation program, and development of a sewage treatment plan. The social measures also focused on the development of lagging areas, through several programs such as rural infrastructure development, rural settlements development program, and socio-economy infrastructure development program of districts.

Lastly, while social measures in the previous round were still limited to the provision of basic infrastructures, this round displayed more enriched programs that improved the social living conditions in regions. Those programs were Self-assist Home Stimulant Aid Quality Improvement, Low Income Housing Development Program, development of public housing and rehabilitation
Without Slums Program.

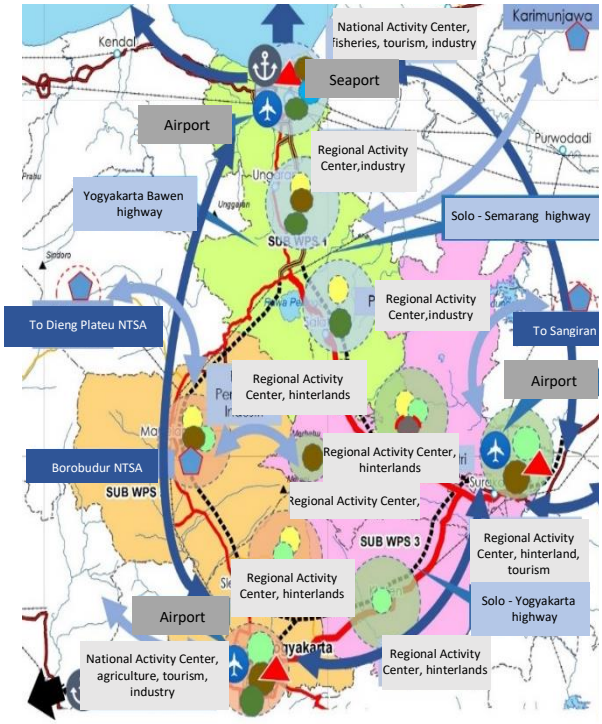


Figure 18. Ultimate Goal of YSS Corridor
Source: MPWH, 2016b

7.3.3 Governance factors of round three

In round three, actors focused on the type of programs implemented with the state funding while, at the same time, they were critical of its impact on sustainability.

The sustainability outcome analysis showed that major state funding was allocated for programs that benefitted the economic sector, such as large-scale programs such as road development and the development of dams/reservoirs, or small-scale programs such as the revitalization of tourism areas. Nonetheless, more environmental and social measures were implemented compared to the attention given to environmental challenges in round one and environmental and social challenges in two rounds. The governance factors in this third round can be described as the following.

First, the corridor concept persisted as the core of the YSS vision since the first round. Furthermore, the corridor maintained its economic orientation, but additional environmental and social sustainability ideas became more firmly embedded within the vision during the second and third rounds of corridor development. Every year, RIDA also formulated Pre-RC's annual theme, which opened the door to a broader sustainability perspective.

In 2016, the theme was "improving the integration of public work infrastructures based upon the Strategic Development Regions toward a sovereign, independent, and personable Indonesia" and in 2017, the theme was "the push toward infrastructure development and economy to increase jobs opportunity, reduce poverty, and disparity gap." In 2018, the theme changed to "Spurring Investment and Infrastructure for Growth and Equality." These themes not only displayed the need to boost economic growth through the commanding role of infrastructure development. It also highlighted the social aspects of poverty, disparity, and equality, which gave reasoning as to why there were more measures in the third round of corridor development compared to the previous ones.

The corridor and the annual Pre-RC vision were projected upon programs that improved the connectivity and mobility between the four urbanized nodes of the YSS Corridor, which were meant to support the activities of the leading economic sectors and movements and stimulate the growth of the lagging regions. Since the economic aspect did not stand alone, programs in this round were also channeled to address extensive environmental issues of natural disasters and solid waste and the social issues of clean water, sanitation, slums, and access to education facilities.

Moreover, even though it appeared that the vision of a transport corridor with additional sustainability ideas led to a more sustainable corridor development, the decision-making process of actors within Pre-RC was also influenced by external factors. Central Government's commitment to the New Urban Agenda (NUA) and the newly Integrated Tourism Development Plan (ITDP) of Borobudur - Yogyakarta

- Prambanan Program were significant factors. The NUA called for sustainable urbanization, job creation, livelihood opportunities, and improved quality of life (unhabitat.org). At the same time, ITDP was established to improve relevant road quality and basic services accessibility, strengthen local economic linkages to tourism, and promote investment (MPWH, 2017. P.7). Even though the visions of the two programs did not explicitly root for the realization of a sustainable corridor, nevertheless, the NUA's and ITDP's sustainability ambition within common working units provided additional measures that complemented the implementation of a sustainable corridor. Thus, the corridor vision did not influence the corridor development toward sustainability. Instead, it was complemented by other visions offering different visions of sustainability. These competing visions opened the door for a broader scope of programs to be prioritized.

Second, Pre-RC meeting adopted a collaborative governance approach, allowing for top-down and bottom-up initiatives. In contrast with the first round, the regional government actors significantly contributed to the YSS implementation through the initiatives and commitment to providing the readiness criteria of programs while also voicing their aspirations and opinions of programs that they considered to be a priority for sustainability purposes.

Moreover, with the adopted governance approach, Provincial government actors were allowed to propose programs not listed in the previous round, as long as they were strategic, with justifications for their urgency, accompanied by a commitment from the regional government to fulfill their readiness criteria. Because of this, many programs that were not proposed in the planning round came about in the third round; for example, the regional government proposed the allocation of the Community-based Clean Water and Sanitation Provision Program (Pamsimas) or the green city development program in locations that were previously not proposed in the second round.

Third, only the central and the two provincial governments joined Pre-RC network in the third round. The participation of provincial governments was limited to representatives of the Regional Planning Agencies (RPA), the Regional Public Works Agencies (RPWA) of Central Java, and the Special Region of Yogyakarta.

PA and RPWA represented the three pillars of sustainability. RPA was essential in the implementation round because of its authority in managing regions' environmental planning, natural resources, human development, social welfare, and economy. RPA coordinated the planning of other regional sectoral agencies in the related province for such tasks. Whenever any regional sectoral agency wanted to propose a new program to MPWH, RPA represented their aspirations during Pre-RC on behalf of their provincial government. Before the program could be proposed in Pre-RC, RPA had to ensure any necessary internal coordination with other

sectoral agencies, including coordination for the program's safety in the environmental and social dimensions.

Meanwhile, RPWA managed and implemented the regional public work infrastructures that functioned as measures for regions' environmental, social, and economic issues. At the same time, RPWA also had to ensure that the regional infrastructure programs were in line and integrated with the national-scale public work infrastructure. With RPA and RPWAs' knowledge of the regions, and their authority related to the planning and implementation of the pubic-work programs, their involvement in Pre-RC brought advantage in the environmental and social dimensions, as seen in the extensively implemented programs in this third round.

In addition, the implementation round involved the indirect participation of the National/Regional Environmental Planning Agency (NEPA/REPA), as explained by Respondent 25. Their involvement was related to the environmental assessment, as one of readiness criteria requirements that required permission from Environmental Impact Assessment Committee within the agency.

> "As my task, every infrastructure in that (the YSS) corridor development must have its environmental assessment. Therefore, the negative environmental impact can be predicted. The crucial impacts must be accompanied by an impact management plan. So, there are measures being prepared as part of the impact management to minimize the negative environmental threats" - Respondent 25

> "We happened to be reviewing its environmental impact assessment (about Borobudur development plan within ITDP Program). The first thing we see is that it has to sync with the regional spatial plan. Because it is a tourism area, it is necessary to have an environmental impact document, because certainly it will have an impact on the environment, such as the land conversion from forest to tourism area, and the water quality, air quality, mobilization, social impact, the locals, everything will be reviewed in that document, and the environmental management plan will have to be there" - Respondent 25

Fourth, the utilization of environmental, social, and economic knowledge to meet two readiness criteria requirements, the environmental analysis and the feasibility study, provided the risk assessments that safeguarded the projects' potential environmental and social constraints.

The first readiness criteria can be distinguished into Environmental Impact Assessment (EIA) and Environmental Management Effort - Environmental Monitoring Effort (EMEs). EIA was prepared for an activity/program with a

potentially significant environmental impact, which included a recommendation for future management plans. Meanwhile, EMEs cover a protection and management plan of an activity without significant environmental impact as a prerequisite for a business license. Moreover, EIA was obligated for every large-scale project, such as road infrastructure construction of Batas Temanggung - Bawen- Salatiga - Sruwen (road widening) in Central Java with 51,56 km. Such project required an EIA due to its possible impact related to its location, design, construction stage, and/or facility operations (MPWH, 2017). The possibility of impact included the loss of vegetation and topsoil from land cleaning, noise, and air emissions from heavy equipment, improper disposal of construction waste, and visual intrusion of infrastructure into natural and cultural landscapes (RIDA, 2017).

Due to the importance and complexity of such an assessment, in the event an EIA was required, the entity that proposed the project had to engage a particular expert/consultant firm with AMDAL preparation certification. The experts/firm then conducted the necessary studies and prepared the documents with a comprehensive technical sustainability analysis related to environmental ethics, environmental law and policy, environmental economy, ecology, ecosystems typology, and spatial plan. The output had to cover the project's possible impacts on the quality of air, soil, water resources, marine hydrodynamics, and land use; spatial plan of various scales; social environment; and community health (Antaranews, 2010).

Moreover, as the second readiness criterion, the Feasibility Study emphasized the analysis of socio-cultural and financial benefits of a project through assessments of the environmental impact, spatial policy, and land acquisition or resettlement activity as an implication of the physical investment. The procedure to result in such output involved codified knowledge related to technical aspects (topography, geometry, geology geotechnics, hydrology, and drainage), environmental science, and socio-economic and land acquisitions (MPWH, 2018).

Nevertheless, this codified knowledge would not succeed individually in delivering the priority programs' list, as they had to be allocated in a more detailed manner than the previous round. This means programs had to be planned for specific districts/areas/blocks/segments, even within regions. This circumstance required tacit and local knowledge of provincial actors concerning norms, traditions, local wisdom, culture, and knowledge regarding the state of sustainability of regions that cannot be codified, as it was based on their personal experience. With the growing presence of local actors, more locally embedded tacit knowledge became available in this third round.

Fifth, the interaction process in this third round came about in a revised institutionalized setting, with an existing planning process, platform, procedures, and rules RIDA adapted to favor corridor planning and implementation.

The planning process in this round took place within Pre-RC, an existing coordination platform joined by MPWH actors and sustainability representatives at a provincial level, to discuss and select proposals that Central Government would fund. The overall process was directed within a Pre RC guideline, an annual document produced by RIDA.

The guideline specified not only the existing procedures and rules, but also new rules that RIDA set up to guide the decision-making process in the forum. The existing procedure of Pre-RC included the requirements to complete the readiness criteria for environmental assessment, feasibility study, detailed engineering design, and land acquisition. The existing rules comprised the types of actors involved in Pre-RC, the sequence of activities that had to be joined by actors and their roles in it, the means for sharing each other's priorities and strategies during the desk and sub-desk sessions, and the availability of state budget as rewards for programs that were selected as priorities.

Meanwhile, the adapted rules were related to central government agendas, in which actors had to select proposals aligned with Pre-RC's vision and annual theme set within Pre-RC guidelines. This way, RIDA could enforce actors to select sustainability measures favoring corridor implementation. The reason was that their decisions were guided by Central Government's corridor vision (which was also infused with environmental and social ideas) and strengthened by NUA and ITDP, emphasizing the realization of sustainable development within the corridor delineation. In addition, two of the readiness criteria - the environmental document and the feasibility study- played their role in mitigating a program's negative environmental/social impacts while ensuring the commitment of provincial governments to support the program's implementation.

7.4. Conclusion of governance of YSS Corridor

As a critical transportation network in Indonesia, Yogyakarta - Solo - Semarang (YSS) Corridor has been envisioned not only as a driver of economic growth but also as a pathway toward sustainable development. While initially overshadowed by the economic focus, despite limitations, environmental and social dimensions gained ground in the later planning rounds. Nevertheless, the transition toward sustainability was partial. Thus, this chapter analyzes the positioning of governance factors and interaction process in steering/hindering the corridor development into a sustainability direction.

The early vision of the YSS Corridor emphasized connectivity and mobility. However, it was complemented by an additional sustainability vision due to a national mandate to achieve sustainable development of regions. As a result, the corridor's vision experienced a shift in which environmental and social goals strived and strengthened their position among the economic vision. This sustainable transport corridor vision was widely accepted by regional actors because, apart

from being aware that the two provinces of Central Java and Special Regions of Yogyakarta needed to strengthen their economic linkages, they perceived the necessity to mitigate numerous environmental and social issues that could threaten the YSS regions.

While the sustainability vision remains robust in the later planning rounds, as the corridor moved from the planning to implementation round, its vision was supplemented by other central government agendas that further enhanced its sustainability. The agendas were: the New Urban Agendas, and the Integrated Tourism Development Project, specifically aimed at sustainable, resilient, safe, and inclusive regions.

The reason the sustainability vision was able to be strengthened can be explained in the changes of governance mechanisms, from a top-down mode (as RIDA formulated the SDR concept/principles and delineations in a rather isolated setting) to one that embraced the participation and capacities of regional and local actors within a collaborative mode. As the planning process advanced, the YSS Corridor governance progressively included sustainability representatives, allowing them to be more actively involved in the decision-making process of the corridor’s future. Initially dominated by officials with technical planning backgrounds, the later rounds saw the involvement of regional/local actors due to Indonesia's decentralized planning system and the additional sustainability vision, which forced RIDA to promote more inclusive planning.

The participation of regional/local actors benefited sustainability, as they possess valuable insights into the specific challenges, needs, and opportunities of their respective areas. Their intimate understanding of local ecosystems, cultural practices, and social dynamics can contribute to more contextually relevant and sustainable planning. Without their input, the corridor may overlook critical environmental, social, and economic considerations unique to each region. As a result, the initial decision-making process that relied heavily on codified economic knowledge from technical planners of RIDA was switched. Subsequent rounds saw a broader range of sustainability knowledge, including codified, tacit, and local knowledge, facilitated by the involvement of experts and regional sustainability representatives. This transition enabled a more comprehensive and holistic approach to addressing sustainability issues within the corridor.

Process management and process design facilitated this collaborative setting, extending the corridor's network to multiple stakeholders. This approach allowed for meaningful participation, knowledge exchange, and integration of the three sustainability pillars, fostering more contextual planning. Thus, it can be said that process management and process design allowed the incorporation of local wisdom and knowledge capacities, fostering contextually relevant planning, which enhances the sustainability of the YSS Corridor.

In addition, the congregation of central government and regional/local actors made possible by process management allowed actors to align their sustainability objectives and strategies with the central government and move forward for joint actions. Meanwhile, process design allowed changes to the corridor's institutional setting. It started with the establishment of RIDA, which implied a break with the sectoral approach, leading RIDA to adopt an early sustainability vision while maintaining the YSS economic vision. This is followed by an adaptation to the existing rules, procedures, and platforms by RIDA to include regional/local actors in the decision-making process, guiding their behavior to progress toward sustainability.

Achieving more balanced outcomes of environmental, social, and economic measures requires a well-designed and adaptive institutional setting. By focusing on the adaptation of rules, procedures, and platforms to guide and direct the behavior and interaction of various YSS Corridor actors, the institutional setting provides a foundation for how decisions are made among actors, resources are allocated, and authority is distributed to ensure that they are working together to push sustainability measures toward an equilibrium state.

Furthermore, the establishment of coordination platforms and changes in governance mechanisms addressed the complexity of actors' interaction process. There had been no objection from the regional/local actors toward the YSS corridor's delineation, as it was formulated to further advance the existing Semarang - Yogyakarta connectivity. However, there were two main issues that the corridor needed to address: the severe disparity issue experienced in the western and eastern regions, especially by Magelang Regency, and how to cater to the emerging sustainable tourism and creative industries of the southwest regions of Yogyakarta and Kulonprogo. These issues were discussed throughout different consultative and coordination platforms, resulting in YSS regional development strategies that answered to the related issues, complemented by the additional Integrated Tourism Development Plan program that aimed toward sustainable tourism.

While sustainability was strengthened, the key sustainability concerns are that the initial economic delineation of the corridor remains and that the implementation measures were predominantly infrastructure-focused, with limited attention to (technological) innovation, human resource development, and other soft infrastructure. An infrastructural focus is unlikely to fully address sustainability challenges.

Even though mixed governance was incorporated into the later planning process, wherein regional and local actors were given the opportunity to influence sustainability discussions and negotiations, the governance analysis shows that predominant actors remained public entities, driven by their government agendas.

For instance, government agencies pursued ambitious targets like the 100% provision of clean water and sanitation infrastructure, which explains the push for social measures in the implementation round. Consequently, this oversight resulted in a disproportionate emphasis on hard infrastructure programs. By relying predominantly on conventional planning approaches and established public sector entities, the corridor development sidelined the invaluable ideas to explore measures that can support sustainability innovations from the ground up that can be brought into sustainability discussions and negotiations by regional/local innovation actors.

Moreover, the pressing need to promote sustainable tourism development in the western and eastern regions, coupled with concerns regarding the hinterlands facing mounting pressure from agglomerations and large-scale infrastructure projects, necessitates a more inclusive approach. The network must evolve to accommodate the interests and objectives of non-public actors, particularly groups and local communities passionate about sustainability agendas. The role of platforms that can congregate public and non-public sustainability actors became crucial to allow actors to actively participate in meaningful sustainability discussions and joint actions throughout the rounds. The inclusivity of the corridor's network with the presence of coordination platform(s) can foster a more balanced and comprehensive approach to sustainability that addresses the diverse needs and aspirations of all stakeholders, ultimately leading to more resilient and equitable development in the Yogyakarta-Solo-Semarang (YSS) Corridor.

