



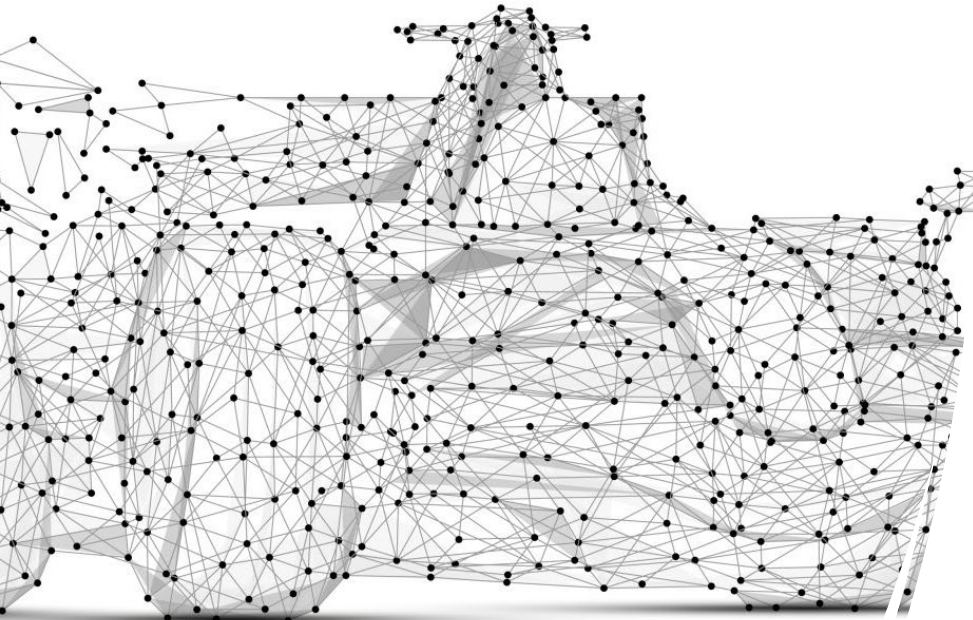
Model Based Design of Carbon Neutral Maritime Transportation System

Kazuo Hiekata

Professor, Graduate School of Frontier Sciences, The University of Tokyo



Abstract



Due to the existing infrastructure and the complexity of the maritime industry, decision makings for new technology adoptions and for policy design for decarbonization are very difficult. A framework to discuss the future visions of alternative fuels for decarbonization is proposed. The key concept of the framework is the model-based approach to describe the current practice of maritime transportation system in both qualitative and quantitative manners, to predict the uncertain and complex behaviors of the global maritime transportation system.

Model-based Strategy Design for Carbon Neutral Maritime Transportation

Strategy



Technology Development

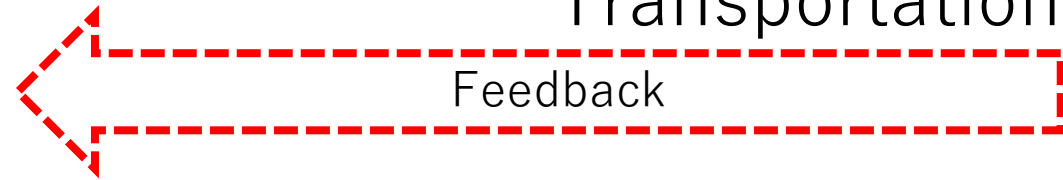
Policy

Policy Design

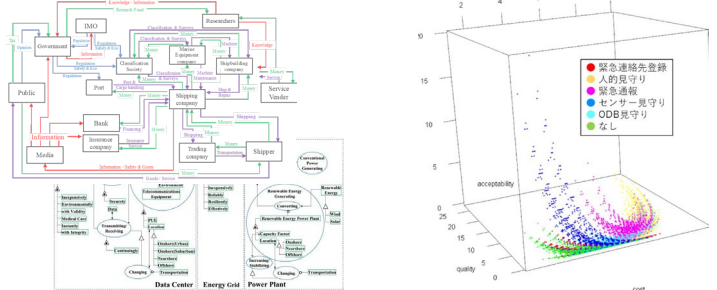
Uncertain Environment



Market and etc.

