Sustainable and Resilient Infrastructure in Indonesia

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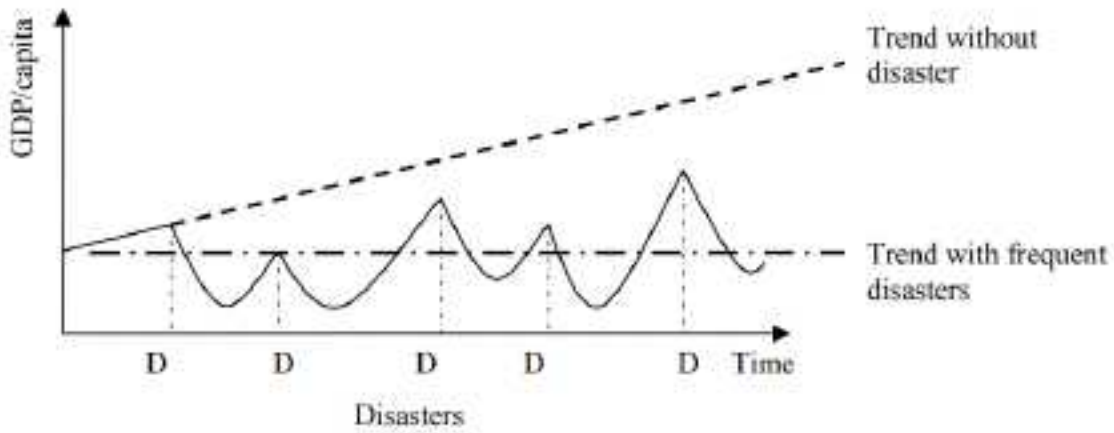
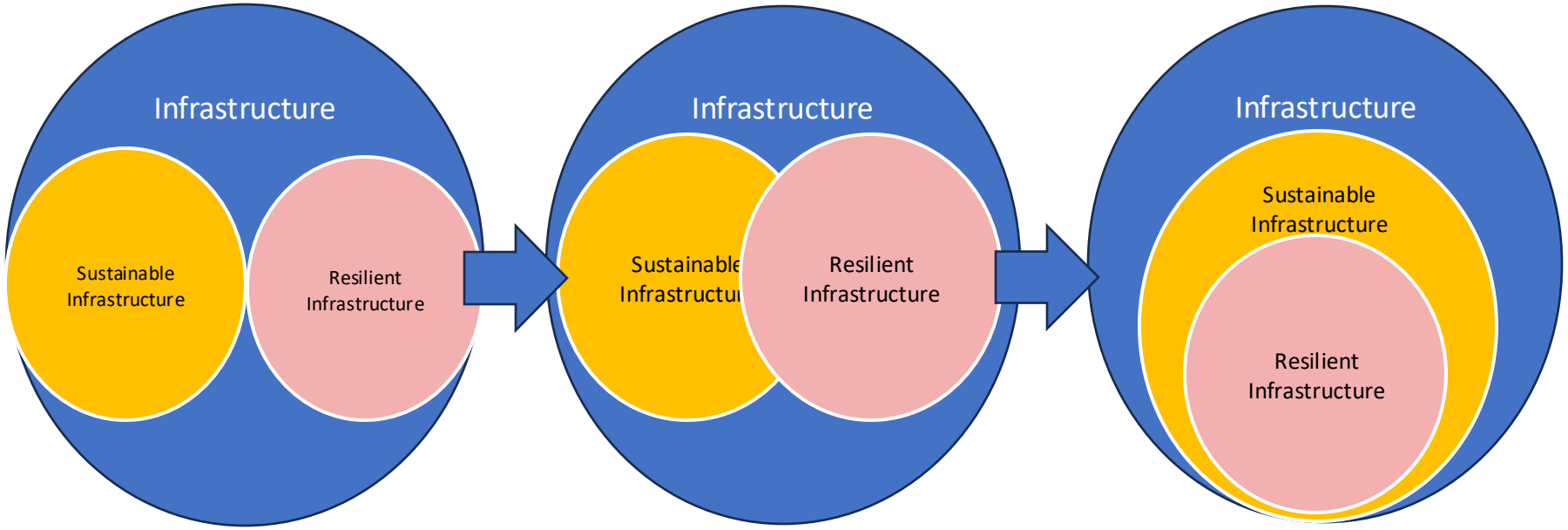
Why Infrastructure needs to be Sustainable & Disaster Resilient?



The economic losses in areas affected by repeated disasters (Chhibber & Laajaj, 2007)

What is Sustainable & Disaster Resilient Infrastructure (SDRI)?