To close this chapter, we can see that both the GDP Corridor and the YSS Corridor share noteworthy similarities in their governance approaches. Firstly, both corridors were envisioned with a strong commitment to sustainability during the planning rounds, aligning with their respective national sustainable development agendas, as indicated by the Pre-RC's thematic focus. Secondly, both corridors initially adopted a top-down approach but later transitioned to incorporate bottom-up governance strategies in account of process management and process design, allowing the corridor's network to be extended to a wider array of stakeholders and promote collaborative governance. This shift enhanced the corridors' responsiveness to more complex sustainability challenges. Another commonality is the evolution from predominantly codified knowledge into a blended approach that integrates codified, local, and tacit knowledge as the planning progressed.

However, there are also notable differences between the governance of the two corridors. The GDP Corridor placed a strong emphasis on connecting regions within the corridor to those outside it, which shows the corridor's ambition for its trickle-down/spread impact. On the other hand, the YSS Corridor, while sharing a common sustainability vision with the GDP Corridor, added a specific goal to promote sustainable tourism in its western and southern regions to particularly address the

inequality and disparity issue by engaging external actors of the World Bank to support this objective. Moreover, the YSS Corridor, spanning two provinces with separate provincial governments, established Mutual Agreements (or Perjanjian Kerjasama in Indonesian) to synchronize their regional plannings, creating a synergy that benefited corridor implementation. Such a coordinated inter-provincial approach was absent in the governance of the GDP Corridor, highlighting one of the key distinctions between the two corridors' governance structures.

CHAPTER 8
CONCLUSION OF GOVERNING SUSTAINABLE CORRIDOR DEVELOPMENT

Developing sustainable (transport) corridors involves more than just tapping economic opportunities along linear infrastructure through transportation infrastructure development (Healey, 2004; Escap, 2020; Nogales, 2014; Hope and Cox, 2015). It also necessitates addressing local environmental, social, and economic sustainability challenges of the regions while mobilizing public and private resources (Quium, 2019; Dossani, 2016; Nogales, 2014). Realizing such a vast and complex goal requires the involvement of multiple stakeholders with different capacities (Nogales, 2014; Oberg, 2017) across the three sustainability dimensions. This would allow actors to address issues they could not realize individually (Li, 2016; Termeer et al., 2013; Ouden, 2015; Ansell and Gash, 2007; Romein et al., 2003).

At the same time, those actors have differing interests, perceptions, and strategies that challenge their interaction and decision-making process (Kickert et al., 1997; Hope and Cox, 2015; Sisto, 2018), as conflicting interests can impede the realization of sustainable solutions. Therefore, governance becomes vital as it coordinates the interactions among stakeholders (Stoker, 1998; Klijn and Koppenjan, 2016) and balances their interests, mediates conflicts, and fosters collaboration (Michel, 2017; Ansell and Gash, 2008; Ding et al., 2022). By establishing favorable organizational and steering conditions, governance enables the integration of diverse interests, resources, and knowledge, facilitating the coordination necessary for joint sustainability outcomes (Klijn and Koppenjan, 2016; Padilla and Daigle, 1998; Emerson and Murchie, 2010).

The role of governance has been discussed in various regional development and sustainable development literature, in which governance is characterized by the involvement of diverse actors and the sharing of responsibilities, directing actors to come together for joint actions toward a common goal. However, governance does not guarantee a sustainable direction for corridor development, as actors with various environmental, social, and economic objectives can influence decision-making processes and outcomes (Gjaltema et al., 2019), potentially favoring one sustainability dimension over the others. Therefore, governing a sustainable (transport) corridor requires conscious planning to incorporate both sustainable development principles and regional development practices guided by governance to ensure equitable outcomes across environmental, social, and economic dimensions. Nevertheless, the application of regional development theories in combination with the sustainability concept, guided by governance, is understudied, particularly in the context of sustainable (transport) corridor development.

To address this lack of integrated study, this study examines two Indonesian corridor cases, namely the Giimanuk-Denpasar-Padangbai (GDP) and the Yogyakarta-Solo-Semarang (YSS) Corridors, which exemplify sustainable development aspirations within the SDR framework (MPWH, 2015). By analyzing the role of governance in guiding, facilitating, and coordinating corridor actors with differing agendas, resources, and sustainability knowledge, the study aims to provide an answer to how governance of the GDP and YSS Corridors' development process contributes to the realization of their sustainability outcomes.

To guide the study in aiming it, the study draws upon regional development, sustainable development, corridor development, and governance literature to develop a conceptual framework that answers the gap in theories as well as empirical studies, explaining the intricate relationships between the key concepts of governance, the interaction process of actors, and sustainability outcomes derived from integrating those bodies of literature. The key concepts of the framework are further analyzed in the two case studies to answer four sub-research questions that can help the author in answering the main research question. The sub-questions are: 1) To what extent did the development of the GDP and the YSS Corridors result in sustainability outcomes?; 2) How did the interaction processes of the GDP and the YSS Corridors evolve throughout the corridor development process?; 3) What findings regarding governance factors of the GDP and YSS Corridors can this study learn from?; 4) What are the similarities and differences between the sustainable nature of outcomes, the interaction process, the governance factors, and their relationships within the GDP and the YSS Corridors?

Moreover, while the initial theoretically grounded conceptual framework mentioned above provides a structured and systematic approach to understanding the complex phenomena of sustainable (transport) corridor development and guides the empirical analysis from the perspective of theories, a revised conceptual framework is presented as part of the study's conclusion from the empirical analysis. This process also helped the author refine the initial framework to better capture the intricacies of the phenomenon of the investigated corridors.

Overall, this chapter offers a comprehensive study of sustainable (transport) corridors' governance. It addresses four sub-research questions and one main research question in section 8.1, followed by discussions on theoretical contributions in section 8.2 and practical recommendations for practitioners involved in corridor development planning in section 8.3. Additionally, section 8.4 discusses the strengths and limitations of the study, and section 8.5 provides future research recommendations based on the study's findings.

8.1. Answering the Research Questions

This section answers the four sub-research questions mentioned earlier, followed by the answer to the main research question. The answers to the sub-research questions show how the key concepts unfold across different rounds of the planning process. Each round is demarcated by the tasks assigned to actors within a specific time frame, leading to certain decisions that set the stage for the subsequent rounds.

8.1.1 Sub-Research Question 1. To what extent did the development of the GDP and YSS Corridors result in sustainability outcomes?

This section provides answers concerning the extent of sustainability outcomes delivered throughout the different planning processes of both case studies. Assessing the extent of sustainability in corridors undergoing their development phase, where not all planned programs have been executed, presents a challenging task. Due to the uncertainties and incomplete information inherent in such contexts, traditional impact assessments might not yield accurate results. Consequently, the study took an innovative approach to address this challenge. Instead of attempting to directly measure the impact of the corridors on regional sustainability, the study shifted its focus to analyzing sustainability outcomes. Recognizing that full impact assessment might be premature, the study turned its attention to scrutinizing the array of environmental, social, and economic programs in addressing specific sustainability issues within their respective dimensions and allocating budgetary resources to programs corresponding to distinct sustainability dimensions.

By doing the above, the study gained insights into the priorities and sustainability commitments underlying the corridors' development efforts. In this manner, the study engaged a novel approach to gauging the sustainability of the corridors, navigating the challenges of assessing corridors within their ongoing development phase while generating meaningful insights into their potential impact on regional sustainability.

Initially, the sustainability analysis revealed that in the early stages, the focus of the transport corridor development was primarily economic, driven by the SDR conception of transport corridors. This approach aimed to promote the development of growth centers and enhance the competitiveness of regions, particularly those with transportation hubs, urbanized areas, and sectoral growth centers. However, this economically-centric approach contradicted the principles of sustainable development, which emphasize equal importance given to all pillars of sustainability. The analysis further indicated that extensive socio-economic programs were directed towards the less developed regions in later planning rounds. These programs focused on developing agricultural facilities, conserving

tourism areas, improving roads in rural settlements, and developing traditional markets.

As the development process progressed, sustainability outcomes began to evolve and adapt to the environmental, social, and economic challenges specific to different areas within the corridors. In the second round, there was a greater emphasis on addressing environmental issues, improving the quality of urban areas and settlements, and addressing natural disasters. The third round saw the implementation of programs to address social issues that had not been adequately addressed, such as clean water and sanitation, accessibility to housing and education, and improving the quality of low-income housing.

Notably, the later planning rounds allocated significant funding for programs that benefited the economic, environmental, and social dimensions. Several environmental programs, such as landfill revitalization, coastal safeguard development, and river diversion channel construction, received substantial funding. Similarly, social programs, including housing assistance and school rehabilitation, were also adequately funded.

However, it is evident that there was a lack of emphasis on soft infrastructure compared to hard infrastructure. Programs that could promote sustainable practices in sectors like fisheries, local goods processing and marketing, sustainable tourism, and renewable energy innovation were notably absent. This imbalance between hard and soft infrastructure can lead to issues such as land conversion, biodiversity loss, pollution, and noise if the planned projects' impacts are not properly assessed.

Additionally, while the environmental and social dimensions were gradually strengthened, the corridor approach did not address all the sustainability issues identified in the research. Road development programs, such as underpasses, highways, bridges, and road widening, only offered short-term solutions to traffic congestion without adequately promoting the use of public transportation. Furthermore, the initial economic focus of the corridors neglected the unequal distribution of wealth and economic opportunities among regions, both within and outside the corridor. Therefore, the later planning process had to adapt to incorporate programs for the excluded regions to foster sustainability.

To answer sub-research question one, the case studies showed that the corridor approach can be directed to a more sustainable trajectory that follows sustainability principles to foster a harmonious balance between economic growth, social inclusivity, and environmental stewardship. Throughout different stages of corridor development, the sustainability outcomes of both corridors became more tailored to the local context as the planning shifted from macro to meso and micro levels. A wide range of well-funded measures were implemented to address existing and future sustainability challenges, including waste management, traffic

congestion, access to education and affordable housing, and natural disasters. In the third planning round, extensive socio-economic programs were appointed for the lagging regions, resulting in a more balanced corridor development addressing all sustainability dimensions.

Despite these improvements, the economic focus of the corridors persisted, prioritizing the corridors' role as drivers of economic growth. This is a consequence of the early economic principles and delineations based on regional economic knowledge, primarily influenced by technical urban/regional planners. Consequently, economic measures continued to overshadow environmental and social measures, emphasizing stimulating economic nodes along the corridors.

Moreover, both corridors tended to prioritize the development of hard infrastructure as the main driver of corridor development. This narrow focus may hinder the long-term sustainability of the corridors by neglecting programs that could enhance labor skills, human capital, and regional/local innovations. While hard infrastructure is essential for economic facilitation and improving living conditions, the corridors lack economic diversification to reduce dependency on a single industry or sector and enhance resilience to economic threats. This emphasis on hard infrastructure is partly due to the decision-making process, which primarily involves national and regional/local public actors, particularly in public work infrastructure. The lack of inclusiveness and engagement of non-public actors, including the private sector, educational institutions, NGOs, and local communities, is a notable gap in the decision-making process throughout the planning rounds, thus hindering the corridors from being directed optimally toward sustainability.

8.1.2 Sub-Research Question 2. How did the interaction process of the GDP and the YSS corridors evolve throughout their development?

This section presents the study's findings regarding how the interaction process by which the corridor was developed evolved. The study answered this question by identifying the rounds of the planning process and the nature of outcomes that actors need to deliver, the involved actors and the capacity they brought into the process, the objectives they have and strategies they deployed, and the interim outcomes that were realized.

The process took place within three development rounds. The first round involved macro planning in generating the SDR Corridors concepts and delineations, catered to within the MPWH Strategic Plan 2015-2019. The second round involved a meso-planning process, which resulted in the GDP and the YSS's ultimate goals and regional development strategies, inscribed within the Integrated Infrastructure Development Plan (IIDP) program's final report. In the third round, the corridor development called for micro-planning, prioritizing, and implementing measures listed within the Pre-Regional Consultation (Pre-RC) baseline. The actors'

interaction processes formed differently within each round as they influenced the sustainability outcomes. The switch of the process is as follows.

In round one, the process involved one main central government actor- RIDA. RIDA was established as a political initiative of the MPWH Minister, who envisioned integrated planning of the regions. He then appointed an influential practitioner with a transportation planning background, tasked to propose a new planning concept, together with five other MPWH officials from different MPWH sectors, to enrich the agency with their sectoral views. The new integrated planning concept was then known as Strategic Development Regions (SDR), which utilized a prioritization strategy to define the delineations of the SDR corridors. This strategy directed RIDA to allocate investment in specified regions along the corridors' backbones, improve their economic linkages, and facilitate their growth, showing the SDR Corridors' dominant economic nature.

Following the legalization of the SDR Corridors within the MPWH Strategic Plan, RIDA formulated a Term of Reference for a new program called the Integrated Infrastructure Development Plan (IIDP) and the Pre-Regional Consultations (Pre-RC) guidelines, which directed the planning process of both corridors in following rounds. These two were planned as RIDA perceived the need to involve the regional and local actors for their local sustainability knowledge and implementation authority to derive contextual corridor planning and move forward to the subsequent rounds.

In round two, RIDA introduced the corridor concept to a broader party by executing the IIDP Program. This attempt was to gain support from the regional/local actors toward corridor implementations. The IIDP was designed as a contractual program, in which RIDA held a bidding procedure to select a planning firm to execute the IIDP. The winning firm then appointed experts from different backgrounds to conduct two predominant activities: surveys and focus group discussions (FGDs) meant for experts to deliver a thorough sustainability analysis concerning the environmental, social, and economic states of regions. The resulting sustainability analysis was presented and discussed in the FGDs and used as input by related actors to formulate the GDP and the YSS Corridors' ultimate goals and regional development strategies.

The interaction process analysis of round two shows how the inclusion of a wide range of actors led to more extensive discussions regarding sustainability issues of regions. At the same time, actors became more aware of each other's capacities and found the means to participate in developing the corridors toward sustainability. However, their interactions were not without challenges, as actors revealed their contrasting/additional objectives and strategies.

For the YSS Case, the central government shared an intersected strategy with regional/local actors concerning the need to improve road transport connectivity

between the urbanized nodes of Semarang and Yogyakarta (via Bawen) and between Solo and Yogyakarta (via Kulonprogo). However, these regional/local actors also had additional objectives. Central Java's regional actors aimed to improve the socio-economic condition of Magelang City and Magelang Regency on the West of the YSS corridor. On the other hand, actors representing Special Regions of Yogyakarta aimed to facilitate the emerging tourism and creative industry sectors in Yogyakarta City, Sleman, and their surroundings. Meanwhile, for the GDP Case, there was a dispute on the delineations of the corridor as regional actors perceived it to be problematic, for it excluded the lagging northern regions. This exclusion could potentially widen the disparity gap between regions in Bali.

The interactions between multiple actors in FGDs made the central and regional actors aware of each other's capacity. The regional actors needed state funding to implement more programs in the regions. In contrast, RIDA needed the regional/local actors for their input on programs that could enrich the sustainability outcomes. As a result, there was a series of discussions and negotiations in the FGDs where GDP and YSS's regional development strategies were formulated. The strategies catered to the interests of both central and regional/local actors, and those programs were directed within the corridor framework and simultaneously addressed the contextual needs of regions. The catering to GDP's regional/local government interest can be seen from road connectivity (highway) planned between the most prosperous southern region of Badung (in the South) and the excluded northern region of Buleleng (in the North). To facilitate YSS regional/local actors, socio-economic programs were appointed, particularly in areas surrounding the Borobudur Compound of Magelang Regency (see Chapters 5 and 7 for more detailed strategies).

In round three, the central and regional actors interacted again within the Pre-Regional Consultations Forum (Pre-RCs). The pre-RCs were an existing annual platform used by actors to prioritize public work programs that would be realized in the following year (N+1). RIDA utilized the forum to negotiate the concrete implementation of programs for the corridors. This time, regional/local actors' involvement was restricted to Provincial Governments: Provincial Planning Agency, and Provincial Public Work Agency, due to their local sustainability knowledge capacity and direct authorities for interventions in regions. Within the Pre-RCs, actors discussed the selection of programs proposed within the regional development strategies delivered in round two. In their congregations, the provincial government and MPWH sectoral actors (directorate generals of highways, human settlements, water management, and housing provisions) were allowed to propose additional new programs that are strategic or urgent to address specific sustainability issues and in line with the GDP and YSS Corridors' vision.

The consultations in this third round happened within three sessions: the plenary, the panel, and the desk. In the plenary session, regional actors were informed of

the overall strategy of the Central Government on a macro scale. Afterward, the central and provincial actors presented their detailed strategies within the panel session, together with issues they perceived as problematic in the regions. Each party then shared their upcoming agendas concerning regions within the corridor. Following this, the desk session facilitated face-to-face interactions among actors. Here, actors discussed various strategic programs that needed to be prioritized and implemented. To do so, they needed to find their common environmental, social, and economic objectives to arrive at joint actions, catering to each other's strategies within the corridors' ideas. As a result, programs were appointed in detailed areas/segments/blocks to address specific environmental, social, and economic issues.

The Pre-RCs' analysis highlighted how the regional actors' role was strengthened. Before the state budget could be used to fund any program, the provincial government needed to deliver each program's requirements, known as the readiness criteria. Four criteria had to be prepared: environmental impact assessment, feasibility study, land acquisition, and detailed engineering plan. These criteria are time-consuming and costly, which might hinder certain programs from being implemented according to their planned timeline. During the desk session, actors spent most of their time negotiating when each criterion could be fulfilled, allowing the related program to be executed in a particular year. A Pre-RC baseline programs list listed the agreed programs that met all readiness criteria.