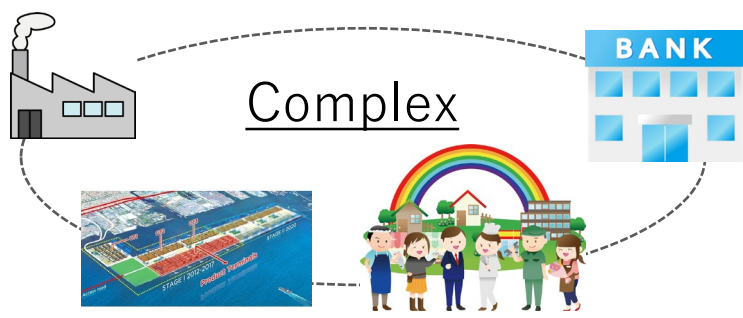


Digital Twin: Descriptive and Computational Models

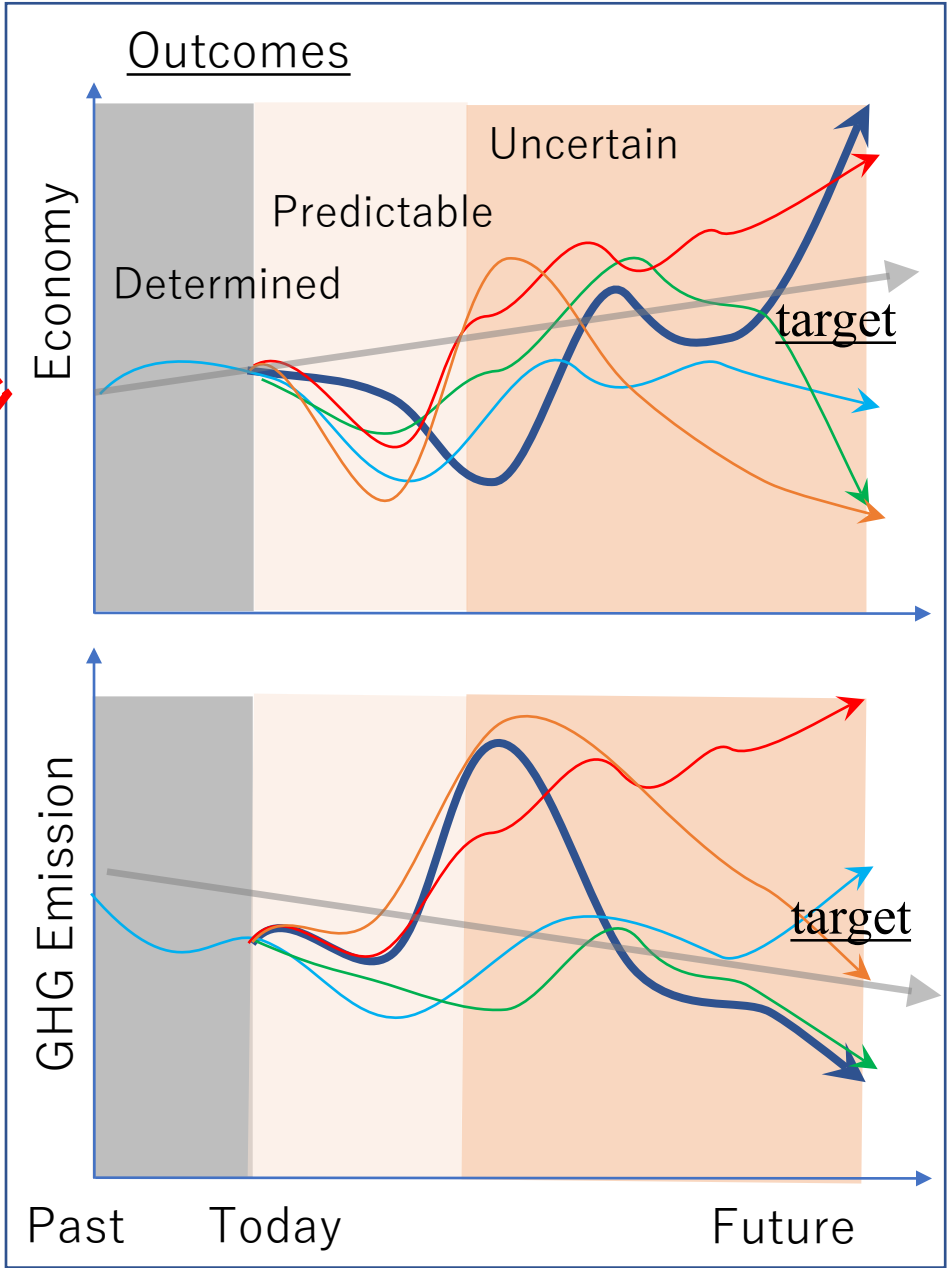


Maritime Transportation System

Complex

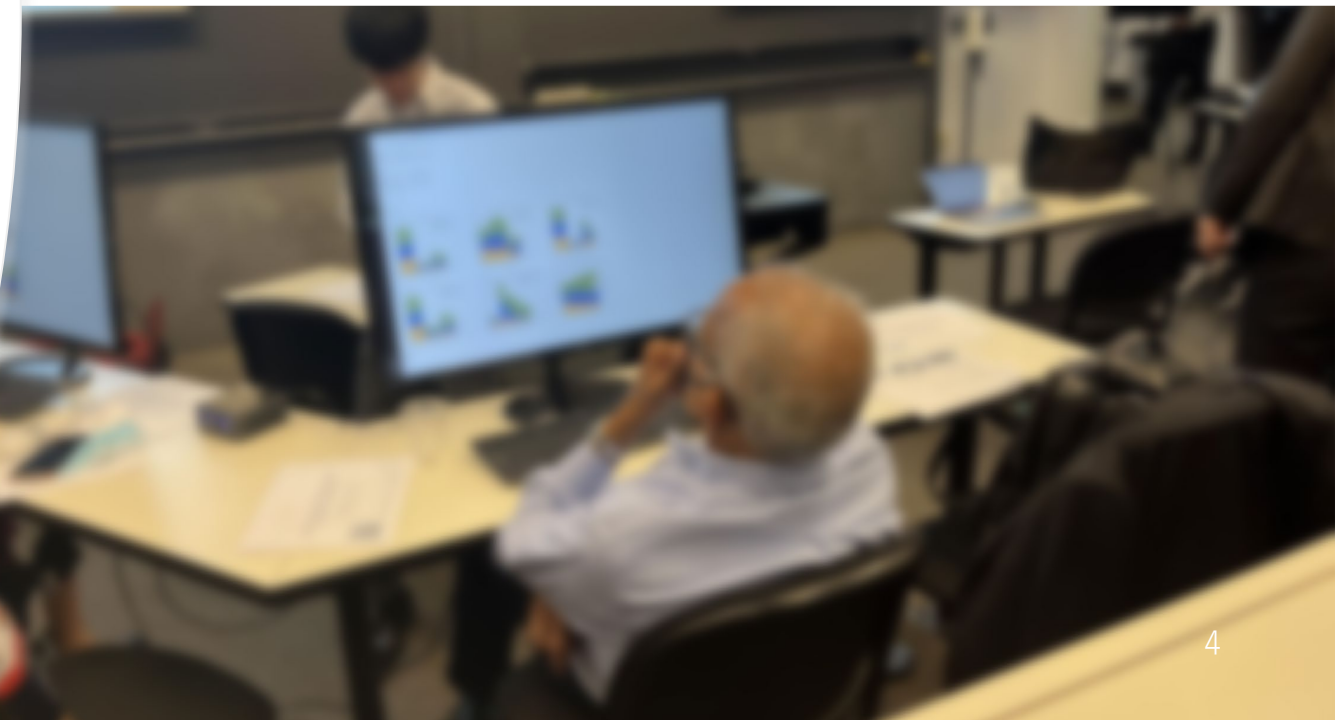


Stakeholders behave independently based on their own decisions.



Teamwork for Decarbonization across Stakeholders

- To explore how we can make impacts on the decarbonization of the global maritime transportation systems, we conducted several workshop sessions for researchers, professionals and general public.



TE 2022 July 5-8
Cambridge, MA USA

Thank you



E. Crawley, B. Cameron and D. Selva, System Architecture: Strategy and Product Development for Complex Systems, Pearson, 2016.

NASA Systems Engineering Handbook (SP-2016-6105), Rev 2

Ichinose, Y., Hayashi, M., Nomura, S., Moser, B., & Hiekata, K. (2022). Sustainable Data Centers in Southeast Asia: Offshore, Nearshore, and Onshore Systems for Integrated Data and Power. Sustainable Cities and Society, 81, 103867.

<https://doi.org/10.1016/J.SCS.2022.103867>

Kazuo Hiekata, Shinnosuke Wanaka, Taiga Mitsuyuki, Ryuji Ueno, Ryota Wada, Bryan Moser (2021), "System Analysis for Deployment of Internet of Things(IoT) in the Maritime Industry", Journal of Marine Science and Technology,

<https://doi.org/10.1007/s00773-020-00750-5>