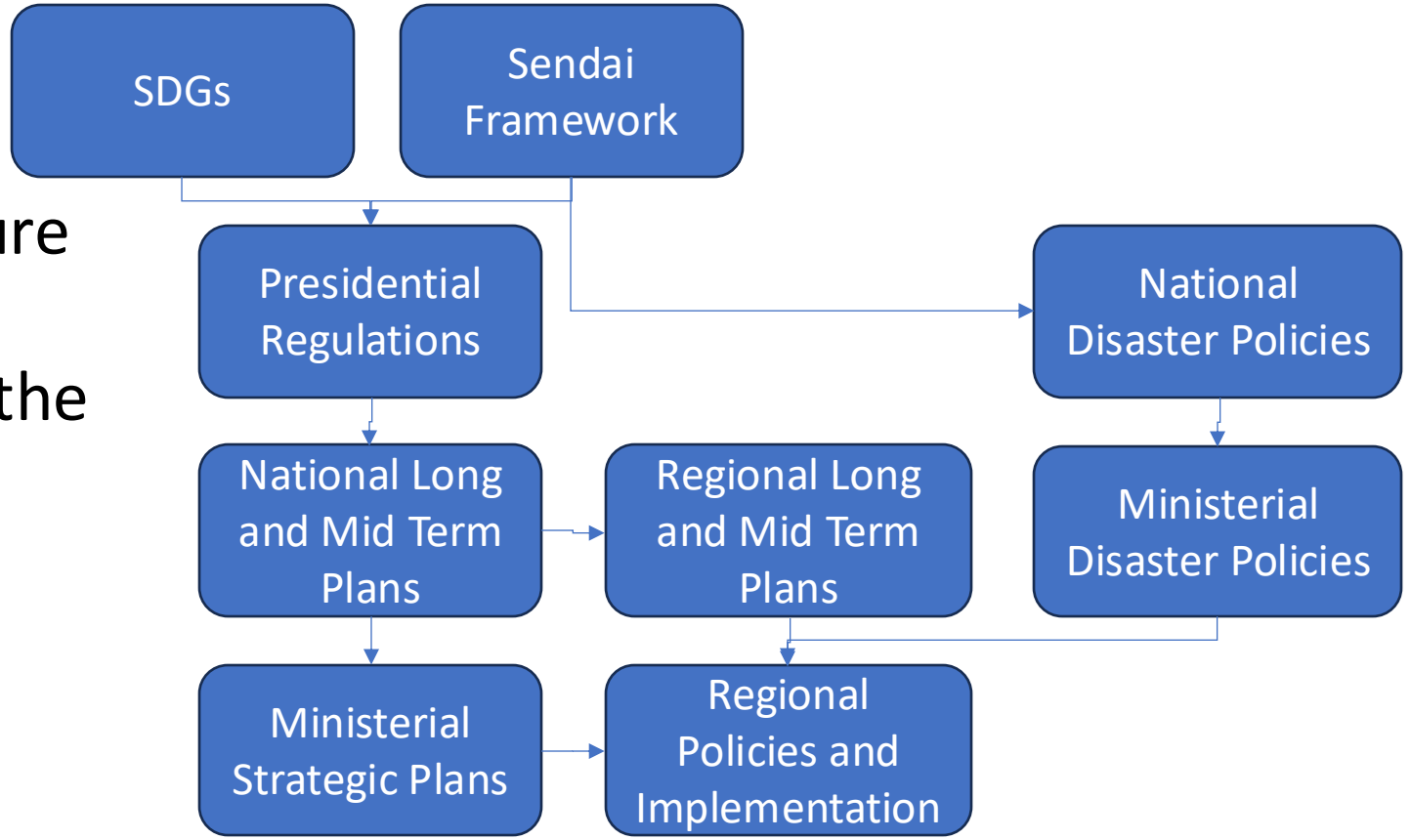
Bocchini et al. (2014)

Lounis and McAllister (2016)

Gillespie-Marthaler et al. (2019)

Indonesia's Infrastructure Policy Structure to SDRI

- Simplified Indonesia's infrastructure policy structure to SDRI.
- Policies should go down to the level of design criteria,, technical specifications, technical instructions, SOPs and other technical documents that are to be implemened at a practical level.