As the conclusion to the second research question, the study shows that the interaction process of the GDP and YSS actors did not happen organically without direction. Interdependent central and local actors joined the corridor network and interacted within the sequence of later planning rounds to discuss and negotiate tailored programs within a sustainable (transport) corridor framework. Nevertheless, this interaction was accompanied by a challenge, since regional/local actors were initially skeptical and resistant to the corridors' idea, for they possessed different or additional objectives and goals. Through face-to-face interactions within a platform, actors also became aware of each other's capacity and the need to work together throughout the corridor development process to benefit from one another, which thrust them to collaborate for joint outcomes. Actors circulated sustainability knowledge and information, which increased their attention to sustainability. In addition, the central government's recent commitment to the UN's New Urban Agenda (an international agenda to apply the Sustainable Development Goals for safe, inclusive, resilient, and sustainable cities) complemented the corridor idea. It helped improve actors' commitment to the corridors' planning and implementation of sustainability.

8.1.3 Sub-Research Question 3. What governance factors were present in the various rounds of the corridor development process?

Answers to the third sub-research question present the values of each of the five governance factors and how they interplay. These factors are the study's independent variables that shaped the interaction process of actors in the corridor network and the extent to which the corridor evolved in a sustainable direction. The five governance factors are vision, modes of governance, the constellation of representatives, knowledge types and use, and the institutional setting and process design. These factors were dynamic and formed certain constellations as they co-evolved with rounds of the interaction process. Their values are presented as the following.

First, from the outset, the development process was guided by a vision of how regional development could be propelled by a corridor approach to overcome sectoral division. From the beginning, the new Minister explicitly expressed the need for an integrated planning vision to boost the regional economy. Building upon that vision, the corridor concept was adopted and elaborated in the MPWH Strategic Plan, focusing on developing economic growth centers. To a certain extent, environmental and social sustainability concerns were included in the vision, accompanied by SDR's planning scope that safeguarded the regions' environmental carrying and environmental support capacities.

The mentioning of sustainability vision since the early SDR conceptualization influenced RIDA in facilitating the inclusion of local actors and their local knowledge in the subsequent planning process, to allow a more robust sustainable (transport) corridor vision to be catered within the IIDP final report and Pre-RCs' theme. During the implementation round, the corridor vision, known as the Pre-RCs' theme, was complemented by the central government's commitment to the UN's New Urban Agenda (NUA) and the Integrated Tourism Development Project (IIDP of the YSS Corridor). These external factors offered an additional vision that intersected with the sustainability idea of the corridor and forced actors to appoint environmental and social measures that were previously overlooked in the earlier planning rounds.

Second, the governance mechanism shifted over the rounds from a top-down approach into collaborative governance that allowed bottom-up contributions of the local actors within the corridor framework set by RIDA. In the beginning, the top-down mechanism allowed RIDA to lead the conceptualization of the corridor. Such a mechanism in the early macro-planning process allowed RIDA to generate a general conception of SDR transport corridors legalized within the MPWH Strategic Plan. However, the SDR vision had more than economic ambition, as it was also directed toward addressing the environmental sustainability of urban areas and settlements, and the disparity issues of regions (MPWH, 2015). RIDA then depended on other actors in the subsequent rounds to plan the corridor

contextually. This led the agency to set up the scenes for actors' collaboration, codified within the IIDP program and the Pre-RCs through process management and process design.

The process management allowed the top-down steering of the corridor development to be combined with bottom-up supports, in which selected regional/local actors became involved in the FGDs and the Pre-RCs discussions and became RIDA's partners in collaboration. The circumstance was projected on the GDP and the YSS regional development strategies (that incorporated both central and regional/local actors' strategies) and how regional/local actors delivered the readiness criteria of programs, while the central government provided the funding for the programs.

Furthermore, process design gave direction to the corridors' planning process. It transformed the institutional settings and adapted the institutional rules and procedures to shape and constrain the interaction of actors while facilitating collaboration, decision-making, and problem-solving among multiple stakeholders within various coordination platforms (set up by RIDA). Thus, it can be said that the elements of collaborative governance, process management, and process design facilitated actors in providing the necessary environmental, social, and economic input, taking part in the decision-making process, and giving direction to the process. As a result, we can see the mix of top-down mechanism with collaborative mechanism, where RIDA remains as the actor that manages the planning process, rules, procedures, and platforms of the development of the corridor, the decision-making process involving input from regional/local actors, leading to outcomes that are more embedded in the local context over the rounds.

Third, following the switch of governance mechanism in the later planning rounds, the actors' constellation of the GDP and YSS Corridors was extended to multiple actors from economic, social, and environmental disciplines, thereby representing local sustainability interests more than the earliest round did. In the second round, additional actors with environmental and social concerns were introduced; however, NGOs and local communities were absent, while academics and private institutions were marginally present. In the third round, the network became limited to regional/local governmental agencies' actors with local knowledge and implementation power.

While the constellation thereby represents the collaboration and coordination of multi-domain actors for joint solutions, it shows that the network was not completely inclusive since the beginning of the process. Hence, even though the role of regional/local actors was enhanced as they enriched the sustainability debates throughout various platforms, the imbalance in the constellation of actors between government and non-government actors means that government actors could predominantly influence the corridor outcomes according to their interests.

As an impact, outcomes of the three rounds of corridor development focused on the agendas of national, regional, and local governments in the form of public infrastructure (hard infrastructure) implementation, leaving behind community engagement programs for sustainable development innovations.

Fourth, the knowledge that influenced the decision-making process evolved throughout the rounds in which economic and technical expertise and ideas dominated, to the ones in which local and sustainability knowledge was more actively sought and used. The evolution could be seen from the adoption of regional planning principles that stressed upon economic advantage (regional development theories, Pareto, economic linkages) into knowledge that appraised the contextual challenges of the regions (topography, demography, land use, natural disasters' threats, local commodities, infrastructure projection analysis and more). More locally embedded tacit knowledge became available with a growing presence of regional/local actors in later planning grounds. As a result, the scientific knowledge from experts in FGD discussion was enriched with practical local knowledge of regional/local actors. Actors used this knowledge to formulate the corridors' ultimate goals and regional development strategies and infused the previous transport corridor vision with more sustainability ideas. Subsequently, in the Pre-RCs Forum, local and tacit knowledge was brought by local government actors representing different sustainability dimensions. At the same time, formal institutional procedures like environmental impact assessments required the presence of expertise on the social and environmental dimensions of sustainability.

Fifth, the establishment of RIDA implied MPWH's break with the sectoral approach and marked the beginning of corridor development. In the first round, the new institutional setting gave RIDA the authority to start conceptualizing the general framework of SDR corridors with a top-down approach without much intervention from other actors' interests. Such a process allowed the conceptualization of the SDR Corridors to be catered to in a short period in the MPWH strategic plan as central government policy. Formulating the SDR concept without the involvement of regional/local actors at this stage was possible since the planning process was directed at a macro scale, in which the SDR concept was applied to every SDR Corridor. Nevertheless, due to Indonesia's decentralized systems, together with the SDR's complementary sustainability vision, the involvement of regional and local actors in the corridor planning process was unavoidable and necessary. With the need to include regional/local actors in the later planning, RIDA used process design, codified within the IIDP and the Pre-RC, to adapt the institutional settings of the corridor, the planning process, rules, and procedures. These settings directed the sequence of activities, roles, positions, responsibilities of actors in the network, and their scope of activities to brainstorm activities and deliver environmental, social, and economic measures.

In conclusion, the interplay of the five governance factors - vision, modes of governance, the constellation of representatives, knowledge types and use, and the institutional setting and process design - has a significant influence on the interaction of actors and the delivery of sustainability outcomes in regional development and sustainable (transport) corridor development. The vision sets the overarching goals and direction of the corridor development. The inclusion of sustainability concerns in the vision from the early stage shapes subsequent planning processes, guiding the integration of environmental and social considerations alongside economic development. Moreover, process management and process design influence the interaction of actors as they open the door for inclusivity as well as facilitate collaboration, decision-making, and problem-solving among stakeholders, combining top-down steering with bottom-up contributions. This mix of governance allows the decision-making process of the GDP and YSS Corridors to incorporate a broader range of sustainability interests.

By inviting more actors into the process, the constellation of sustainability actors was enriched with representatives of economic, social, and environmental disciplines, allowing the transitioning from economic and technical knowledge to the active integration of local and sustainability knowledge, which subsequently influenced the later planning vision with more sustainability ideas. Lastly, institutional adaptations to the existing rules, procedures, and platforms facilitate multiple engagements, allowing governance to guide their roles, responsibilities, and scope of activities toward sustainability. The presence of these constellations of factors shows how it becomes evident that the interplay of these five governance factors is essential in shaping the interaction of actors and delivering sustainability outcomes in developing sustainable (transport) corridors.

8.1.4 Sub-Research Question 4. To what extent can the similarities or differences of the dependent variables (outcomes) be explained by similarities and differences between the two cases in the process or governance?

This section examines the similarities and differences between the three key concepts of governance factors, interaction process, and sustainability outcomes of the GDP and YSS Corridors with unique characteristics, sustainability challenges, and different actors' involvement. This was done to analyze how the dependent variables (sustainability outcomes) could be explained by similarities and differences between the governance of the two cases. An overview of the similarities and differences between the GDP and YSS Corridors can be seen in Table 18 below.

<table>
<tr><th rowspan="2">Sustainability Outcomes</th><th colspan="2">Round one</th><th colspan="2">Round two</th><th colspan="2">Round three</th></tr>
<tr><th>GDP</th><th>YSS</th><th>GDP</th><th>YSS</th><th>GDP</th><th>YSS</th></tr>
<tr><td>Environmental</td><td colspan="2">Addressing environmental and carrying capacities of regions.</td><td colspan="2">GDP/YSS Regional Development Strategies: Addressing the natural disasters, waste issues, land conversion, traffic congestion, and environmental quality of urbanized areas.</td><td>Revitalization of beaches, coastal safeguard, river normalization underpass.</td><td>River channel diversion, sand pocket, sediment control, lake revitalization</td></tr>
<tr><td>Social</td><td colspan="2">Provision of basic infrastructures.</td><td colspan="2">Provision of basic infrastructures, addressing disparity gap in lagging regions and inequality issue.</td><td colspan="2">Removal of slums program; self-assist home stimulant aid; waste-water treatment plant; regional drinking water system; community sanitation; development of schools and public housings; acceleration of basic infrastructure in rural areas.</td></tr>
<tr><td rowspan="2">Economic</td><td colspan="2">Bali and Java Islands Development Theme: accelerating growth in tourism, agriculture, and fisheries sectors.</td><td rowspan="2">Strengthen west-east axis connectivity

There is a connectivity plan outside its delineation: North-South.</td><td rowspan="2">Strengthen North-South connectivi-ty via the lagging western regions.</td><td colspan="2">Road improvement; development of dams/reservoirs/irrigation systems; traditional market; revitalization of tourism destinations; raw water supply.</td></tr>
<tr><td>GDP delinea-tion excludes the lagging northern regions.</td><td>YSS delinea-tion includes the lagging western and eastern regions.</td><td>Smart Travellers' Plaza of Rambut Siwi; Mengwitani Singaraja highway</td><td>Yogyakarta-Bawen highway; Integrated Tourism Development Plan (external program for sustainable tourism development.</td></tr>
</table>

Interaction process	Round one		Round two		Round three	
	GDP	YSS	GDP	YSS	GDP	YSS
Rounds	SDR Conception.		Planning of ultimate goals strategies.		Prioritization and implementation.	
Actors	RIDA.		Public and non-public actors: RIDA, experts, provincial and local governments, academic, and private.		Public actors: RIDA, MPWH sectoral, provincial government actors.	
Strategy	RIDA: Competitiveness of regions; accelerated growth while addressing regions' environmental and social challenges.		Regional/local actors' resistance to GDP's delineation. More attention is paid to the northern regions.	There is no resistance to YSS delineation with regional/local actors' additional strategy to enhance tourism in the West and South, addressing the disparity issue in the West.	Regional/ local actors' support to corridor implemen -tation, with expected spillover from the corridor to the northern regions.	Regional/ local actors support corridor implemen-tation, comple-mented by the Integrated Tourism Develop-ment Plan.

Governance factors	Round one		Round two		Round three	
	GDP	YSS	GDP	YSS	GDP	YSS
Vision	Transport corridor vision with additional sustainability ambitions.		Sustainable, reliable, and equitable corridor that enhances the balance of natural resources and environmental sustainability and alleviates the disparity between regions.	A contextual corridor that enhances the connectivity of Joglosemar, environmental aspects of regions, people's living quality, and equality	Sustainable Transport corridor and realization of New Urban Agendas as Pre-RC's theme).	
					Additional vision to connect rich southern regions with the excluded (lagging) northern regions.	Additional sustainable tourism dev. vision for Yogyakarta, Sleman, Magelang City, and Magelang Regency.

Governance mechanism	Top-down, RIDA formulated the SDR concept and YSS delineation. Process management and process design: giving direction to the corridors' planning process through IIDP and Pre-RC.	Collaborative governance: regional/local actors' participation in sustainability analysis, the formulation of ultimate goals, and regional development strategies. Process management and process design: allowing collaborative mechanism, transforming the institutional rules and procedures to guide and facilitate actors' interaction in FGDs.	Collaborative governance: discussion and negotiations between central and regional actors to prioritize programs for implementation. Process management and process design: allowing collaborative mechanism, adapting the existing institutional rules and procedure to direct Pre-RC actors' interactions.	
Sustainability Representatives	Predominant technical planners of RIDA.	Environmental, social, and economic dimensions from public and non-public actors	environmental, social, and economic dimensions from the provincial government.	
			No external actor.	External ITDP Actor (World Bank).
Knowledge	Codified knowledge of regional economic development theories.	Codified knowledge: IIDP's sustainability analysis by a team of experts. Local and tacit knowledge of regional/local governments in FGDs.	Codified knowledge: Readiness criteria involving experts. Local tacit knowledge of regional government in Pe-RC desk-session	
Institutional design.	RIDA was established, implying a break with the sectoral approach, allowing the formulation of SDR concept without much intervention for other actors' interests.	IIDP Rules: types of experts who can be involved in FGDs, planning scope for outcomes to address the environmental carrying and support capacities and disparity issues. IIDP Procedures: sequence of IIDP activities, types of analysis and reports to be	Pre-RC Rules: Regional government actors' involvement, planning scope for programs to align with Pre-RC's theme, for all baseline programs to meet the readiness criteria.	

		delivered by experts, frequency, and timing of FGDs.	Pre-RC Procedures: sequence of Pre-RC activities (Plenary, panel, and desk sessions), delivery of baseline and stock programs.

Table 18. An overview of the GDP and YSS Corridors' key concepts and variables.
Source: author.

At the outset, sustainability outcomes of the GDP and YSS Corridors did not incorporate the local contexts of the regions. They were delivered in the form of the SDR concept and Bali/Java's Island development (economic) themes that were generically applied to every SDR corridor despite the regions' unique environmental and socio-cultural contexts. Both corridors were also delineated based on the presence of national roads and growth centers that projected the transport corridors' idea and economic focus. In later rounds, the SDR concept was translated into the GDP/YSS regional development strategies, comprising environmental, social, and economic sustainability measures funded by the state and regional budgets for implementation. Sustainability was then enhanced as programs were tailored to regions' specific challenges, strengthening the environmental and social dimensions overlooked during the corridors' initial planning process. Common economic programs were appointed not only in the richer regions but also in the lagging regions, including tourism destination revitalization, dams/irrigation system development, and traditional market/incubation areas for local commodities. At the same time, environmental and social measures were appointed to improve the living quality and ecology of urbanized areas and settlements.

While both corridors exhibited common outcomes, each corridor had programs appointed based on the specific challenges of regions. For example, regions in the GDP Corridor had a long coastal line, so programs were appointed for coastal abrasion protection and beach conservation. Meanwhile, the YSS had a problematic issue surrounding the Borobudur Compound in Magelang Regency, which grappled with poverty more severely than other regions In Central Java. Consequently, there was a strong drive toward promoting sustainable tourism and implementing a green open space program directed in the areas. Another different outcome was observed in a program of the GDP appointed outside the delineations, such as the Mengwitani - Singaraja highway development that directed the development away from the saturated southern regions of Bali, thus enhancing the sustainability of the GDP Corridor. Meanwhile, the YSS had additional sustainable tourism programs outside the corridor framework (from the Integrated Tourism Development Plan Program) that complemented YSS's sustainable outcomes.

Both cases moved in the same direction, from an economic focus toward more sustainable corridors, as outcomes in environmental and social dimensions gained momentum in later stages. The similarities and differences between the dependent, intermediate, and independent variables of the GDP and YSS Corridors demonstrate that a common planning approach can lead to specific and contextual outcomes that meet both corridor and sustainability goals.

The corridors progressively moved towards a sustainable direction since the meso-planning phase (round two) due to the interaction of multiple actors with different local, tacit, and codified knowledge of regions and implementation capacities in a collaborative setting. Central government actors' local knowledge capacity was limited, while the corridor outcomes needed to become more specific over rounds of the planning process, necessitating the engagement of RIDA with more regional/local actors. However, actors had to align their perceptions of the corridors' ideas and delineations. Thus, the actors' interaction process was instrumental in aligning their interests and objectives, ultimately leading to joint actions in realizing sustainability vision of the corridors. The possibility to engage regional and local actors and address their interaction challenges was facilitated by process management, process design, and the adaptation to an institutionalized setting in which RIDA's hierarchical role was switched into a coordinator role, and actors' roles and responsibilities were clarified within institutionalized procedures and platforms. Regional/local actors could reveal their objectives and strategies and propose programs deemed as strategic or urgent. This circumstance continued in the micro-planning phase, allowing regional/local actors to negotiate strategic programs that fit the regions' characteristics, potentials, and challenges and align with the generic requirements of the corridor and sustainability goals.

