

## AIM:

My research aims to contribute to the theory and practice of supply chain resilience in the face of climate change related disruptions by **exploring the nature of the reciprocal relationship** between supply chain resilience and climate change, using Complex Adaptive Systems as a theoretical perspective.

## BACKGROUND:

Globalisation has enabled a world in which **global supply chains are intertwined and interdependent**. Expanding the length and complexity of supply chains has allowed organisations to reduce costs and increase profits, but it has also enabled small disturbances to ripple across the globe into major disruptions. At the same time, **climate change has become one of, if not the greatest, challenge of the modern world**, exhibited by rising temperatures and sea levels, changing weather patterns, and frequent and intensified extreme weather events such as storms, floods, droughts and heatwaves. In the face of increasingly frequent and intensified climate related disruptions, supply chain resilience strategies need to be redesigned to deal with the complexities of the modern dynamic environment.

The goal can no longer be to return to a pre-disruption state or an even better state but to **continuously adapt and transform** to the evolving environment.

## DESIGN OF THE RESEARCH:



To achieve the aim, purposive sampling will be used in the initial stage of this research to select three large multinational organisations, known as the focal firms. Then, snowball sampling will be used to identify 4-5 small-medium sized supply chain partners and 1-2 regulatory stakeholders within each supply chain. This will enable a comprehensive multi case study approach. Data will be collected through a combination of documents, semi-structured interviews, and focus groups, before reflexive thematic analysis is used to develop themes and derive meaning.

Before primary data collection commences, an initial pilot study has been performed, focusing on three large New Zealand based firms, solely using secondary data collected from company reports and documents, press releases, news articles and databases. **The findings of which will later be used to complement interviews and focus groups with company executives.**

## PILOT STUDY KEY FINDINGS:

- 1 Past experience with a major disruption, significantly increases a firm's capability to learn and position themselves in a more progressive position of using proactive strategies in the face of future disruptions.
- 2 Reducing carbon emissions is heavily used as a long-term proactive strategy, with significant investment and resources being applied to achieve this.
- 3 Strong commitment to strengthening supply chain relationships, but this increased collaboration is not consciously used as a concurrent strategy to manage climate risk.



## DISCUSSION:

Overall, there is a **lack of conscious use of supply chain resilience strategies to face intensifying climate risk**. Whilst, firms are actively using proactive resiliency strategies, these are engaged with as more generalised safeguards. **The use of increased collaboration and flexibility as concurrent strategies will undoubtedly bring positive unintended consequences** in response to climate disruptions, although, a more conscious and targeted use of such strategies would allow firms to allocate their resources and investments more effectively.

With increasingly stringent climate related regulations and consumer pressures, firms are strongly focused on reducing their carbon footprint, but appear to be less in tune with the significance of the climate impact they will face now and into the future, unless they have **already experienced significant disruption**. Of the three firms, only one had dealt with a devastating disruption, and this firm was also the only firm to publicly outline a clear supply chain resilience strategy to face increasing climate risk. This demonstrates the supply chain's strong learning capabilities and an ability to anticipate future risk.



# THE INTERPLAY BETWEEN SUPPLY CHAIN RESILIENCE AND CLIMATE CHANGE.

How can a firm within a complex supply chain network develop their resilience capabilities in the face of increasing climate risk?

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SCAN FOR FURTHER INFORMATION