SDRI Policy in Indonesia

National level SDRI policies:

- Law no. 59 of 2024 concerning the National Long Term Development Plan for 2025-2045 : Agenda 7 - Creating Quality and Environmentally Friendly Facilities and Infrastructure
- Presidential Regulation Number 18 of 2020 concerning the 2020-2024 National Medium Term Development Plan : Policy and strategy for development of disaster resilient infrastructure and strengthening vital infrastructure,
- Presidential Regulation Number 111 of 2022 concerning the Implementation of Achieving Sustainable Development Goals
- Presidential Regulation Number 87 of 2020 concerning the 2020-2044 Disaster Management Master Plan
- Minister of Public Works and Public Housing Regulation Number 9 of 2021 concerning Guidelines for the Implementation of Sustainable Construction

Regional level SDRI policies:

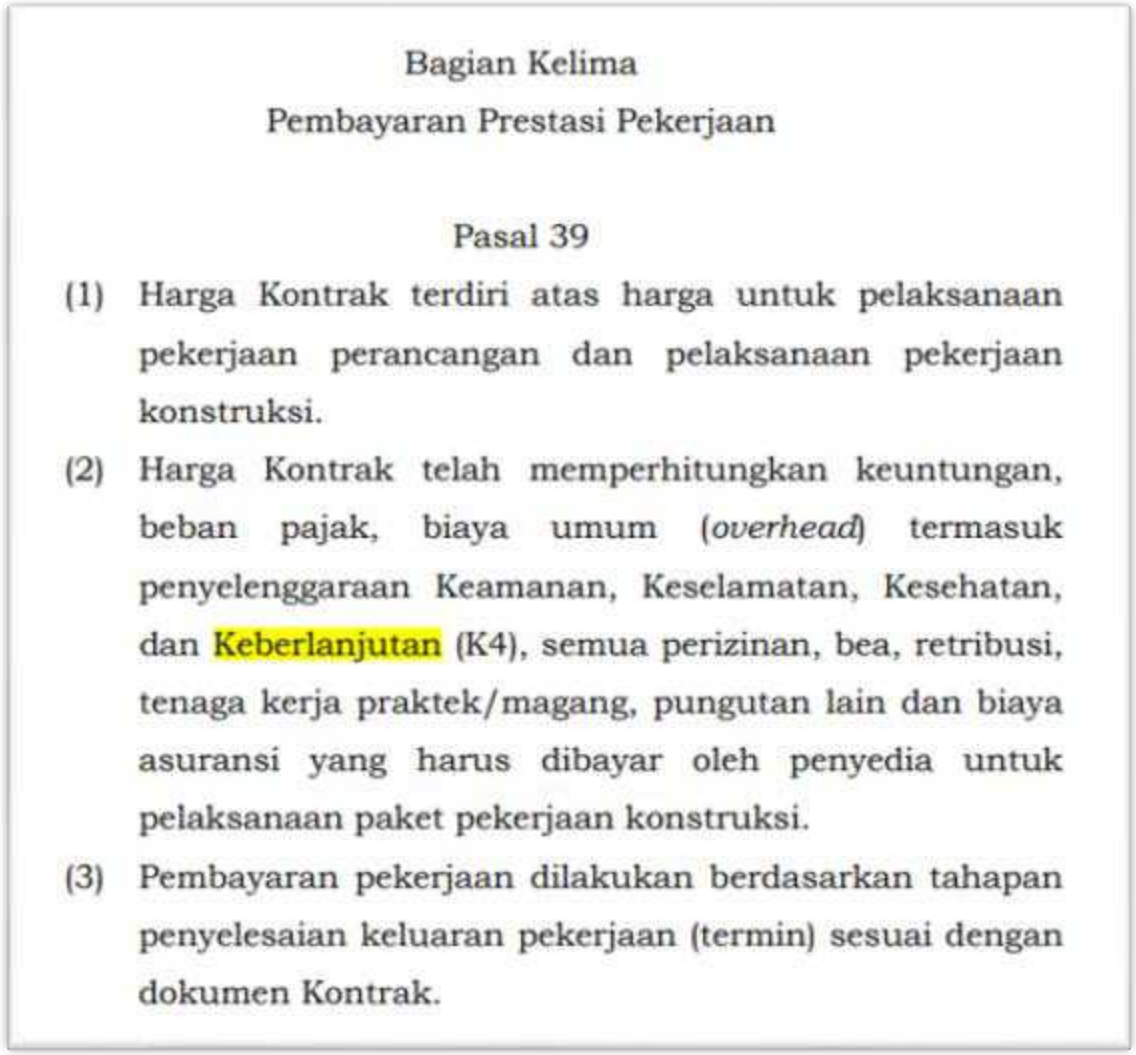
- There is no specific policy regulating SDRI at the district/city level.
- Each district/city level has its own regulation, however, they follow the regulations set out in national regulations.