While both GDP and YSS Corridors moved toward sustainability, the way they were commonly governed led to shortcomings in their outcomes. Public actors were prevailingly involved in the whole corridors' planning process, leading to predominant hard infrastructure outcomes, which overshadowed the significance of programs that empower local communities and promote regional/local innovations. The corridors have primarily focused on physical infrastructure development without much attention directed to empowering local communities, which hinders the potential for grassroots initiatives and innovations that could contribute to sustainable corridor development.

Furthermore, since these corridors were delineated primarily with a focus on economic aspect, prioritizing regions with the most growth potential, there is an inherent challenge in striking a balance between economic development and sustainability, as outcomes were focused on accelerating growth but not specifically in addressing the existing issue of equity and wealth distribution. While economic growth has been one of the corridors' priorities, there is a lack of programs that emphasize the equitable distribution of benefits and opportunities

among different segments of society. The focus on hard infrastructure development and economic sectors may disproportionately benefit certain regions or groups, widening the existing wealth gaps and exacerbating inequalities. Without proper consideration of equity and wealth distribution, the sustainability of the corridors may become compromised, as social cohesion and inclusivity are essential.

In conclusion, while there are limitations to the corridors' outcomes, the GDP and YSS Corridors still moved forward from the economic-centric planning process into a contextual one. This is attributed to the common governance approach adopted in the development of both corridors that emphasizes in conditioning the presence of favorable governance factors combined, which allowed the consideration of specific environmental, social, and economic aspects of a region throughout the macro to meso and micro planning process. This approach emphasizes the importance of collaboration and engagement among various stakeholders, including government agencies, local communities, and experts with local knowledge and varied implementation capacities, to ensure that the planning process is inclusive and tailored to the local context.

8.1.5 Main Research Question. How does governance contribute to the development of transport corridors towards sustainability?.

The answer to the main research question explains the extent to which the GDP and YSS corridors gradually progressed toward sustainability and why the outcomes, nevertheless, are limited in realizing the full potential of sustainability despite the corridors' positive development.

Findings from the study indicated that the GDP and YSS Corridors were moving towards sustainable development, as they were developed beyond the traditional sectoral approach. The corridors delivered measures addressing regional sustainability concerns and progressively enhancing each sustainability dimension. Environmental and socio-economic programs were strategically allocated to meet the unique challenges of prosperous and lagging regions. Consequently, the corridors' outcomes became more location-specific, evidence-based, and responsive to regional needs.

The positive outcomes can be explained by how the governance factors and processes facilitated the interaction and collaboration of multiple sustainability actors. The initial vision of sustainable corridors provided a clear direction for the planning process. It set the framework for considering environmental sustainability, social equity, and viable economics within the corridors. This vision served as a guiding principle, motivating actors to actively participate and contribute within the sustainable corridor's framework.

To realize the vision, process management and process design played pivotal roles in achieving a collaborative setting by providing direction to the planning process and activating the selection of actors whose involvement is needed to enhance the corridors' sustainability. Process management makes it possible to use different governance modes, including top-down and bottom-up elements, leading to a collaborative governance mechanism that allows the participation of regional/local actors over the rounds within different consultative platforms. This allowed actors to alter the corridors' economic focus and formulate regional development strategies from a sustainability perspective. As a positive impact, the vision was enhanced throughout the later planning process and inhibited sustainability, increasing actors' attention to prioritizing sustainability objectives. Meanwhile, process design allowed the adaptation of institutional settings to facilitate face-to-face interactions and the circulation of local sustainability knowledge. At the same time, it set up clear roles and responsibilities among the actors. Such face-to-face interactions, in which actors discussed and negotiated sustainability challenges and interventions, enabled collective learning, knowledge-sharing, and the integration of actors' needs and interests into decision-making.

Therefore, it can be said that a favorable constellation of vision, process management, and process design co-evolved with the process and contributed to the extent of sustainability outcomes achieved. Those factors promoted inclusivity and collaboration in an interaction process, enabling actors from various backgrounds to contribute their expertise, resources, and perspectives toward sustainability.

As a result, the interaction of actors did not occur in a process without direction. Instead, it contributed to contextualizing both corridors and increased actors' attention to sustainability ideas. In addition, for the GDP Case, the initial skepticism of the regional/local actors gradually faded as they were empowered to be actively involved in the shaping of the corridors' future. This incident offered the premise of national investments and the Pareto mechanism with its trickle-down effect. This shows that the interaction process was crucial, allowing actors' needs and interests to be considered in the decision-making process. The interaction process also illuminates its role in bringing in the dynamic of governance factors that played out over the rounds.

Despite these positive outcomes, the corridors fell short of fully realizing their potential as sustainable corridors due to the initial conception of the SDR and its economic angle that shaped the corridor delineations. The early delineations excluded lagging regions, disregarding their environmental and socio-cultural linkages. Consequently, the corridors' ability to address issues such as economic sustainability and disparity (equal wealth distribution, employment opportunities, fair wages) was limited, as the programs primarily focused on regions with the

highest growth potential. Economic programs preceded critical issues like agricultural conservation and public transport provision.

The sustainability outcomes also primarily focused on hard infrastructure development, with less attention given to the presence of soft infrastructure programs. This could lead to an overreliance on exogenous factors, community disengagement, limited economic diversification within regions, and hindering grassroots movements in sustainable innovations.

To explain these outcomes, this study shows that regional/local actors' participation was limited in the early planning process of the corridors, as it excluded those who held the potential to advocate soft infrastructure implementations. This restriction persisted in the subsequent rounds, particularly in the third one. As a result, the anticipated soft infrastructure measures remained unrealized. This circumstance can be traced back to how the initial planning phase adopted a hierarchical approach. The early exclusion set boundaries for interactions in the following rounds, which could not be corrected. Consequently, even when collaborative governance was adopted in the later planning process, there was a strong top-down element where the decision-making process was not so inclusive, predominantly involving government actors. Thus, outcomes during the meso-to-miso planning process prioritized public agendas with little consideration of how the contributions of non-government actors in areas such as sustainable resource management, regional innovations, and community development could optimize the realization of sustainable corridors.

To sum up, the governance of the GDP and YSS corridors chosen by the Indonesian government demonstrated its strength and adaptability. The governance approach employed balanced top-down, bottom-up, and collaborative elements to address the diverse contexts of the corridors. This approach acknowledged the importance of aligning sustainability objectives with a clear vision and incorporating inclusivity and local relevance in the planning process.

By setting a sustainability vision since the corridor's early planning process, followed by the involvement of regional/local actors and promoting collaboration in the decision-making process, the Indonesian government navigated the corridors' different contexts without losing sight of sustainability objectives. This governance approach served as a valuable model for other countries embarking on corridor development, emphasizing the importance of combining diverse perspectives and engaging stakeholders at multiple levels. Ultimately, the Indonesian experience in corridor development served as a valuable lesson for other countries, highlighting the significance of a robust governance approach that paves the way for balancing diverse perspectives of actors and maintaining direction in the pursuit of sustainable development. However, it is important to acknowledge that challenges remain. The choice for a transport corridor approach

has an inherent tension since sustainability needs to be accomplished within this frame. The initial conception of the corridors driven by the economic angle also resulted in limited attention to critical sustainability issues.

A disproportionate focus on hard infrastructure development overshadows the importance of facilitating community empowerment, promoting local innovations, and fostering social inclusion, which is crucial for achieving sustainable outcomes. It enhances the capacity of communities to adapt to changing circumstances, encourages participation and collaboration, and ensures the equitable distribution of benefits and opportunities.

8.2. Discussions and Theoretical Contributions

This section compares the findings to the theories. It discusses in what respects the findings are relevant for theories, what theoretical discussions they brought up, and how they contribute to theories.

Firstly, this research shows how the GDP and YS case studies were developed using exogenous regional development theories. They were established as government-initiated (transport) corridors that predominantly focused on infrastructure development, as Nogales (2014) described. The situation displays the core idea of the neoclassical exogenous theory, as opposed to the endogenous theories that rely on the development of soft infrastructure (Svetikas, 2014; Sook Lee, 2009). The analogies with exogenous theories could also be seen in how the GDP and YSS Corridors were delineated geographically and functionally in transport streams, economic activities, and tourism, using the ideas from the growth pole (Perroux, 1955; Aydalot, 1965; Boudeville, 1968) and circular cumulative causations theories (Myrdal, 1956; O'Hara, 2008) to deliver a trickle-down or spread effect to their surroundings (Jovovic et al., 2017).

As a result, environmental and social measures were discussed insofar as they could be added to the overall package or were needed to mitigate the negative impacts of the corridor development. In this sense, the very idea of transport corridors was at odds with an equal position for each of the three sustainability pillars. The study thus argues that when the environmental, social, and economic sustainability aspects are taken into account in the planning process of a sustainable (transport) corridor development, as opposed to the economic focus of the regional development theories, the corridor no longer strictly follows the perspectives of growth pole or the Circular Cumulative Causation theories that prioritize investments in specific regions for multiplier effect (Carruthers and Kanaka, 2014). A corridor's geographical and functional delineations based on sustainability considerations - for instance, if social or natural development rather than transport or the economy were the guiding values - might turn out to be completely different.

Our research findings, therefore, confirm that exogenous regional development theories are likely to be associated with an economic bias in transport corridor development (Svetikas, 2014; Sook Lee, 2009)

Secondly, attempts to incorporate endogenous theories in the later planning process of both corridors appeared to be limited. Endogenous theories emphasize the inclusion and engagement of institution/local innovation actors that have the capacity to push innovation and the development of technology as the engine of growth (Klarin, 2018; Antonescu, 2015; OECD, 2012). However, even though non-government actors were present in the second planning round, the central and regional/local government actors outnumbered the academic institutions and private sectors, while civil society organization actors were missing. This imbalance in actor composition hindered the transition from a government-centric approach to a more collaborative governance practice. Consequently, the Indonesian Corridors only partially shifted towards governance that embraces broader stakeholder engagement and participation (Shannon and van Egeraat, 2013; Jäger, 2007; Bruszt and Palestini, 2016; Keune, 2001; Tappeser et al., 1997).

It is crucial to acknowledge the significance of involving actors who possess the capabilities to foster innovation, promote local entrepreneurship, and facilitate collaborations. By neglecting the inclusion of such actors, the corridor development initiatives primarily focused on fulfilling government targets, particularly in terms of public infrastructure projects, rather than catering to the diverse interests and perspectives of a wider range of stakeholders. This finding aligns with the observations made by Athukorala and Narayan (2018), highlighting the need for a more balanced and inclusive composition of actors to ensure that corridor outcomes reflect a broader set of interests and priorities.

This study underscores the importance of recognizing that the mere presence of private actors does not guarantee increased sustainability or a shift towards a more holistic development approach. While private sector involvement can bring valuable expertise and resources, the emphasis should be placed on fostering collaboration, innovation, and inclusive decision-making processes. By embracing a more diverse range of actors, including academic institutions, civil society organizations, and non-governmental entities (OECD, 2012), the Indonesian Corridors may have a bigger chance to tap into a broader pool of knowledge and perspectives, thereby promoting sustainable development more comprehensively and inclusively.

Endogenous theories also focus on the development of human capital, the promotion of knowledge exchange among the clusters of firms, and local potentials/internal capacities of regions as the driving force for innovation, entrepreneurship, and creativity (Capello and Nijkamp, 2011; Svetikas, 2014; Antonescu, 2015; Sabic and Vujadinovic, 2017). Therefore, the over-focus on

infrastructure, the prioritization of the more intensified nodes, and the lack of roles of firms, industries, local organizations, and institutions toward the research and development activities displayed a major weakness of the GDP and YSS Corridors development. Hence, innovation systems were hardly supported at all. This circumstance hindered the role of local factors and regional dynamics in driving economic growth and pushing environmental and social sustainability. This research then confirms that an over-focus on hard infrastructure as opposed to soft infrastructure is insufficient to enable endogenous growth (Brunner, 2013; Carruthers and Kanaka, 2014; Svetikas, 2014).

Thirdly, the study confirmed that both exogenous and endogenous regional development theories have economic and planning focuses, referred to by Dawkins (2013) as regional economic development theories. These theories center their inquiries on how regions grow and why some grow more rapidly than others, which is the opposite of the economic sustainability principle that aims for the distribution of wealth, income equality, and poverty reduction (Camdessus, 1995). The study enriches the theory of sustainable regional development and sustainable corridor development by showing that adopting those theories alone is insufficient in directing corridor development into sustainability. The study confirms a statement by Jovovic et al. (2017) regarding the need to combine regional development theories with sustainability notions (when aiming for sustainable development (of corridors). This was done by taking into account regions' unique characteristics (geographical, institutional, organizational, and cultural context) and their economic, social, and environmental aspects in the planning (Thierstein and Walser, 1997; Sabic and Vujadinovic, 2017).

Fourthly, the significance of governance in directing and guiding actors' behavior throughout their interaction process toward collaborative efforts among actors from diverse fields of knowledge and expertise. The study affirms the governance role by identifying five governance factors toward sustainable (transport) corridor development from various theoretical strands. While each factor may have been discussed individually in the literature, this study investigates their interplay throughout different interaction processes of actors to influence sustainability outcomes. These relationships of the key concepts were knitted within a new conceptual framework relevant for both researchers and policymakers who study or aim to direct a public-led corridor development into sustainability.

The framework is new in theory since it provides a conceptualization of the interaction process, which makes it possible to analyze how the dynamic nature of the constellation of governance factors played out in various rounds of the process, thus influencing the direction of the process and its (in-between) outcomes.

The study further contributes to the governance and sustainable development theories by showing how the relationships between variables of those key concepts

within the framework are not linear. Instead, there are feedback loops from the sustainability outcomes toward the constellation of governance factors and the interaction process, and therefore, require a revision of the initial framework (presented in Chapter 2). This is also new in theories (OECD, 2001a; Oberg, 2017; Quium, 2019; Clune and Zehnder, 2019), as most literature discuss how governance can influence sustainability outcomes, but not vice versa. In the framework, sustainability outcomes delivered during the earlier planning process influence governance factors, the interaction process, and outcomes in the later planning process.

Outcomes in the earliest macro-planning process (SDR conception round) were used to determine the kinds of governance mechanisms, the types of actors, and the knowledge needed to contextualize the SDR concept into IIDP's GDP/YSS strategies. Subsequently, outcomes in the GDP and YSS regional development strategies (envisioning round) helped RIDA determine the modes of governance, actors, and knowledge needed to adapt to the Pre-RCs, where actors were expected to prioritize and implement programs as planned in the strategies. Outcomes achieved during the early planning process also significantly impact the perceptions and strategies of actors during the subsequent planning rounds. This can be seen, for example, in how the presence of programs outside the initially delineated GDP corridor could shift the resistance of regional and local actors toward the corridor idea into joint sustainability actions. This demonstrates the dynamic nature of the interaction process and the potential of sustainability outcomes in influencing governance processes throughout the different rounds of corridor development. Consequently, the framework shows how the interaction processes, and the use of the rounds model approach are pivotal in the study of sustainable (transport) corridors, as they shed light on the intricate relationship beyond the linear understanding of the key concepts and reveal the existence of feedback loops between them.

Fifthly, the study identifies the importance of external factors that are not part of the initial conceptual framework, yet they influence the governance factors and the interaction process of the corridors' actors (See Diagram 2).

In this study, the factors are found in the form of other sustainable development agendas, such as the UN's New Urban Agenda and the Integrated Tourism Development Plan that the government is committed to, which offered not only an additional vision to the corridor idea, but also directed the governance modes to realize the visions, thus, strengthening the emphasis on sustainability.

External factors can play out in other corridor cases since a sustainable corridor vision can be complemented by various national/regional/local agendas that promote contextual and sustainable development of regions to which certain actors may be committed, such as the Sustainable Development Goals that have

broad acceptance and commitment from the international community. The presence of external factors confirmed the study of Gannon et al. (2020), which looked into the possibility of integration between the SDG's goals and targets with the corridors' idea. The external factors help align actors' additional/contrasting strategies as the factors could facilitate programs that may be excluded from the corridor idea but still benefit the sustainability of the corridor's regions.

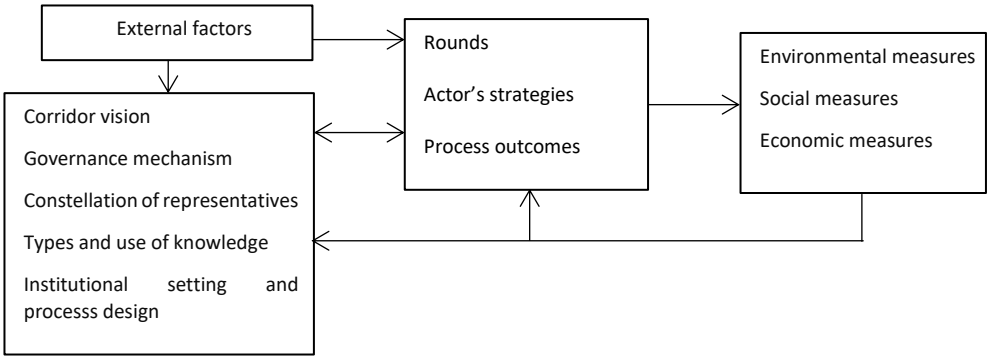


Diagram 2. Revised conceptual framework.
Source: Author

Sixthly, the study makes a significant contribution to the literature on corridor development by expanding the concept of transport corridors beyond their traditional roles. While transport corridors have conventionally been seen as infrastructure, economic, or urbanization axes (Priemus and Zonneveld, 2003), this research highlights their potential, despite their limitations, as sustainability axes. This rethinking of the idea of corridors opens up new possibilities for their application and purpose. It is recognized in the regional development and corridor development literature that transport corridors can do more than connect regions, facilitating the movement of various economic sectors, and accelerating growth (Quium, 2019; Athukorala and Narayanan, 2018; Srivastava, 2011; Priemus and Zonneveld, 2003). Transport corridor can be used as a tool to address environmental challenges (Awais et al., 2019; Dossani, 2016; Hope and Cox, 2015), and socioeconomic challenges, including disparity and income inequality issues (Athukorala and Narayan, 2017; Hope and Cox, 2015).

