As illustrated by the empty grocery shelves during the COVID-19 pandemic or following a natural hazard, shock events expose the fragility of supply chains. Since New Zealand (NZ) is prone to natural hazards (earthquakes, volcanic eruptions, floods, etc.), supply chain disruptions are to be expected. It is not a question of if but when. Due to the country's geography (long, narrow and mountainous islands) and its over-reliance on road transport, infrastructure damage caused by natural hazards often leads to severe freight bottlenecks and delays in deliveries.

Yet, the impact of these disruptive events on NZ supply chain operations is not sufficiently understood. In particular, little research examines the consequences of natural hazards on freight operations in NZ and the exacerbating effect of cost-focused distribution practices with little built-in redundancy (e.g. centralised distribution centres, low inventory levels and just-in-time deliveries). Therefore, the objectives of this study are to:

1. Establish an overview of the impacts of natural hazards on NZ supply chain operations;
2. Understand how the lack of redundancy in the NZ distribution networks increases supply chain fragility after a natural hazard.

This project will focus on the May/June 2021 Canterbury flooding that damaged major transport links and disrupted freight operations for extended periods of time. In particular, the closure of several sections of State Highway 1 between Christchurch and Timaru severely affected the deliveries of Fast-Moving Consumer Goods (FMCG) to the lower South Island (including Ashburton, Timaru, Oamaru, Dunedin, Mosgiel, Gore and Invercargill) and resulted in shortages on the shelves of supermarkets and other retailers (bottle shops, fruit and vegetable stores, etc.).

The student will conduct the following research tasks:

1. Through a review of the press, the student will understand the context of the 2021 Canterbury flooding and its impact on the continuity of FMCG supply chains operations.
2. Through a review of the academic and industry literature, the student will identify and categorise the possible supply chain impacts of natural hazards and the risks associated with the distribution practices prevalent in today's business environment.
3. Using the findings of the press and literature reviews, the student will assist in designing and administering a survey of industry stakeholders in order to collect data on the supply chain disruptions caused by the 2021 Canterbury flooding and on the distribution practices in place in the lower South Island.
4. The student will contribute to the statistical analysis of the survey data and to the write-up of the study.

This study will contribute to a broader research project documenting the impact of the 2021 Canterbury flooding. Parallel research work capturing the nature and extent of the infrastructure damage will be undertaken by an undergraduate student of the University of Auckland (Faculty of Engineering). Therefore, this project will enable a Waikato Management School student to get exposure to multi-disciplinary research. In addition, by investigating the mechanisms underlying freight disruptions and supply chain fragility in NZ, this study is an opportunity for the student to be involved in a practical and industry-relevant project.

STUDENT SKILLS:

- Good knowledge of supply chain management concepts
- Skills in data analytics (preferred: ECONS205 completed)
- Good academic writing skills
- Self-motivation and proactivity
- Attention to detail
PROJECT TASKS:
- Press review to understand the context of the 2021 Canterbury flooding and its impact on the continuity of FMCG supply chains operations
- Review of the academic and industry literature to identify and categorise the possible supply chain impacts of natural hazards and the risks associated with the distribution practices prevalent in today's business environment
- Preliminary design of a survey questionnaire to collect data on the supply chain disruptions caused by the 2021 Canterbury flooding and on the distribution practices in place in the lower South Island
- Preliminary data analysis to identify correlations between the distribution practices in place in the lower South Island and the supply chain disruptions caused by the 2021 Canterbury flooding
- Documentation of Tasks 1 to 4 in a 5,000-word project report
- Preparation of a research poster highlighting the report’s key insights and findings

EXPECTED OUTCOMES:
- Student’s Research Poster (as per clause 6 of the Scholarship regulations)
- The research will contribute to a journal article
- The research will contribute to a conference presentation