Challenges

- At the implementation level, there are lack of details on how to implement sustainable and resilient infrastructure agenda
- Despite Ministry of PUPR's Regulation No 9/2021, there are many implementing regulations that do not describe how "sustainable and resilient infrastructure" is to be implemented
- These requirements mostly do no appears in project brief and design criteria for examples in infrastructure projects
- Example of Implementation of SDRI strategy in Design & Build Projects

Implementation of Strategy:
Example for Procurement Regulation of Design & Build Project

- In the Regulation of the Minister of Public Works and Public Housing Number 12 of 2017 concerning Standards and Guidelines for Procurement of Integrated Design and Build Construction Works, there is no clause that directs how the sustainability and disaster resilience of infrastructure are achieved
- It only mentions the word sustainability but does not specifically require the requirements in question.



Bagian Kelima

Pembayaran Prestasi Pekerjaan

Pasal 39

(1) Harga Kontrak terdiri atas harga untuk pelaksanaan pekerjaan perancangan dan pelaksanaan pekerjaan konstruksi.

(2) Harga Kontrak telah memperhitungkan keuntungan, beban pajak, biaya umum (*overhead*) termasuk penyelenggaraan Keamanan, Keselamatan, Kesehatan, dan Keberlanjutan (K4), semua perizinan, bea, retribusi, tenaga kerja praktek/magang, pungutan lain dan biaya asuransi yang harus dibayar oleh penyedia untuk pelaksanaan paket pekerjaan konstruksi.

(3) Pembayaran pekerjaan dilakukan berdasarkan tahapan penyelesaian keluaran pekerjaan (termin) sesuai dengan dokumen Kontrak.

SDRI Requirements in Procurement

- In general, in design criteria documents, TOR, quality targets, and similar work requirement documents, earthquake load requirements must be taken into account because they are listed in the SNI (Indonesian National Standard).
- However, it is still very rarely found design requirements to ensure the sustainability and resilience of the infrastructure to be built.
- Consideration of other aspects of vulnerability and exposure in design is very rarely found.
- Design and build procurement should be a good opportunity to embed requirements related to resiliency and sustainability because service providers should have technical expertise in this field. However, it needs to be given more incentives to be able to trigger the implementation.

Design and Build Projects

- The development projects of the Indonesian National Capital that use the design and build method include the Presidential Palace and Ceremonial Field, the Presidential Office Building, the Coordinating Ministry Building and Area 1, Wastewater Treatment Plants (IPAL) 1, 2, and 3 of the IKN Government Center Core Area (KIPP).
- Presidential Regulation (Perpres) Number 63 of 2022 concerning the Details of the Master Plan for the Indonesian Capital City mentions several points of the IKN principles regarding sustainable and resilient cities.
- However, the key performance indicators mentioned regarding resiliency are only in the sense of food resilience, not for disaster resilience.

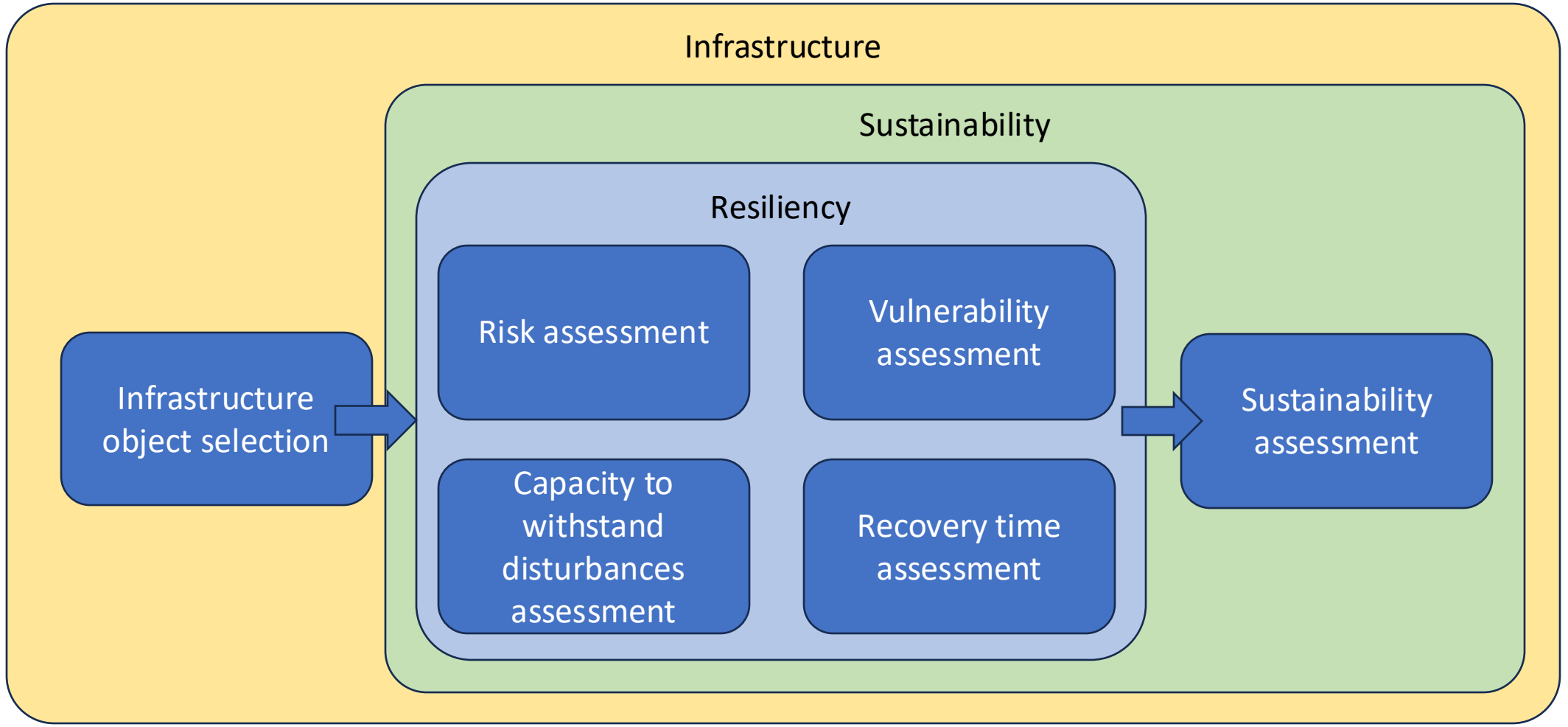
Examples of Design and Build Projects in Indonesia