By reimagining transport corridors as sustainability axes and leveraging their potential to address environmental and socio-economic challenges, the study opens up new avenues for corridor development theories. This study thus enables researchers to examine the broader impacts and possibilities of corridors beyond their conventional functions, as well as the prerequisites for such a direction. This shift in perspective fosters a more holistic approach to corridor planning and

implementation, allowing for rethinking of the idea of corridors. These insights can offer valuable guidance for creating corridor development projects that integrate economic, social, and environmental sustainability into their core objectives.

Finally, the study shows that the governance of sustainability is paramount. It confirms that governing a sustainable (transport) corridor requires collective actions (Oberg, 2018; Kunaka and Carruthers, 2014; Athukorala and Narayan, 2017), made possible through governance. As a government-led policy that involves extensive planning and implementation across regions that will be developed into sustainability, its development needs the involvement of sustainability actors, including regional/local non-public actors (Dhimitri et al., 2015; Athukorala and Narayan, 2018). The study contributes to governance literature by emphasizing the roles of vision, process management, and process design to congregate and coordinate actors in a sustainable corridor development framework. (Gjaltema et al., 2020; Meier and O'Toole, 2001; Klijn, Steijn, and Edelenbos, 2010). RIDA actively designed the planning process, whereby it used and reshaped institutional practices and simultaneously managed the process by bringing sustainability actors together through process management, while securing and providing direction to the interaction process through process design (Ansell and Gash, 2007; Robertson and Choi, 2010). As a result, the corridors' governance went from a hierarchical approach into a mix of top-down and bottom-up, allowing actors to collaborate and coordinate in a collaborative governance setting guided by the sustainable corridor vision. The combination of vision, process design, and process management was needed to design, manage, monitor, and improve the coordination and interaction process of selected sustainability actors within the corridors network, and cater to knowledge sharing and trust-building among actors.

The text above eventually presents how this study on governance also contributes to the literature on sustainable development. It demonstrates the interconnectedness between governance and sustainable development within the study of transport corridor development, highlighting the necessity of a sustainability vision and the involvement of diverse actors, including regional and local non-public actors, in the governance process to ensure sustainability outcomes. This emphasis aligns with the broader goals of sustainable development, which aim to address environmental, social, and economic challenges through collaborative efforts, guided by the vision.

8.3. Practical Contributions and Policy Recommendations

In recent years, the development of corridors has gained significant recognition worldwide as an approach to enhancing connectivity and fostering economic growth (Srivastava, 2011; Brunner, 2013; Susantono, 2015). Corridors, defined as linear developments that integrate various sectors and regions, have been

embraced due to their integral nature. By linking different regions and sectors, corridors facilitate the movement of goods, services, and people, bolstering economic activities and promoting regional integration (Athukorala and Narayanan, 2018; De and Iyengar, 2014). They serve as catalysts for development, attracting investments, creating jobs, and stimulating economic growth. Furthermore, corridors often encompass multiple sectors, such as transportation, logistics, energy, and agriculture, enabling synergies and optimizing resource utilization (Nogales, 2014). This holistic approach is seen as a solution to address various developmental challenges and unlock the potential of regions.

However, while the adoption of corridors has been praised for its comprehensive approach and promising economic benefits, there have been concerns about how they can also bring about negative environmental and social impacts if not implemented with a sustainable lens (Quium, 2019; Jain and Jehling, 2020; Dossani, 2016). The rapid pace of corridor development, particularly from infrastructure development, has raised concerns about deforestation, habitat destruction, pollution, the displacement of local communities, and the widening of the disparity gap, exacerbating inequality as development is prioritized in regions with abundant economic potential (MPWH, 2017). These sustainability concerns call for a more comprehensive and inclusive approach that balances economic growth with environmental protection and social equity.

The above led to the call for sustainable corridors that aim for a broader integral approach, encompassing regional development and sustainable development principles to ensure environmental protection, social equity, and economic viability, or green corridors where non-economic elements such as health systems, environment protection, and cultural dimensions are added along economic initiatives (Nogales, 2014). Such corridors are expected to become catalysts for sustainable development, fostering economic growth while safeguarding regions' environmental, social, and economic states. Such ambitions can be found worldwide, for example, in the Maputo Corridor that stretches from Mozambique to the landlocked country of Zimbabwe; the Nacala Corridor that stretches along Mozambique, Malawi, and Zambia; the Greater Mekong Subregion Corridor that spans across Cambodia, Laos, Myanmar, Thailand, Vietnam, and parts of southern China; and the China-Pakistan Corridor that connects the Northwestern regions of China with the Southwestern regions of Pakistan; and the Ten-T Corridor that spans across multiple countries in Europe (Hope and Cox, 2015; Nogales, 2014; Dossani, 2016; Oberg, 2018).

While abundant studies have been dedicated to the economic benefits, little is known about how to govern a (transport) corridor development into a sustainable one. Conversely, many countries, including Indonesia, have pledged to participate in the New Urban Agenda, which challenges countries to achieve safe, resilient, and sustainable regions. This makes this study politically and practically relevant for

governments and decision-makers striving to achieve such goals. Therefore, this study has particularly explored the circumstances under which a (transport) corridor approach can be governed to achieve sustainable development. The goal is to provide practical contributions for practitioners and decision-makers involved in planning a sustainable corridor.

First, this study offers valuable insights for policymakers regarding how to govern a public-initiated sustainable (transport) corridor by emphasizing the importance of dynamic governance factors. The factors come together to influence the interaction processes of actors within the local context, which then shape and constrain sustainability outcomes. By fostering a favorable constellation of governance factors, a sustainable (transport) corridor is likely to be realized. The practical implication of this study is for policymakers to strengthen the governance factors and find a good balance between them.

Not all factors are easily influenced, but the sustainability vision itself is considered paramount (Jovovic et al., 2017; OECD, 2001b; Thierstein and Walser, 1999), given its commitment to sustainability. Therefore, the study recommends designing a robust yet adaptive sustainability-oriented vision rather than an economic vision from the onset. Moreover, the use of process management and process design is highly recommended as they allow for a combination of top-down steering and bottom-up contributions from regional and local actors. This means that process management and design can ensure the inclusivity of the corridors' network to a wider range of actors (Koppenjan and Klijn, 2013; Klijn and Edelenboos, 2007; Paim and Flexa, 2011; Gjaltema et al., 2019), who can not only provide input on scientific and local expertise on sustainability but also contribute to the implementation of hard and soft infrastructure (Brunner, 2013; Klarin, 2018; Athukorala and Narayan, 2017; Kunaka and Carruthers, 2014). Consequently, it is crucial to acknowledge that accommodating diverse interests and objectives can pose difficulties in the decision-making process (Hope and Cox, 2015). As the network of actors expands, more interests and goals need to be considered and aligned with the overall sustainability objectives of the corridor. Balancing these various perspectives requires careful negotiation and stakeholder engagement within facilitated coordination platform(s) (Oberg, 2017).

Second, this study stresses the importance of delineating a corridor based on a sustainability vision, utilizing the knowledge of regional/local actors on sustainability. This approach will likely lead to a different delineation that improves regional sustainability with outcomes beyond mitigation. The study analyzed how the Indonesian SDR corridors were developed and delineated from an economic perspective, overlooking the local environmental, socio-cultural, and economic sustainability of the regions. Consequently, the corridors could not realize their sustainability potential optimally, as outcomes supporting economic activities remained the primary focus throughout their development process. Therefore, this

study recommends an approach that goes beyond traditional economic-focused delineations. Guided by the corridor's sustainability vision, thorough considerations, and analysis of the regions' environmental, social, and economic characteristics should be integrated into the corridor's concept and delineation decisions.

In cases where a corridor is in its ongoing development process and has been primarily delineated by economic factors, the study recommends an assessment of the existing delineation with sustainability in mind. This assessment advocates for a dynamic and adaptive approach to corridor delineation that can respond to changes and further enhance the sustainability of the corridor. This flexibility in delineation allows for considerations such as mitigation of potential natural disasters or force majeure events, preservation of conservation areas and hinterlands, or the inclusion of lagging regions for spillover impact.

Third, this study delves into the nuanced dynamics of the mixed governance mode in regional development implementation, offering a more sophisticated understanding of how vertical and horizontal relationships can take place within the presence of coordination platforms. While the literature acknowledges the importance of horizontal relationships for collaboration among actors, this study sheds light on the practical complexities that arise in actual implementation. In the cases of the GDP and YSS Corridors, a predominantly hierarchical element often associated with top-down governance was observed, wherein RIDA played a central role in setting the corridors' planning process agenda and the conditions that governed actors' interactions. Consequently, regional and local parties did not have equal roles or positions in the Indonesian Corridors platforms (FGDs and Pre-RCs).

Nevertheless, the platforms remain important, for they allow stakeholders' participation, dialogue, and interactions across different hierarchical levels, from various levels of government agencies, and regional/local non-public actors (Ansell and Gash, 2007; Connick and Innes, 2003). Hence, they enabled the exchange of information, ideas, and expertise, and fostered a sense of shared ownership and commitment, leading to more effective and sustainable corridor development. Therefore, this study recommends the continuation of the coordination platforms. This recommendation aligns with a study by Equable (2017), which highlighted the need for vertical and horizontal coordination to enhance the partnership and participation of actors in sustainable regional development practices. The interconnected and interrelated nature of ecological, social, and economic program implementation necessitates the involvement of actors with expertise in various domains. However, to further enhance sustainability, it is recommended for rules and procedures to be adapted, to allow balanced sustainability representatives in which the network needed to be extended to more regional/local actors. Such an attempt is expected to strengthen the bottom-up initiative, as shared by Athukorala and Narayanan (2018).

Fourth, this study recommends the incorporation of measures beyond traditional investments in physical infrastructure and recognizes the value of intangible factors such as local entrepreneurship, innovation, and collaboration that contribute to the overall sustainability and growth of regions. Incorporating such measures is essential for both ongoing corridor projects and those yet to be implemented.

One example is through education and training programs that can equip local communities with the necessary skills and knowledge to thrive in a modern economy. These programs ensure that the region can effectively utilize the opportunities created by the corridor, leading to increased economic sustainability. Additionally, initiatives aimed at enhancing the quality of life for local communities, such as cultural amenities and recreational facilities, can also contribute to the social sustainability of the corridor.

Furthermore, the study highlights the importance of programs that foster innovation and creativity. For example, the development of cultural institutions such as museums and libraries that not only enriches the region's cultural fabric but also catalyzes new ideas and creative thinking. Additionally, the establishment of communal reduce-reuse-recycling centers can significantly impact waste management. These centers provide facilities and training to local communities, enabling them to reduce waste sent to landfills, promote sustainable consumption, and even transform their waste into locally made products such as furniture or fashion apparel. This contributes to environmental sustainability and generates income and economic opportunities within the community. Overall, these proposed programs encourage the exchange of ideas and creative thinking that can make regions more environmentally and socially sustainable, and, at the same time, attractive to potential residents and businesses.

Lastly, since the development of transport corridors often prioritizes hard infrastructure planning, it is recommended to recognize the significant potential of investing in new technologies of hard infrastructure development that help achieve sustainability objectives, as advocated in the concept of green corridors (Nogales, 2014; Aman et al., 2022; Prause, 2014; Prause and Schroder, 2015; Clausen U et al., 2012). Green corridors emphasize freight logistics development while integrating innovative technologies and practices that minimize environmental impact and promote sustainability (Clausen U et al., 2012). Such technologies include novel propulsion systems, heating and cooling technologies, alternative fuels and cargo handling techniques, and Information and Communication Technologies/ICT infrastructures (Ibid.)

In this context, government institutions play a critical role in initiating sustainability-focused ideas and policies (Oberg, 2017). They can provide the necessary regulatory frameworks, incentives, and funding to encourage the adoption of new technologies in transportation development. Governments can also establish

partnerships with private firms, research institutions, and industry experts to foster innovation and drive the implementation of these ideas (Iddris, 2015). However, it is necessary to acknowledge the indispensable role of private firms in realizing sustainable innovations (OECD, 2001a; OECD, 2013). Private sector entities are often at the forefront of technological advancements, investing in research and development to create cutting-edge solutions. Their expertise, entrepreneurial spirit, and financial resources are instrumental in bringing sustainable ideas to fruition. Hence, they are vital in promoting market-driven innovations and competitiveness in the transport sector that align with sustainability goals (Ibid.). Thus, collaborations between governments and private firms could leverage the strengths of both sectors, leading to a more effective and efficient implementation of sustainable technologies within transport corridors (Iddris, 2015).

8.4. Strengths and Limitations of the Study

This section discusses the study's strengths and limitations, and how the study then addresses its weaknesses. The first strength of this study is how it fills the gap in literature covering topics of governance, sustainable development, regional development, and corridor development literature that explores the role of governance in the interaction process toward a sustainable direction. It has been done by using ample and unique data sources from the central, regional, and local governments, notorious for being difficult to obtain due to the complex bureaucratic procedures in Indonesia. Nevertheless, the author collected important and sufficient data to complete this study. In addition, the extensive data allowed the author to conduct data triangulation, which enhanced the internal validity of the study.

The second strength is the method used for data analysis. The study utilized rounds model analysis, which allowed the author to identify the sequential events and the causal configurations of the key concepts across different corridors' planning stages comprehensively, from the early establishment of the corridors' idea (2015) through the implementation phase when the data was collected (2019). This method was challenging, as it involved extensive variables (independent, intermediate, and dependent variables) related to different time periods of corridor development (4-year planning periods). Nevertheless, the author managed to identify and interview related actors involved in the different planning processes and collect various data sets of programs of different implementation years.

While this study demonstrates its strength, there are limitations to it. The first limitation is that the study relies on a limited number of advanced corridors case studies, making it challenging to generalize the findings to other less prominent cases. Nevertheless, according to Yin (2009), case research can be generalized toward theory, contributing to theoretical understanding beyond specific

instances. The first step to deal with this limitation was to study two cases to strengthen the empirical basis of the findings.

The two cases of the GDP and YSS Corridors were deliberately selected to ensure that both cases represent a larger phenomenon. The GDP and the YSS are two of the most important and advanced cases than other SDR corridors due to their national significance to the Indonesian economy. These two corridors are also parts of SDR Corridors that were developed earlier than those in the same category. Having comprised some of Indonesia's largest metropolitan regions, the two corridors face many environmental, social, and economic challenges in developing their regions. On the flip side, the corridors possess considerable potential to be developed towards sustainability and garner substantial attention from governance stakeholders. Thus, from a practical point of view, new cases can learn from this study's research findings.

The challenge in generalizing the study was addressed through the study's framework, which made it possible for theoretical generalization, as it was built on the general and extensive literature on regional development, corridor development, sustainable development, and governance that needed to be analyzed in any types of sustainable corridor governance study. The framework helped the study to develop a theory-driven analysis, allowing the study's key concepts to be explored beyond merely descriptive accounts to show patterns/causalities that go beyond the specifics of the two cases. Thus, the framework used generic concepts in which patterns were studied and conceptualized in general terms to be significant for other cases beyond the Indonesian context. As a result, the (revised) conceptual framework (as this study's main outcome) can be applied in other cases by other scholars and practitioners interested in sustainable regional development processes.

The second limitation is that not all outcomes can be fully assessed in this study since the corridor was in its ongoing development during the study's data collection (in 2019). Therefore, the sustainability outcomes of the corridors could only be assessed based on the obtained data, used to indicate the variety of programs, the availability of funding for each program, the proportionality of programs within certain sustainability pillars of sustainability, and the types of sustainability issues that each program addressed. As a result, this study could not assess the trickle-down impact nor the Pareto effect on the regions and their environmental, social, and economic states until all planned programs are realized.

The third limitation is the time constraint and information received involving respondents from private institutions and local societies, as many of them were not involved in the corridor's planning process. On the other hand, these actors possessed rich local tacit knowledge needed in this study to conduct its sustainability analysis. To address this matter, the author interviewed several actors

from academic institutions, NGOs, and a private business who had the capacity to enrich the study's analysis regarding the environmental, social, and economic issues of the corridor and the types of measures they perceived as suitable to resolve the related issues. This limitation was also mitigated by having interviews with numerous public domain representatives to cross-check and validate data by comparing information from multiple sources to ensure its accuracy and consistency.

8.5. Future Research Activities

From the above-presented reflections on methods, types of data utilized, the data analysis, and the findings of this study, five research activities can be recommended as follow-ups.

First, the author recommends future research to analyze the governance factors, actors' interaction process, and sustainability outcomes for the next implementation rounds of the GDP and YSS Corridors up to 2026. Since programs will have been completed by this time, studying the results of these projects in the future is important. To do so, this study then suggests the use of mixed method analysis, using both qualitative and quantitative data. Qualitative data in the form of interviews with related actors can be used to analyze how the governance factors and interactions processes continued to evolve after 2019, and how the dynamic constellations of governance factors evolved during the later planning rounds. Meanwhile, quantitative data is needed to assess outcomes comprehensively (such as using the baseline program data that includes the name of each implemented program, its type, location, readiness criteria checklists, and the amount of funding allocated). Sustainability analysis of such data can show if each sustainability issue has been answered, and whether a broader range of outcomes and funding were allocated than what was identified in this study. As importantly, quantitative analysis can also be used to assess the overall impact of the corridor outcomes toward regions within the corridors and their surroundings, to answer if Pareto and the trickle-down implication had been reached, and if it delivers positive or negative (sustainability) impact to the corridors and its larger regions as a whole.

