



# Managing Digital Transformation for Nusantara New Capital City Development Construction

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# Introduction

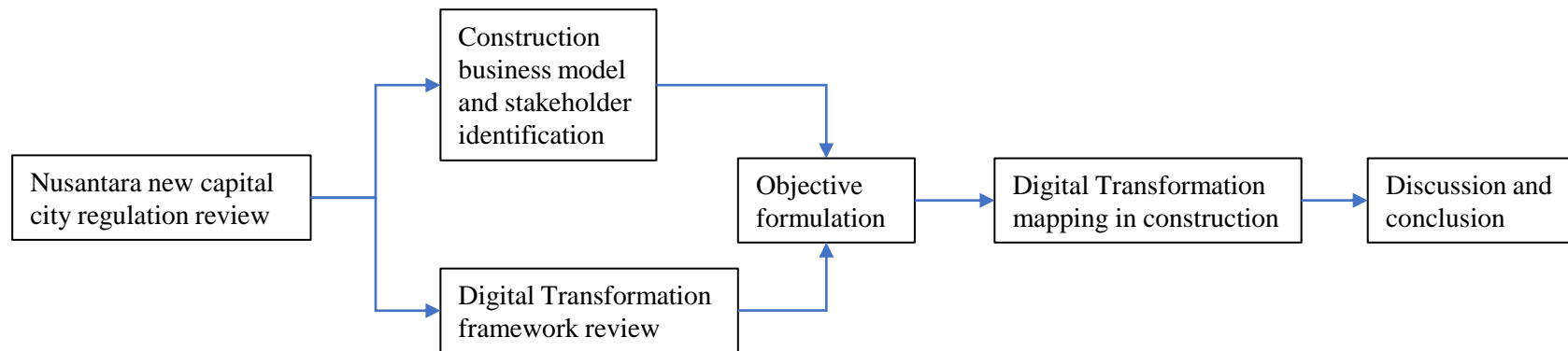
- The Indonesian government targeted a radical change in how to develop the Nusantara New Capital City development, through the digital transformation vision
- The role of regulatory, supervisory, and performing entities will change to achieve effective operation integration.
- The construction digital transformation is needed to present the integrative adoption of systemic ecosystems for construction activities, which becomes a crucial part of the capital city development.
- This study aims to determine a strategic mapping on how to implement digital transformation in the Nusantara project construction activities.

# Literature review

- The basic principles of Nusantara development including sustainable, green, resilient, inclusive, and smart [1, 2]
- Infrastructure digital transformation development directly deals with technology adoption [3, 4].
- A mapping for digital transformation as a whole system becomes a reference for the systemic integration framework for all aspects of construction development that will be useful for the authority [5].
- The technology adoption will affect the operation methods, while the operation method will affect the data and information handling used in the construction activities [13, 14].

# Method

- The study begins with a regulation review related to Nusantara's new capital city to identify constraints and important points related to the transformation vision.
- Conduct a literature study related to the construction business model and identify key formulations of digital transformation implementation to obtain the strategic construction digital transformation objectives formulation.
- Perform analysis and mapping on a quadrant for a specific role for each stakeholder involvement. Discussion and conclusion are given at the end of the stages.



# Result and Discussion

No	Nusantara Vision	Interpretation	Key function
1	Involvement of non-government entities and foreign investments in financing [1, 2]	Provide remote observation unit function that can perform near real-time construction monitoring activities [8]	Twin model
2	Integrated monitoring, supervision, and control. Implementation of long-term development parallel with the non-physical object. [1, 2]	Utilizing analytics and command functions that enable digital one-stop coordination [9]. The design and supervision must be fit with needs, agile, and responsive in implementation [10]	Integration through twin model. Separation of execution, supervision, and design systems.
3	Carbon capture emission measurement and the involvement of domestic components in construction [1, 2]	The need for a system that can perform object-based identification and measurement through a quantitative approach [11]	Data capturing and identification instrument utilization
4	Implementation of an open, accountable, and transparent governance [1, 2]	The use of integrated data systems with knowledge management-based analytical functions. [12]	Data and analytic center

Constraints from identification:

- Data-based construction systems
- Centralized system
- Analytical systems
- Numerical-based progress quantification
- Twin system

# Result and Discussion

Transformation objective	Stakeholder		
	Performing	Supervising	Owner (including external entities)
<b>Step #1: Technology adoption</b>	To speed up execution, improve quality, and cost saving	Effective supervision and ease of interpreting results	Integrate monitoring and control system of construction progress
<b>Step #2: Operation method</b>	The nearly real-time system	Centralized supervising board	Utilizing twin model, data center and command center
<b>Step #3: Data and information handling</b>	Utilizing data driven approach to quantify progress update	Utilizing data-driven knowledge, integrative information management, and data analytics	Utilizing dynamic data driven decision making and the use of twin model for observation
	<b>(the data-based activities)</b>	<b>(the efficient data management)</b>	<b>(the selected integrative approaches used for the ecosystem)</b>

## Discussion

- Systemic roles among stakeholders determine how the project controls the process [3]. However, this process can be guided through analytics functions on the system that is built directly attached with the digital twin model. This will complement the system's ability to carry out complex processes and present them with more deterministic problem-solving [15].
- The development of this system requires a complex data infrastructure that requires a security system from potential abuse, especially related to national vital objects or other confidential projects [16].

# Conclusion

- Digital transformation in project construction is an ecosystem-based transformation approach targeted to the aspect, cycle, and parties/stakeholder involvement in the whole process.
- The study found that it requires 3 aspects that need to be widely improved to achieve the transformation vision for construction; the data-based activities, the efficient data management, and the selected integrative approaches used for the ecosystem.
- A regulation-based delivery is also required to maintain the transformation objective effectively. The study contributes to the framework of digital twin for aerial construction

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