Kijing container port, Kalimantan

IKN presidential palace

Trans Sumatra Highway projects

SDRI Assessment Framework



SDRI Assessment Framework tailored to Indonesia's condition (work in progress)

Challenges for SDRI in Design and Build Projects in Indonesia

1. Integration of Sustainability Goals

- **Conflicting Objectives**: Design and build contracts often prioritize cost and time efficiency, which can conflict with sustainability goals. This may lead to compromises in environmentally friendly materials or practices.
- **Limited Design Flexibility**: The fixed-price nature of these contracts can discourage innovative design solutions that prioritize sustainability, as contractors may opt for cheaper, less sustainable options to stay within budget.

2. Risk Management

- **Disaster Preparedness**: Integrating disaster resilience into the design phase requires comprehensive risk assessments. Contractors may lack the necessary expertise or resources to adequately evaluate and mitigate these risks.
- **Unforeseen Challenges**: Natural disasters can introduce unexpected challenges during construction, such as delays or increased costs, which may not be accounted for in the initial contract.

3. Stakeholder Engagement

- **Diverse Interests**: Achieving sustainable and disaster-resilient infrastructure often involves multiple stakeholders (government agencies, communities, environmental groups). Balancing these interests within a design and build framework can be complex.
- **Public Awareness**: Engaging the public in understanding the importance of sustainability and resilience can be challenging, leading to potential opposition or lack of support for projects.

4. Regulatory Compliance

- **Complex Regulations**: Navigating the regulatory landscape for sustainable building practices can be cumbersome. Design and build teams must stay updated on evolving regulations related to sustainability and disaster resilience.
- **Inconsistent Standards**: Variability in standards across regions can complicate compliance efforts, particularly in projects that span multiple jurisdictions.

5. Knowledge and Skills Gap

- **Lack of Expertise**: There is often a gap in knowledge regarding sustainable practices and disaster resilience among contractors and designers. This can hinder the effective implementation of innovative solutions.
- **Training Needs**: Continuous training is required to keep teams updated on best practices for sustainability and resilience, which can be resource-intensive.

6. Financial Constraints

- **Initial Investment**: Sustainable materials and technologies may require higher upfront costs, which can deter stakeholders focused on short-term financial returns.
- **Funding Availability**: Securing funding for projects that prioritize sustainability and disaster resilience can be challenging, especially in regions with limited financial resources.

Questions for Indonesian Construction Contractors

- What are the role of contractors in implementing SDI in Indonesia?
- What are needed in terms of project governance that will provide enabling environment for contractors to deliver SDRI?
- How are general condition of contract and technical specification need to be prepared in order that contractors can develop appropriate estimates and properly price the work for SDRI?
- To answer those questions we need to conduct collaborative research : INDUSTRY – ACADEMIC COLLABORATION!

Thank you!