Second, this study proposes the application of the theoretical framework of this study to deepen the relationship analysis of this study's key concepts and their variables. The framework can be used for the continuation of the GDP and YSS cases analysis of its later planning rounds (2019 onwards). The model can also be used to explore other corridors that are in its ongoing development process. As mentioned in the earlier section, the use of rounds models had been one of the study's strengths in showing the dynamics of the factors and the evolution of the interaction process of actors, which resulted in outcomes that differed in scales and forms throughout the various planning rounds. With the rounds model, future

studies are expected to be able to deepen their analysis according to their timeline. It includes - but is not limited to how different governance complexities are addressed in each unique round; the particular aspect of sustainability that actors are focusing on in each round (during the discussion, negotiations, and decision-making process); the interplay between variables within a round, the evolution of the variables' values over time; and the relationships between key concepts.

Third, a similar study (using the improved framework) with a limited number of case studies can be applied for in-depth analysis of other corridors. This can be done using a Qualitative Comparative Analysis (QCA), a method that analyzes complex causal relationships among variables to identify patterns and conditions that lead to a particular outcome. This is particularly suitable when examining cases where success and failure vary based on several critical factors. By carefully selecting cases that exhibit different outcomes, QCA helps us discern the combinations of conditions that lead to success or failure in sustainable transport corridor projects. This approach allows us to focus on the essential conditions that contribute to divergent outcomes, thus capturing the multifaceted nature of corridor development. When the number of cases is constrained, QCA's ability to identify necessary and sufficient conditions in a relatively small sample of cases becomes especially advantageous.

The comparison can be conducted within the Indonesian corridors context under the SDR framework. This comparison may involve corridors with similar advanced characteristics to those examined in this study or corridors falling into a less advanced category with lower economic potential. In such less advanced regions, governance capacity tends to be weaker, and due to variations in economic potential, governance factors, and processes compared to the corridors in this study, the sustainability outcomes are likely to differ. Another comparison that can be done is between Indonesian corridor(s) with those outside Indonesia (either those with similar or different decentralized autonomy systems) such as TEN-T, China-Pakistan Economic Corridor, Belt and Road Initiative, Maputo Development Corridor, Malaysia's economic corridors, and Northern Corridor in Africa. These comparisons can give us the validity of favorable constellations of dynamic governance factors that manifest themselves in corridors with different local contexts of regions; diverse kinds of sustainability outcomes may have resulted, but they are still in line with the generic requirements of the corridor and sustainability goals.

Fourth, the study recommends future research that employs the Comparative Study Analysis (CSA) method to analyze multiple case studies (medium or high N), thereby enabling a more comprehensive comparison across cases. For this purpose, CSA can utilize corridor cases within Indonesia (with similar or varied categories of SDR development corridors), or sustainable corridor cases abroad for international comparative research, or other types of regional development corridors that focus

on certain sectors (such as agricultural corridor or tourism corridor) for sectoral comparative cases. With CSA, multiple case study analyses can also be conducted to compare corridors with the most favorable constellations of factors (that integrate with the contextual factors of regions) in which sustainability outcomes are optimized, with the least favorable of factors through which sustainability was not achieved. These cases allow researchers pursuing doctorates, an international team, a consortium of universities, or organizations like the World Bank or the United Nations to conduct a comparison of corridors. For example, they can compare corridors with different start of delineations: some that have integrated environmental, social, and economic aspects of regions from the beginning, as opposed to those that adapted sustainability in the later planning rounds; or corridors that have been developed solely through hard infrastructure initiatives in contrast to those that have incorporated both hard and soft infrastructure components.

Studies that use CSA can also enrich/improve this study's framework by identifying more favorable governance factors that may not have been included in this study. The comparison can also confirm or refute the findings of this study that a delineation of a corridor that started from an economic angle (based on the economic potential of regions) faces more challenges in the interaction process of actors to obtain sustainability without major governance interventions. Additionally, it can assess whether a delineation made without incorporating regions' sustainability contexts would not have the capability to optimize its sustainability outcomes, as economic programs continuously dominate the outcomes. As an additional note, a researcher for this kind of study needs to be aware that having more cases also means more challenges in obtaining the related data, which may require more time in its analysis.

As a final reflection, this study focuses on the extent of environmental, social, and economic outcomes of the Indonesian corridors and relates them to the governance factors and process of corridors in subsequent implementation rounds. To do so, the study is grounded in a theoretical framework to deepen its analysis, using in-depth case studies of corridors with distinctive characteristics and actors involved, in order to look for common patterns in which the corridors were governed to favor sustainability. Thus, this research endeavors to contribute to realizing the potential of sustainable transport corridors in addressing the existing and future sustainability challenges they face, ultimately leading to a development that prioritizes the balance between sustainability dimensions rather than being overshadowed by economic concerns, making sustainability the primary ambition of these corridors.

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ANNEXES

Annex 1

A letter from the Head of RIDA involving permission for data collection activities.

KEMENTERIAN PEKERJAAN UMUM DAN PERUMAHAN RAKYAT
BADAN PENGEMBANGAN INFRASTRUKTUR WILAYAH
Jalan Pattimura No 20 Kebayoran Baru – Jakarta Selatan 12110

Nomor : HM.05.06-Kw/02 Jakarta, 21 Juni 2019
Lampiran : 1 (satu) lampiran
Perihal : Izin Terkait Pengumpulan Data dan Pelaksanaan Interview Dalam Rangka *Ph.D Research Field Work* Mahasiswi *Erasmus University Rotterdam, The Netherlands.*

Kepada Yth.
(daftar terlampir)
di –
TEMPAT

Sehubungan dengan adanya permohonan terkait pengumpulan data dan wawancara dalam rangka pelaksanaan *Research Fieldwork* yang dilaksanakan oleh:

Nama : Gitasanti Andriani Djais
Institusi : *Institute of Housing and Urban Development, Erasmus University Rotterdam - The* Netherlands
Judul : *Developing Indonesian Corridors through Regional Development Approach*

dimohon kesediaan Bapak/Ibu untuk mendukung yang bersangkutan dengan penyediaan data/informasi terkait.

Demikian disampaikan, atas perhatian dan kerjasama Bapak/Ibu kami ucapkan terima kasih.

Kepala
Badan Pengembangan Infrastruktur Wilayah

KEMENTERIAN PEKERJAAN UMUM
BADAN PENGEMBANGAN INFRASTRUKTUR WILAYAH
PERUMAHAN RAKYAT

Ir. Hadi Sucahyono, MPP, Ph.D
NIP. 196104 28 198903 1 001

Annex 2

List of respondents involved in the interviews.

Location	Actor	Position
Jakarta	Central Government	RIDA
		RIDA - Directorate of Regional Infrastructure Planning II
		RIDA - Directorate of Regional Infrastructure Planning II
		RIDA - Directorate of Regional Infrastructure Planning I
		RIDA - Directorate of Strategic Areas Development
		RIDA - Directorate of Strategic Areas Development
	Consultants	Consultant of the Master Plan and Development of the Yogyakarta-Solo-Semarang Strategic Development Corridor project
		Consultant of the Master Plan and Development of the Gilimanuk - Denpasar - Padangbai Strategic Development Corridor project
Bali	Regional governments	Regional Transportation Connectivity Department of Bali Province and a regional planning academic from the University of Parahyangan Bandung
		Sub-division of Planning and Evaluation of regional infrastructure, Department of Public Works and Spatial Planning of Bali Province
		Sub-Division of Spatial Planning, Regional Planning Agency of Bali Province
		Regional Infrastructure, Regional Planning Agency of Bali Province
		Spatial Planning Division, Public Works Regional Agency of Bali Province
		Sub-Division of Environment and Regional Planning
		Sub-Division of Planning and Environmental Impact Assessment, Environmental Agency of Bali Province
	Local governments	Division of Infrastructure Development of Badung Regency, Bali
	Academics	Urban and Regional Planner, University of Udayana, Bali
	Bali's Chamber of Commerce and Industry	Division of Environmental and Sustainable Development
Semarang and Yogyakarta	Regional governments	Division of integrated infrastructure, People's Housing and Settlements Agency of Central Java Province
		Division of Program Planning, Regional Planning Agency of Central Java
		Division of Regional Planning, Settlements and Land Use, Regional Planning Agency of Central Java
		Division of Regional Planning, Settlements and Land Use, Regional Planning Agency of Central Java
		Division of Environment and Natural Resources, Regional Planning Agency of Central Java
		Sub-Division of Public Work, Water Resources, and Spatial of Central Java

		Division of Environmental Impact Assessment and Environmental Capacity, Environmental Agency of Central Java
		Sub-division of water utilization planning at the program and planning division, Ministry of Public Works
		Division of Infrastructure and supporting facilities, Regional Planning Agency of Special Regions of Yogyakarta Province
	Local governments	Division of Tourism Attraction and Creative Economy, Tourism Agency of Yogyakarta
	Academics	Urban and regional planner at Diponegoro University, Semarang City
		Architect and Planner at Yogyakarta University of Technology, Yogyakarta City
	Private actors	Planning Department of Candi Industrial Site, Semarang
	NGOs	Expert in Urban Advocacy, Climate Justice, and Green Spatial Planning from The Indonesian Forum of Environment (WALHI of Central Java)
		Expert in Green Policy Development from The Indonesian Forum of Environment (WALHI of Central Java)
		The Indonesian Forum of Environment (Walhi) DIY Yogyakarta

Annex 3

Questions to guideline interviews with the GDP and YSS Corridors actors.

The following questions were designed to guide the author to conduct semi-structured interviews with multiple actors related to their knowledge of sustainability issues of the corridor and experience to corridor development.

Concepts	Respondent	Questions
Introduction	Central government. Regional/local governments, non-government	Introduction to actors' position in the agency/institution/company Describe his/her roles/responsibilities in it
Corridor's ideas and establishments, visions knowledge involved.	Central government	Actor's perception of what the SR Corridors are
		How did the idea of SDR originate within MPWH (theories, concepts, ideas behind SDR establishment, delineation, and implementation?)
		How the corridors were envisioned; what are the issues they aim to address
		Do you think all of the corridors' potentials have been mapped and identified? Anything left behind? (Elaborate)
		What were the corridors' development critical moments? (Elaborate)
	Regional/local governments' non-government	Are you aware of the presence of SDR Corridors? When did you learn about the SDR's presence, and how?
		In your opinion, how is the corridor being envisioned? What do you think about it?
		What do you think that seemed to be the ideas/concept behind the SDR establishment?
Actors/sustainability representatives involved	Central government	Does the corridors' planning and implementation involve other actors besides RIDA?
		If yes, who are they, and to what extent were they involved (intensity and form of involvement)?
		Were the relationships among actors conducive?
		How were actors got selected and brought into the network?
		What was the strategy to have them involved and willing to contribute to the corridor's development?

	Regional/local governments' non-government	How did you/your institution get involved in the corridor development (how it started, and how was your experience in it)
		Who were the other actors involved? What do you think about them?
		Were any actors being left out? Elaborate
Actors' perceptions and strategies	Central government	When did RIDA introduce the concept of SDR to other actors, and how did they perceive it?
		What strategies did RIDA use to align the various perceptions of the actors; what strategies were used to engage the actors for joint action?
		Was the strategy effective? Why? Were there obstacles?
	Regional/local governments' non-government	What are the corridors, in your opinion, and what issues can they address?
		What perceptions do you have on the corridor development regarding its meaning to the regions; issues surrounding its development
institutional setting, rules, procedures, platforms	Central government	What are the different tasks/responsibilities of each type of actors involved
		Were there any rules that guided actors' coordination/behavior?
		What platforms were used for coordination? Was it effective to discuss the issues of regions? Did it lead to joint actions?
		Was there any trust established among actors?
	Regional/local governments' non-government	what are your tasks/responsibilities throughout the process of the corridor's development
		Any limitations to your involvement?
		How do actors meet, what platform, and was it effective? Did it lead to joint action?
		Have your perceptions about the corridor switched over time? More positive/negative? Elaborate
Sustainability issues	Central government. Regional/local governments, non-government	Do you know of any environmental, social, or economic issues related to Corridor?
		Any issues seemed to remain even with the corridor's interventions?
Sustainability measures	Central government.	Were there measures (that you know of) to address the mentioned sustainability issues?
		What kind of measures, who did it

	Regional/local governments, non-government	Were they effective and comprehensive, in your opinion?
		Any recommendations for solutions/measures?

Annex 4

List of generated codes, groups, and themes

No	Codes	Grouped	Themes
1	Environmental issues	Sustainability issues	**1. Sustainability**
2	Social Issues	Sustainability issues	
3	Economic Issues	Sustainability issues	
4	Environmental programs	Sustainability measures	
5	Social programs	Sustainability measures	**2. Interaction Process**
6	Economic programs	Sustainability measures	
7	Start of round one	Interaction Process	
8	Start of round two	Interaction Process	**3. Governance factors**
9	Start of round three	Interaction Process	
10	SDR conception-nature of R1	Interaction Process	
11	Envisioning - nature of R2	Interaction Process	
12	Prioritization implementation - nature of R3	Interaction Process	**4. External factors**
13	End of round one	Interaction Process	
14	End of round two	Interaction Process	
15	End of round three	Interaction Process	
16	Type of actor: central government	Interaction Process	
17	Type of actor: regional/local government	Interaction Process	
18	Type of actor: non-government	Interaction Process	
19	Perception: central government	Interaction Process	
20	Perception: regional/local government	Interaction Process	
21	Perception: non-government	Interaction Process	
22	Strategy: central government	Interaction Process	
23	Strategy: regional/local government	Interaction Process	
24	Strategy: non-government	Interaction Process	
25	Process outcome round one	Interaction Process	
26	Process outcome round two	Interaction Process	
27	Process outcome round three	Interaction Process	
28	Environmental vision	Governance factors	
29	Social vision	Governance factors	

30	Economic vision	Governance factors
31	External sustainability vision	External factors
32	Top-down mechanism	Governance factors
33	Bottom-up mechanism	Governance factors
34	Collaborative mechanism	Governance factors
35	Environmental actors	Governance factors
36	Social actors	Governance factors
37	Economic actors	Governance factors
38	Environmental knowledge	Governance factors
39	Social knowledge	Governance factors
40	Economic knowledge	Governance factors
41	Codified knowledge	Governance factors
42	Tacit knowledge	Governance factors
43	Local knowledge	Governance factors
44	Institutional Setting	Governance factors
45	Planning Process	Governance factors
46	Rules	Governance factors
47	Procedures	Governance factors
48	Coordination Platform	Governance factors

Annex 5

Sustainability measures of the GDP Corridor appointed in the implementation round (round 3)

Source: Author's elaboration, based on MPWH data of baseline programs 2017-2019 (MPWH, 2019a)

Sustainability DImension	Programs	Mitigated Issues	Year	Location	Estimated Budget (More or less, in Rupiah)
Environmental dimension	Revitalization of Suwung Landfill	Overcapacity landfills and waste piles	2017 2018 2019	Denpasar Denpasar Denpasar	±Rp. 37.868.450.000, - ±Rp. 120.229.439.000, - ±Rp. 94.151.331.000, -
Environmental dimension	Optimization of Linggasana (including supervision)	waste pile	2017 2018	Karangasem Karangasem	±Rp. 5.6291.156.000, - ±Rp. 1.727.480.000, -
Environmental dimension	Integrated landfill with Reduce-Reuse-Recycle facility (TPST)	waste pile	2017 2017 2018 2018 2018	Denpasar Tabanan Denpasar Klungkung Gianyar	±Rp. 650.000.000, - ±Rp. 650.000.000, - ±Rp. 650.000.000, - ±Rp. 650.000.000, - ±Rp.7.629.720.000, -
Environmental dimension And Economic dimension	New road development	Traffic congestion in the south of the corridor (Sarbagita)	2017 2018 2017 2018 2018 2019	Denpasar (Underpass Ngurah Rai) Denpasar (Tukad Teba) Badung, Tabanan, Buleleng (Mengwitani - Singaraja)	±Rp. 49.712.245.000, - ±Rp. 122.899.010.000, - ±Rp. 33.016.540, - ±Rp. 145.212.984, - ±Rp. 52.430.677.000, - ±Rp. 232.055.744.000, -
Environmental dimension And Economic dimension	Rehabilitation, capacity enhancement, and revitalization of Nusa Dua Beach	The waste issue along the coast and abrasion (	2017 2018 2019	Denpasar Denpasar Denpasar	±Rp. 13.333.085.000, - ±Rp. 92. 594.045.000, - ±Rp. 117.209.120.000, -
Environmental dimension	Periodic maintenance of Mount Agung sediment/ lava control; bridge security prevention program; Exploration/Production; Groundwater	Natural disaster mitigation: the volcanic eruption of Mount Agung	2017 2017 2018 2019	Klungkung Karangasem Karangasem, Karangasem	±Rp. 696.464.000, - ±Rp. 4.201.568.000, - ±Rp. 9.281.907.000, - ±Rp. 1.438.414.000, -