## REFERENCES:

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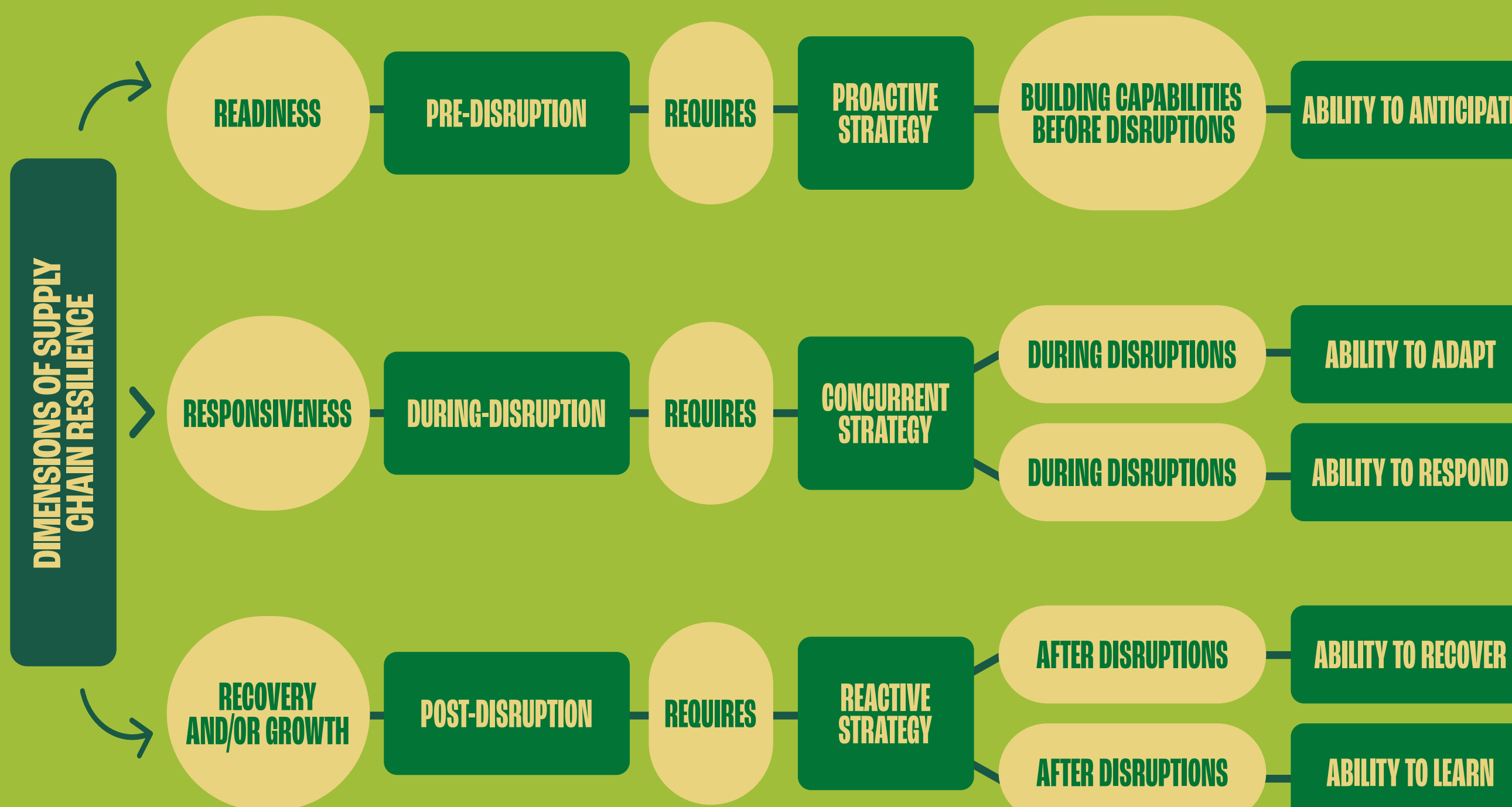
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## LITERATURE REVIEW:

Supply chain resilience is based on the premise that **not all risks can be avoided entirely**, and supply chains need to adopt strategies to prepare, respond and recover quickly (Christopher & Peck, 2004; Hohenstein et al., 2015). In the analysis of the current literature, the most comprehensive definition of supply chain resilience comes from Tukamuhabwa et al. (2015), who define it as: "The adaptive capability of a supply chain to

prepare for and/or respond to disruptions, to make a timely and cost-effective recovery, and therefore progress to a post-disruption state of operations - ideally, a better state than prior to the disruption." (p. 5599).

Ali et al. (2017) consolidated the key elements of supply chain resilience discussed in the literature as: **phases, strategies, and capabilities.**



Source: (Ali et al., 2017)

Complex adaptive systems theory (CAS) attempts to understand how order exists within complex and non-linear systems (Holland, 2006). In relation to supply chain resilience, CAS suggests that:

"a supply chain is resilient to the extent that **the system can maintain core functionality by continually adapting, evolving, and**

**transforming in response to the dynamic multiscale feedbacks** that occur between the multitude of interconnected organisations, institutions, and social and ecological systems that are all parts of the larger supply chain" (p.10).

## CONCLUSION:

As climate related disruptions become more frequent and intensified, **resilience strategies need not be constrained to the fixed time periods of pre, during and post event but instead focused on continuously evolving to the dynamic environment**. Based on the initial findings from the pilot study, a draft conceptual model has been created to represent the ongoing cycle of anticipating, adapting, learning, and transforming to a multiscale environment. The

pilot study findings and conceptual model will be explored and developed further through primary data collection and analysis. This will undoubtedly identify discrepancies between the information that is publicly available, and the level of climate risk awareness and strategy that actually exists. The conceptual model aims to support supply chains in understanding and strategising how best to apply resiliency measures in the short and long term in an increasingly dynamic environment.