

April 17, 2023

## **RESPONSE: IMPROVING ECONOMIC RESILIENCE**

Thank you for pursuing this timely initiative and for providing the opportunity to contribute. I am a supply chain academic at the Waikato Management School. Most of my work (teaching and research) considers how the performance of a country's freight transport system and the competitive environment created by various policies impact the resilience of its supply chains. From this perspective, I would like to suggest that a deeper view of New Zealand's maritime and air connectivity is needed if the country is to anticipate and mitigate future connectivity blows.

### **1. What supply chain disruptions and trends are you worried about?**

Not enough is being done to monitor the structural changes in the global airline and shipping industries and how these changes could affect New Zealand's maritime and air connectivity. Skilling (2022) expertly describes the impact of New Zealand's "long and thin" (pg. 2) connectivity on the country's efficiency and resilience. The survival of our supply chains requires that we not be blindsided by global changes that could leave us looped out of major maritime and air freight routes.

Among industry and government stakeholders, there is a keen appreciation of the global changes that affect New Zealand's connectivity and a reporting of high-level connectivity measures. For example, the Ministry of Foreign Affairs and Trade (MFAT), through its [market intelligence reports](#), provide periodic analyses of the country's maritime and air connectivity, the [New Zealand freight and supply chain strategy](#) accounts for maritime connectivity in its analysis of freight system vulnerabilities, and the Ministry of Transport (MOT)'s [Freight Information Gathering System \(FIGS\)](#) publish up-to-date port traffic statistics. However, the current view of our connectivity is not deep enough.

At the moment, publicly available data quantitatively describe our connectivity to our immediate neighbours, but only offer a qualitative description of what is happening in our neighbours' neighbourhoods. For example, we know the number of ships and containers coming into and out of our ports and their respective origins and destinations, but can we quantify how the re-organisation of liner services in South-East Asia has influenced these numbers? I am worried that a view that focusses too narrowly on New Zealand's immediate neighbourhood limits our ability to anticipate and mitigate disruptions to our connectivity.

### **2. What is your industry/community currently doing or planning to do to address supply chain concerns?**

Starting in 2021, my collaborators and I have been working on a deeper view of New Zealand's maritime connectivity. Using complex network theory and a pilot dataset of vessel trajectories from 2018–2020, we are developing a data analytics methodology that could be used to monitor New Zealand's maritime connectivity on a near-real-time basis. Our work aims to complement ongoing data analysis already executed by MOT's supply chain team.

The approach we have followed to develop our methodology would also be relevant to air connectivity, but we do not yet have the dataset required to do the work.

### **3. How can the government help to enhance the resilience of your industry/community to supply chain disruptions?**

Government can support our research in two ways:

- Provide a platform to share our work with the stakeholders (such as MOT and MFAT) who might be interested in embedding the data analytics into their reporting systems.
- Support the extension of the research through joint funding to purchase air connectivity datasets and more extensive maritime datasets, and employ part-time research assistants.

#### **4. What should the Commission study to learn more about the economic resilience of industries and communities?**

We recommend that the Commission considers the maritime and air connectivity data already publicly available through MOT, MFAT, and the United Nations Conference on Trade and Development (UNCTAD) Liner Shipping Connectivity Index. Furthermore, the Commission could reach out to industry stakeholders such as Air New Zealand and the ports to understand how these stakeholders monitor connectivity internally. Such a review would reveal the intelligence already available.

The next important question would be how New Zealand could anticipate and mitigate blows to its connectivity? Suggestions are made in industry reports and academic literature, but it would be valuable to debate the practicality of these suggestions within the country's context.

Finally, if the Commission is interested in understanding how complex network theory has been used to investigate maritime and air connectivity globally, I'd be happy to share a list of references.

Thank you for your consideration.

Sincerely,



**Dr. Nadia M. Trent** (CMEngNZ, Pr.Eng.)

## **References**

- [1] Skilling, D. (2022). *Supply chains to the last bus stop on the planet: An international perspective on strengthening New Zealand's supply chain resilience*. <https://www.productivity.govt.nz/assets/Inquiries/resilience/Supply-chains-to-the-last-bus-stop-on-the-planet.pdf>