	Drilling in the Context of Handling Emergency Response of the Volcano Disaster Refugees; River Normalization To Alert Mount Agung Eruption				
Environmental dimension	Mitigation of pre-eruption of Mount Agung volcano	Natural disaster mitigation: the volcanic eruption of Mount Agung	2018	Buleleng	±Rp. 3.774.430, -
Environmental dimension	coastal safeguard development/ maintenance/ rehabilitation; modular concrete coastal protection technology	Natural disaster mitigation: High tide	2017 2017 2017 2018 2018 2018 2019 2019 2019 2019 2019	Gianyar Jembrana Buleleng Denpasar Klungkung Buleleng Klungkung Gianyar Denpasar Buleleng Badung	±Rp.32.847.270.000, - ±Rp. 2.770.857.000, - ±Rp. 8.147.969.000, - ±Rp. 1.246.215.000, - ±Rp. 3.399.300.000, - ±Rp. 805.939.000, - ±Rp. 10.138.229.000, - ±Rp. 197.622.000, - ±Rp. 338.639.000, - ±Rp .466.066.000.- ±Rp. 180.231.131.000, -
Environmental dimension	Development/ maintenance/ operational routines of flooding control infrastructure (including supervision)	Natural disaster mitigation: flooding	2017 2017 2017 2017 2017 2018 2018 2018 2019 2019 2019 2019 2019 2019	Tabanan Jembrana Karangasem Badung Buleleng Denpasar Badung Gianyar Tabanan Denpasar Jembrana Karangasem Badung Buleleng	±Rp. 15.209.095. 000, - ±Rp. 779.228.000, - ±Rp. 2.247.996.000, - ±Rp. 31.145.406.000, - ±Rp. 1.060.687.000, - ±Rp. 631.540.000, - ±Rp. 117.306.637, - ±Rp. 5.596.881.000, - ±Rp. 9.642.491.000.- ±Rp. 2.851.657.000.- ±Rp. 1.635.545.000, - ±Rp. 198.520.000, - ±Rp. 180.231.131, - ±Rp. 1.608.445.000, -
Environmental dimension	Development of primary urbanized drainage system, drainage Management System, and drainage maintenance	Natural disaster mitigation: flooding	2017 2017 2018 2018 2018 2019	Denpasar Sarbagita Jembrana Karangasem Buleleng Buleleng	±Rp. 10.426.141.000, - ±Rp. 2.385.790.000, - ±Rp. 11.504.226.000, - ±Rp. 940.296.000, - ±Rp. 2.895.865.000, - ±Rp. 7.119.515.000, -
Environmental dimension and Social dimension	Waste Water Treatment Plant (IPAL) including supervision	Sanitation	2017 2017 2018 2019	Tabanan Denpasar Denpasar Denpasar	±Rp. 23.497.541.000, - ±Rp. 1.290.674.000, - ±Rp. 38.628.205.000, - ±Rp. 50.345.902.000, -

Environmental dimension and Social dimension	Installation of Sewage Treatment Plant (IPLT), including DED and supervision cost	Sanitation	2017 2017	Denpasar Karangasem	±Rp. 3.955.327.000, - ±Rp. 800.661.000, -
Environmental dimension and Social dimension	Rural Community based wastewater program	Sanitation	2019 2019	Gianyar Buleleng	±Rp. 3.500.000.000, - ±Rp. 3.500.000.000, -
Social dimension	Agropolitan Rural settlements' infrastructure	Local road accessibility and basic infrastructure access	2017 2018 2019	Tabanan Tabanan Tabanan	±Rp. 1.796.018.000, - ±Rp. 9.426.505.000, - ±Rp. 2.872.755.000, -
Social dimension	Quality Improvement of Slum Settlements	Poverty issue: reduction of slums	2017 2017 2017 2017 2018 2018 2018	Tabanan Jembrana Bangli Buleleng Tabanan Denpasar Klungkung	±Rp. 4.116.481.000, - ±Rp. 1.493.628.000, - ±Rp. 1.837.375.000, - ±Rp. 2.080.194.000, - ±Rp. 5.444.284.000, - ±Rp. 5.819.229.000, - ±Rp. 784.377.000, -
Social dimension	Public Housing development (flats)	Poverty issue: quality housing for poor-income families	2018	Klungkung	±Rp.15.669.000.000, -
Social dimension	Self-assist Home Stimulant Aid	Poverty issue: quality housing for poor income family	2017 2018 2018 2019 2019	Denpasar Tabanan Karangasem Denpasar Jembrana	±Rp. 32.615.690.000, - ±Rp. 45.000.000.000, - ±Rp. 3.000.000.000, - ±Rp. 57.688.369.000, - ±Rp. 5.670.000.000, -
Social dimension	*Development of Regional drinking water system (SPAM)*	Access to drinking/clean water	2017 2017 2017 2018 2019	Buleleng Denpasar Badung Buleleng (Titab bawah Buleleng (Titab atas) Buleleng (Titab bawah)	±Rp. 12.547.904.000, - ±Rp. 16.000.730.000, - ±Rp. 4.967.002.000, - ±Rp.26.103.561.000,- ±Rp. 22.108.425.000, - ±Rp. 8.226.885.000, -
Social dimension	*Community-Based Clean Water Provision Program (Pamsimas)*	Access to clean water	2017 2017 2018 2018 2018 2019 2019 2019 2019 2019	Gianyar Tabanan Gianyar Jembrana Tabanan Karangasem Gianyar Jembrana Tabanan Klungkung	±Rp. 2.885.000.000, - ±Rp. 1.960.000.000, - ±Rp. 2.695.000.000, - ±Rp 1.956.273.000, - ±Rp. 2.940.000.000, - ±Rp. 2.938.000.000, - ±Rp. 2.205.000.000, - ±Rp. 1.225.000.000, - ±Rp. 2.196.000.000, - ±Rp. 1.515.000.000, -
Social dimension	*Development, rehabilitation/*	Improving the Human	2019	Klungkung, Karangasem	±Rp. 17.568.689.000, -

	renovation of schools	Development Index (access to school)	2019 2019	Karangasem, Jembrana, Buleleng Badung	±Rp. 16.871.551.000, - ±Rp. 21.026.129.000,-
Economic dimension And Social dimension	Socio-Economy Infrastructure development Program in district areas	To stimulate the agricultural sector/rural economy (the infrastructure that helps farmers to distribute their crops) for poverty alleviation	2018 2018 2018 2018 2018 2019 2019 2019 2019 2019 2019	Jembrana Tabanan Gianyar Karangasem Buleleng Tabanan Gianyar Klungkung Karangasem Bangli Buleleng	±Rp. 1.200.000.000, - ±Rp. 1.800.000.000, - ±Rp. 1.800.000.000, - ±Rp. 1.200.000.000, - ±Rp. 1.200.000, - ±Rp. 600.000.000, - ±Rp. 1.020.000.000, - ±Rp. 1.020.000.000, - ±Rp. 600.000.000, - ±Rp. 600.000.000, - ±Rp. 600.000.000, -
Economic dimension And Social dimension	Smart Travelers' Plaza /integrated rest area (Development of incubation area of the corridor) (multi-years 2016-2018)	Facilities to market the local product community empowerment, gatherings, and cultural heritage preservation	2017-2019	Jembrana	±Rp. 67.000.000.000, -
Economic dimension	Agrotourism traditional market development	To stimulate the agricultural sector	2019 2019	Tabanan Gianyar	±Rp. 4.289.463.000, - ±Rp. 13.753.166.000, -
Economic dimension	design and revitalization of tourism strategic areas/touristic destinations	To push the tourism sector outside Badung and Denpasar	2017 2017 2017 2018 2019	Gianyar Karangasem Tabanan Jembrana Jembrana	±Rp. 35.560.009.000, - ±Rp. 2.029.763.000, - ±Rp. 430.180.000, - ±Rp. 10.891.105.000, - ±Rp. 13.222.596.000, -
Economic dimension	Development of Dam/reservoirs	To stimulate the agricultural sector	2107 2018 2019 2018 2019 2018 2019	Badung, Bangli and Gianyar (Sidan Dam) Buleleng (Tamblang Dam) Klungkung (Adegan Kangin Reservoir) Klungkung (Nusa Penida Reservoir)	±Rp. 8.905.100.000, - ±Rp. 49.999.992.000, - ±Rp. 133.676.991.000, - ±Rp. 3.000.000.000, - ±Rp. 88.145.023.000, - ±Rp 4.604.140.000, - ±Rp. 7.213.209.000, -
Economic dimension	Acceleration of Irrigation Water Use	To stimulate the agricultural sector	2018 2019	Denpasar Denpasar	±Rp. 35.635.729.000, - ±Rp. 54.368.774.000, -

	Improvement (P3 - TGAI)				
Economic dimension	Development of the raw water supply system	To stimulate the agricultural sector	2017 2017 2018 2018	Tabanan Buleleng Jembrana (Benel reservoir) Buleleng (Titab reservoir)	±Rp. 7.232.710.000, - ±Rp. 10.610.372.000, - ±Rp. 15.520.847.000, - ±Rp. 31.388.150.000, -
Economic dimension	Enhancing the Irrigation system of the water stream area; raw water supply system	To stimulate the agricultural sector	2017 2017 2017 2018 2018 2018 2018 2018	Gianyar Tabanan Buleleng Badung Karangasem Gianyar Tabanan Buleleng	±Rp. 21.291.935.000, - ±Rp.22.429.851.000, - ±Rp. 14.254.023.000, - ±Rp. 5.737.723.000.- ±Rp. 4.401.157.000, - ±Rp.9.155.240.000, - ±Rp.11.748.243.000, - ±Rp. 5.623.999.000, -
Economic dimension	Road preservations/ rehabilitation/ reconstruction.	To improve the local and regional connectivity for logistics, trade, and tourism purposes	2017 2017 2017 2017 2017 2017 2017 2017 2017 2018 2018 2018 2018 2018 2018 2018 2018 2019 2019 2019 2019 2019 2019 2019	Gianyar Tabanan Jembrana Buleleng Karangasem Denpasar Klungkung Bangli Badung Gianyar Tabanan Jembrana Buleleng Karangasem Denpasar Klungkung Badung Gianyar Tabanan Jembrana Buleleng Karangasem Denpasar Klungkung Badung	±Rp. 11.485.245.000, - ±Rp. 38.381.090.000, - ±Rp. 13.318.790.000,0 ±Rp. 48.746.473.000,0 ±Rp. 6.633.109.000, - ±Rp.28.826.079.000, - ±Rp. 21.018.124.000, - ±Rp. 1.289.323.000, - ±Rp. 48.651.916.000, - ±Rp.11.465.347.000, - ±Rp. 9.526.037.000, - ±Rp. 33.652.125.000, - ±Rp. 45.357.669.000, - ±Rp. 1.530.000.000, - ±Rp. 21.012.160.000, - ±Rp. 25.690.902.000, - ±Rp. 21. 976.316.000, - ±Rp. 5.738.576.000, - ±Rp.20.596.066.000, - ±Rp. 23.121.035.000, - ±Rp. 25.656.949.000, - ±Rp. 23.712.947.000, - ±Rp. 19.364.552.000, - ±Rp. 5.287.149.000, - ±Rp. 9.133.911.000, -

Annex 6.

The UKL-UPL Thresholds and the AMDAL Thresholds (MPWH, 2017)

TYPE of ACTIVITY	*Scale or Extent of Project Activity*
	UKL/UPL (Permen PU No.10/PRT/M/2008)
I. ROAD & BRIDGES	
1. Construction of Toll Road	
a. Construction of toll road - Length of Road (without land acquisition)	<5km
b. Improvement of toll road with land acquisition - Length of road - Land required	<5km <5ha
c. Improvement of Toll Road without land acquisition - Length of road	<10km
2. Road construction/ improvement by widening that needs land acquisition	
a. In a big/metropolitan city - Length of road and required land acquisition area - Land clearance/land acquisition	1km to <5km 2ha to <5ha
b. In medium city - Length of road and required land acquisition area - Land clearance/land acquisition	3km to <10km 5ha to <10ha
c. In a small city - Length of road and required land acquisition area - Land clearance/land acquisition	10km to <30km 10ha to <30ha
3. Construction of underpass, tunnel, flyover	
a. Construction of underpass, tunnel, flyover - Length	<2km
b. Construction of bridge - Length	100 to <500m
II. WATER SUPPLY	
1. Drinking/clean water	
a. Construction of distribution network system - Size of Service Area	100ha to >500ha
b. Construction of Transmission Pipe - Coverage area	
1. Metropolitan city, length	5km to 10km
2. Medium to the small city, length	8km to 10km
c. Water intake from rivers, lakes, and other surface water sources	
1. River and Lake	50 l/sc to 250 l/sc
2. Spring	2,5 l/sc to 250 l/sc
d. Construction of complete Water Treatment Plant water (debit)	50 l/sc to 100 l/sc
e. Extraction of groundwater for (debit)	

TYPE of ACTIVITY	*Scale or Extent of Project Activity*
	UKL/UPL (Permen PU No.10/PRT/M/2008)
1. Community service via SPAM	2,5 l/sc to 50 l/sc
2. Other commercial purposes	1,0 l/sc to 50 l/sc
III. SANITATION	
1. Construction of Fecal Sludge Treatment Plant, including supporting facilities - Size - Or capacity	 <2 ha <11 m3/day
2. Construction of Wastewater Treatment Plant - Size - Organic loading	 <3 ha <2.4 ton/day
3. Construction of sewerage/off-site sanitation system in cities/housing area - Size - Or wastewater debit	 <500 ha <16,000 m3/day

Annex 7

Amdal Threshold

Source: MPWH 2017

TYPE of ACTIVITY	*The scale or Extent of Project Activity*
I. ROAD & BRIDGES	
1. Construction and/or improvement of Toll Road (length scale and land acquisition scale)	
a. In big cities/metropolitan - Length of road - Land acquisition	 ≥ 5 km with ≥ 10 ha ≥ 30 ha
b. In medium cities - Length of road - Land acquisition	 ≥ 5 km with ≥ 20 ha ≥ 30 ha
c. In rural areas - Length of road - Land acquisition	 ≥ 5 km with ≥ 30 ha ≥ 40 ha
2. Road construction/ improvement by widening (length scale and land acquisition scale)	
a. In a big/metropolitan city - Length of road and required land acquisition area - Land acquisition	 ≥ 5 km with ≥ 20 ha ≥ 30 ha
b. In medium city - Length of road and required land acquisition area - Land acquisition	 ≥ 5 km with ≥ 30 ha ≥ 40 ha
c. In rural areas - Length of road and required land acquisition area - Land clearance/land acquisition	 ≥ 5 km with ≥ 40 ha ≥ 50 ha
3. Construction of underpass, tunnel, flyover	
a. Construction of underpass, tunnel, flyover - Length	 ≥ 2 km
b. Construction of bridge - Length	 ≥ 500 m
II. WATER SUPPLY	
Drinking/clean water	
a. Construction of distribution network system - Size of Service Area	 ≥ 500ha
b. Construction of transmission pipe network (length)	≥ 10 km
III. SANITATION	
4. Construction of Fecal Sludge Treatment Plant, including supporting facilities - Size - Or capacity	 ≥ 2 ha ≥ 11 m^3/day
5. Construction of Wastewater Treatment Plant	≥ 3 ha

TYPE of ACTIVITY	*The scale or Extent of Project Activity*
- Size - Or total capacity	≥ 2.4 tons/day
6. Construction of sewerage/off-site sanitation system in cities/housing area - Size of services coverage - Wastewater debit	 ≥ 500 ha ≥ 16,000 m^3/day
4. Construction of drainage channels (primary and/or secondary) in housing areas	
a. In a big/metropolitan city (length)	≥ 5 km
b. In the medium city (length)	≥ 10
IV. SOLID WASTE	
1. Final Disposal Site (TPA) with controlled/sanitary landfill, including supporting facilities - Size - Or total capacity	 ≥ 10 ha ≥ 100,000 ton
2. Final Disposal Site at tidal area - Size - Capacity	 All sizes and capacity
3. Construction of Temporary Disposal Site (TPS)/Transfer Station - Capacity	 ≥ 500 tons/day
4. Construction of Integrated Solid Waste Processing Facilities (TPST) - Capacity	 ≥ 500 tons/day
5. Construction of Incinerator - Capacity	 All capacity
6. Construction of composting plant - Capacity	 ≥ 500 tons/day
V. WATER RESOURCES	
1. Construction of Dam / Reservoir or Other Type of Water Plate - Deep - Capacity - Total area	 ≥ 15 m ≥ 500.000 m^3 ≥ 200 ha
2. Irrigation Area - New Construction - The extent with Additional Area	 ≥ 3.000 Ha ≥ 1.000 Ha
3. Development of Coastal Protection and Improvement of river mouths - Distance perpendicular to the coast	 ≥ 500 m

Annex 8

Types of mitigation in the YSS corridor implementation round based on the sustainability dimension, development aspect, mitigated issues, and Mileti's mitigation objectives.
Source: Author's Elaboration, based on MPWH data (MPWH, 2019b)

Sustainability DImension	Type of programs	Mitigated Issues	Year	Location	Estimated Budget (in Rupiah)
Environmental dimension	Development of final landfill (TPA)	Overcapacity landfills and waste piles	2018	Semarang City	Rp. 17.018.804.000, -
Environmental dimension	Development of Temporary Landfill with Reduce-Reuse-Recycle facility (TPST)	Overcapacity landfills and waste piles	2017 2017 2017 2017 2018 2018 2017	Klaten Regency Salatiga City Semarang City Magelang City Magelang Regency Semarang Regency Sleman Regency	Rp. 550.000.000, - Rp. 550.000.000, - Rp. 550.000.000, - Rp. 550.000.000, - Rp.3.300.000.000, - Rp. 550.000.000, - Rp.1.100.000.000, -
Environmental dimension And Economic dimension	road infrastructure development	Traffic congestion	2018 2018 2018 2019	Surakarta City (Flyover Manahan) SemarangRegency (u-turn lemahbang) Sleman Regency (Underpass kaliurang + land acquisition) Sleman Regency (Underpass kaliurang + land acquisition)	Rp. 43.068.188.000, - Rp. 5.919.881.000, - Rp. 58.844.996.000, - Rp. 57.671.389.000, -
Environmental dimension And Economic dimension	Green Open Space implementation	Land conversion	2018 2019 2017 2019	Magelang Regency Magelang Regency Sleman Regency Sleman Regency	Rp. 2.181.357.000, - Rp. 616.312.000, - Rp. 4.570.820.000, - Rp. 3.267.030.000, -
Environmental dimension And Economic dimension	Construction of Diversion Channel in Putih River	Natural disaster mitigation: flooding, erosion, landslide	2017	Magelang Regency	Rp. 133.695.565.000, -
Environmental dimension And Economic dimension	Construction of Sand Pocket in Gendol River	Natural disaster mitigation: sedimentation, flooding	2018	Sleman regency	Rp. 26.315.921.000, -
Environmental dimension	Sediment control	Natural disaster mitigation:	2019	Semarang regency	Rp. 3.981.900.000, -

	infrastructure development	the volcanic eruption of Mount Agung			
Environmental dimension	Rehabilitation of Sabo Dam Merapi Volcanic	Natural disaster mitigation: the volcanic eruption of Merapi	2017	Klaten Regency	Rp. 137.700.000.000-
Environmental dimension	Construction and rehabilitation of urgent sabo facilities in Mt. Merapi area	Natural disaster mitigation: the volcanic eruption of Merapi	2018 2019	Sleman Regency Yogyakarta City	Rp. 21.000.000.000, - Rp. 58.958.611.000, -
Environmental dimension	Lake revitalization of UNS	Waste issue (over-polluted lake)	2018	Surakarta City	Rp. 9.374.087.000, -
Environmental dimension	Development of flooding control infrastructure/ flooding mitigation	Natural disaster mitigation: flooding	2017 2017 2018 2018 2019	Semarang City Surakarta City Semarang City Surakarta City Semarang City	Rp.68.306.592.000, - Rp. 233.490.810.000, - Rp. 377.774.941.000, - Rp. 198.860.951.000, - Rp. 368.485.127.000, -
Environmental dimension	Development of drainage system	Natural disaster mitigation: flooding	2017 2018	Semarang City Magelang Regency	Rp. 76.199.180.000, - Rp. 2.583.521.000, -
Environmental dimension	residential Environmental Drainage Management System	Natural disaster mitigation: flooding	2018	Magelang Regency	Rp. 13.076.778.000, -
Environmental dimension and Social dimension	Enhancement of off-site wastewater infrastructure	Sanitation	2017	Sleman Regency	Rp. 2.907.439.000, -
Environmental dimension and Social dimension	On-site wastewater infrastructure system	Sanitation	2018	Sleman Regency	Rp. 17.966.393.000, -
Environmental dimension and Social dimension	Domestic scale of Wastewater Management System for settlements, including Wastewater Treatment Plant (IPAL)	Sanitation	2018	Surakarta City	Rp. 4.982.505.000, -

	development/ optimization				
Environmental dimension and Social dimension	Community-based sanitation program (Sanimas)	Sanitation	2017 2017 2017 2018 2018 2017 2018	Magelang Regency Boyolali Regency Magelang City Magelang Regency Semarang Regency Sleman Regency Sleman Regency	Rp. 1.000.000.000, - Rp.500.000.000, - Rp.500.000.000, - Rp. 4.000.000.000, - Rp.1.000.000.000, - Rp. 800.000.000, - Rp. 500.000.000, -
Environmental dimension and Social dimension	*Rehabilitation/ enhancement/ development* of Sewage Treatment Plant (IPLT)	Sanitation	2017 2017	Surakarta city Sleman Regency	Rp. 4.804.093.000, - Rp. 12.219.000.000, -
Social dimension	Settlements infrastructure development program	basis infrastructure access	2019 2017 2018 2019	Semarang Regency Yogyakarta City Yogyakarta City Yogyakarta City	Rp.8.000.000.000, - Rp. 13.450.000.000, - Rp. 25.200.000.000, - Rp. 17.500.000.000, -
Social dimension	Agropolitan/rural infrastructure development	Local road accessibility and basic infrastructure access	2017 2018 2017 2019	Magelang Regency Semarang City Sleman Regency Sleman Regency	Rp. 2.007.200.000, - Rp. 16.192.074.000, - Rp. 1.748.870.000, - Rp. 6.000.000.000, -
Social dimension	Rural settlements development	Local road accessibility and basic infrastructure access	2019 2019 2017	Magelang Regency Magelang Regency Sleman Regency	Rp. 1.213.726.000, - Rp. 1.727.537.000, - Rp. 6.525.455.000, -
Social dimension	Settlements development and guiding program	basis infrastructure access	2017 2017 2018	Semarang Regency Sleman regency Sleman regency	Rp.1.350.000.000, - Rp. 7.405.000.000, - Rp. 2.590.000.000, -
Social dimension	City Without Slum Program (KOTAKU)	Poverty issue: reduction of slums, basic infrastructure access	2017 2017 2018 2018 2018 2019 2019 2019 2019	Magelang Regency Magelang City Magelang Regency Semarang regency Surakarta City Magelang Regency Klaten Regency Magelang City Surakarta City	Rp.1.850.000.000, - Rp.1.700.000,.000, - Rp. 2.600.000.000, - Rp. 5.650.000.000, - Rp. 21.550.000.000, - Rp. 3.500.000.000, - Rp.11.000.000.000, - Rp.4.000.000.000, - Rp.28.000.000.000, -
Social dimension	Community-Based Settlements Development Program	basis infrastructure access	2017 2017 2019	Klaten Regency Sukarta City Boyolal Region	Rp.5.500.000.000, - Rp.12.100.000.000, - Rp.6.000.000.000, -

Social dimension	Quality Improvement of settlements in environmental scale/area scale	basis infrastructure access	2017 2018 2019	Semarang City Semarang City Semarang City	Rp. 39.913.120.000, - Rp. 29.659.483.000, - Rp. 2.637.930.000, -
Social dimension	*Rehabilitation/ enhancement/ development of settlements environment health system*	basis infrastructure access	2017	Surakarta city	Rp. 26.849.292.000, -
Social dimension	Quality Improvement of Slum Settlements	Poverty issue: reduction of slums	2018 2019 2019 2017 2018 2019	Surakarta City Semarang City Sleman Regency Yogyakarta City Yogyakarta City Yogyakarta City	Rp. 9.363.940.000, - Rp.4.405.000.000, - Rp. 1.896.717.000, - Rp. 12.960.370.000. - Rp. 9.111.000.000, - Rp. 5.555.122.000, -
Social dimension	Low-Income Housing development	Poverty issue: quality housing for poor-income families	2018 2019 2019	Magelang Regency Magelang Regency Semarang City	Rp. 4.828.046.000, - Rp. 581.697.000, - Rp.18.575.139.000, -
Social dimension	Development of public housing (flats)	Poverty issue: quality housing for poor-income family	2017 2018 2018 2018 2018	Semarang City Semarang City Surakarta City Sleman Regency Magelang regency	Rp.39.985.224.000, - Rp.48.819.198.000, - Rp. 30.611.021.000, - Rp. 9.942.448.000, - Rp. 29.764.815.000.-
Social dimension	Self-assist Home Stimulant Aid Quality Improvement	Poverty issue: quality housing for poor-income families	2017 2017 2018	Semarang City Yogyakarta City Sleman Regency	Rp. 74.165.000.000, - Rp. 22.500.000.000, - Rp. 42.000.000.000, -
Social dimension	*Development of drinking water provision system*	Access to drinking/clean water	2017 2017 2018 2018 2019 2018 2019	Surakarta City Semarang Regency Surakarta City Magelang City Semarang Regency Sleman Regency Sleman Regency	Rp.30.000.000.000, - Rp. 1.715.000.000, - Rp. 18.091.075.000, - Rp. 9.775.007.000, - Rp. 4.410.000.000, - Rp. 1.960.000.000, - Rp. 2.239.051.000, -
Social dimension	*drinking water system (SPAM) optimization*	Access to drinking/clean water	2018	Semarang City	Rp.1.356.830.000, -
Social dimension	*Development of Regional drinking water system (SPAM)*	Access to drinking/clean water	2018	Yogyakarta City	Rp. 21.131.343.000, -
Social dimension	*Community-Based Clean Water and*	Access to clean water	2017 2017 2017	Magelang Regency Boyolali Regency Klaten Regency	Rp.3.675.000.000, - Rp.1. 184.767.000, - Rp.1.867.500.000, -

	Sanitation Provision Program/ (Pamsimas)		2018 2018 2018 2018 2019 2019 2019 2019 2019	Magelang Regency Klaten Regency Boyolalli Regency Semarang Regency Magelang Regency Boyolali Regency Klaten Regency Semarang City Sleman Regency	Rp. 5. 736.500.000, - Rp. 3.478.300.000, - Rp. 4.367.732.000, - Rp. 5.145.000.000, - Rp.5.734.414.000, - Rp.3.528.000.000, - Rp.1.715.000.000, - Rp. 504.696.000, - Rp. 3.724.000.000, -
Social dimension	*Development, rehabilitation/ renovation of schools*	Improving the Human Developmen t Index (access to school)	2019	Sleman Regency	Rp. 464.256.000, -
Economic dimension And Social dimension	Socio-Economy Infrastructure development Program in district areas	To stimulate the agricultural sector/rural economy (the infrastructur e that helps farmers to distribute their crops) for poverty alleviation	2017 2017 2018 2019 2018 2019	Magelang Regency Semarang city Magelang Regency Magelang Regency Sleman Regency Sleman Regency	Rp.4.200.000.000, - Rp. 1.200.000.000, - Rp. 9.000.000.000, - Rp. 9.120.000.000, - Rp. 3.000.000.000, - Rp. 4.620.000.000, -
Economic dimension	Rehabilitation of agro-traditional Market	To stimulate the agricultural sector and push the tourism sector	2018 2018 2019	Semarang City Semarang City Yogyakarta City	Rp 68.796.000.000, - Rp. 24.515.837.000, - Rp. 8.642.511.000, -
Economic dimension	design and revitalization of tourism strategic areas/touristic destinations	To push the tourism sector	2017 2017 2018 2018 2019 2019 2019 2017	Surakarta City Magelang Regency Semarang City Magelang Regency Magelang Regency Surakarta City Semarang Regency Yogyakarta City	Rp.12.788.191.000, - Rp. 6. 035.251.000, - Rp. 12.161.000.000, - Rp. 12.764.400,000, - Rp. 288.682.000, - Rp. 107.239.660.000, - Rp.24.353.795.000, - Rp. 10.119.953.000, -
Economic dimension	Development of Dam/reservoirs /weir	To stimulate the agricultural sector	2017 2018 2018 2019	Semarang City Semarang City Boyolali Regency Semarang City	Rp. 5.505.536.000, - Rp. 49.999.940.000, - Rp. 12.202.749.000, - Rp. 78.148.329.000, -
Economic dimension	operational/ maintenance/ rehabilitation of Dam/reservoirs /weir	To stimulate the agricultural sector	2017 2017 2018 2019 2019 2017 2017	Semarang City Klaten Regency Semarang City Semarang Regency Semarang City Yogyakarta City Sleman Regency	Rp. 21.483.392.000, - Rp. 4.837.324.000, - Rp. 34.702.800.000, - Rp. 7.324.626.000, - Rp. 12.244.349.000, - Rp. 2.407.999.000, - Rp. 2.790.899.000, -

			2018 2018 2019 2019	Yogyakarta City Sleman Regency Yogyakarta City Sleman Regency	Rp. 798.635.000, - Rp. 3.874,300.000, - Rp. 8. 716.347.000, - Rp. 1. 246.516.000, -
Economic dimension	Maintenance and operation of water resources network/ water utilization network/ irrigation network/river network	To stimulate the agricultural sector	20172 018 2019 2019 2017 2018 2019	Klaten Regency Semarang City Semarang Regency Surakarta City Sleman Regency Sleman Regency Sleman Regency	Rp. 12.048. 832.000, - Rp. 13 091.679.000, - Rp. 4.352.046.000, - Rp.20.120.163.000, - Rp. 1.235.007.000, - Rp. 1.246.516.000, - Rp. 282.445.000, -
Economic dimension	Development of retention basin	To stimulate the agricultural sector	2017 2018 2018 2018 2019 2019	Boyolali Regency Sleman Regency Boyolali Regency Magelang Regency Yogyakarta City Sleman Regency	Rp. 3.803.500.000, - Rp. 3.990.190.000, - Rp. 12.202.749.000, - Rp. 5.815.701.000, - Rp. 711.516.000, - Rp.3.996.910.000, -
Economic dimension	Raw water intake development	To stimulate the agricultural sector	2018	Semarang City	Rp.13.091.679.000, -
Economic dimension	Rehabilitation of raw water system	To stimulate the agricultural sector	2018 2019	Semarang City Semarang City	Rp. 111.662.255.000, - Rp. 54.817.321
Economic dimension	development of raw water provision	To stimulate the agricultural sector	2018 2019 2018	Semarang City Semarang City Sleman Regency	Rp. 9.736.096.000, - Rp.35.626.845.000, - Rp. 37.000.000.000.-
Economic dimension	Development of raw water intake infrastructure	To stimulate the agricultural sector	2019	Semarang City	Rp. 5.934.078.000, -
Economic dimension	Road preservations/ rehabilitation/ reconstruction.	To improve the local and regional connectivity for logistics, trade, and tourism purposes	2017 2018 2019 2017 2017 2017 2017 2017 2017 2017 2018 2018 2018 2018 2018 2018 2019 2019 2019	Sleman Regency Sleman Regency Sleman Regency Surakarta City Boyolali Regency Klaten Regency Magelang Regency Magelang City Semarang City Semarang Regency Surakarta City Boyolali Regency Salatiga City Magelang Regency Semarang City Semarang Regency Magelang Regency Magelang City Boyolali Regency	Rp. 11.323.011.000, - Rp. 38.996.839.000, - Rp. 16.752.615.000, - Rp. 41.285.989.000, - Rp. 50.236.671.000, - Rp. 51.866.943.000, - Rp. 21.781.192.000, - Rp. 7.219.828.000, - Rp. 120.941.834.000, - Rp. 60.554.904.000, - Rp. 112.548.611.000, - Rp. 3.129.349.000, - Rp. 665.002.000, - Rp. 29.877.885.000, - Rp. 14.333.610.000, - Rp. 34.737.661.000, - Rp. 8.278.284.000, - Rp.8.706.838.000, - Rp. 13.232.540.000, -

			2019 2019 2019	Surakarta City Semarang Regency Klaten Regency	Rp. 13.870.764.000, - Rp.67.175.772.000, Rp.1.382.985.000.-

CURRICULUM VITAE

GITASANTI ANDRIANI DJAIS

Education

- Bachelor of Architect | 2000 - 2005

  Parahyangan Catholic University, Bandung - Indonesia.

  Final Thesis: Effectiveness and Efficiency of Cornered House Design to Users' Comfort

  Final Studio Project: Children Hospital in Bandung
- Master of Science in the field of Urbanism | 2006 - 2008

  Technische Universiteit Delft (T.U Delft) ,The Netherlands

  Studio: Spacelab (Spatial mapping, analysis, and design)

  Final thesis: Improving Local's Potentials for a Strong Centrality in Cape Flats.

  Final Project: Transit Oriented development in Nyanga and Gugulethu City Center, Cape Town, South Africa
- PhD in Urban Development and Governance | 2018 – Present (2023)

  Institute for Housing and Urban Development Study (IHS), Erasmus University Rotterdam (EUR)

  Dissertation title: Governing Sustainable Transport Corridors.

  Case studies: Gilimanuk – Denpasar – Padang Bai Corridors and Yogyakarta – Solo – Semarang Corridors of Indonesia

Working Experience

- Urban Planner/Consultant | 2015 - 2018

  Directorate of Strategic Areas Development

  Regional Infrastructure Development Agency, Ministry of Public Work and Housings
- Urban Planner/Consultant | 2011 - 2015

  Directorate of Urban Planning

  Directorate General of Spatial Planning and Management, Ministry of Public Work
- Architect | 2009 – 2010

  Karsayasa Cipta Consultant

Projects Experience

- The Monitoring of Land Acquisition for Infrastructure Development:
  Member of supervision team
- Indonesia Tourism Development Program (ITDP) of Lombok, Borobudur, and Lake Toba, a collaboration project between Government of Indonesia and World Bank:

Leading a team for the formulation of the Environmental and Social Management Framework document (ESMF)

- Integrated Infrastructure Development Plan of Strategic Development Region Corridor : Gilimanuk - Denpasar - Padang Bai:
  Leading the initial planning of GDP's Master Plan Development Plan
- Integrated Infrastructure Development Plan of Strategic Development Region Corridor : Medan - Tebing Tinggi - Dumai – Pekanbaru:
  Leading the supervision team
- Maritime Based Regional Development Program:
  Leading the supervision team
- The Design of Smart Travelers' Plaza/Anjungan Cerdas in Jembrana and Trenggalek Regencies:
  Leading the formulation of the program's Term of refferences, and member of supervision team
- The formulation of City and Municipality Detailed Spatial Planning and Zoning Regulation which became a Ministerial of Public Works Decree No.20 Year 2011:
  Member of conception team
- Heritage City Conservation and Management Program as the implementation of Law No. 26 Year 2007 on Spatial Planning:
  Member of conception team and member of supervision team
- Green City Development Program:
  Member of conception team

<u>Certificates</u>

- Qualitative comparative analysis course
- Qualitative data analysis course
- Qualitative coding with Atlas.ti course
- Qualitative interviewing
- Brush up your research design course
- English academic writing course
- Geographical Information Systems (GIS) course
- Philosophy of the humanities and social science course
- Brush up your research design course
- Making your research proposal works for you course
- Project management course
- Searching, finding, and managing your literature review course
- Doing the literature review course
- Seminar on Regional Development: Road Side Station
- Seminar on Sharing of Road – Related Technologies, Indonesia-Korea Road Engineering Collaboration
- Workshop on Integrating Historical Elements into City Planning
- Training on Public Private Partnership in Investing in Heritage Precincts
- Workshop on Public Private Partnership in Managing Historical Urban Precincts
- Public Lecture and Workshop on Growing Greener Cities

GITASANTI ANDRIANI DJAIS