

Developing resilient manufacturing supply chains through building micro-structural partnership ties

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“Developing Resilient Manufacturing Supply Chains
Through Building Micro-structural Partnership Ties.”

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A little bit history: In the 19th century ‘Scottish merchants, businessmen, and bankers had, however, fostered links with Scottish universities which had become highly regarded by the Japanese’ (Latimer, 2008, p.213).

1872



Source: Nostalgic Car, 2022

1964



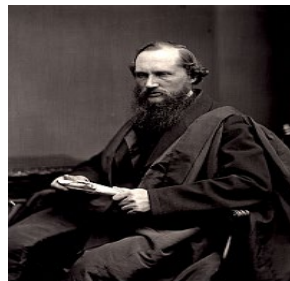
Source: The New York Times, 2014

2014



Source: The Telegraph, 2014

Henry Dyer Sir Professor William Thomson (Lord Kelvin) Professor John Rankine



Source: Scottish Engineering Hall of Fame

Do we now witness a Scottish manufacturing renaissance?

The context

- ▶ Most supply chain disruptions, 58%, are caused by the first-tier suppliers (Business Continuity Institute, 2013, cited Scholten and Schilder (2015))
- ▶ Conventional approach to such disruptions is developing supply chain risk management systems
- ▶ Nonetheless, increasing uncertainty (pandemic, trade wars, regional wars, and global climate change, etc.) adds increasing complexity in the management of global supply chains (Supply Chain Quarterly, October 2023)
- ▶ What we need now is considering the formulation as well as implementation of proactive strategies of building supply chain resilience

Definitions

According to Christopher and Peck (2004, p. 2, bold added), a supply chain is “**the network** of organizations that are involved, through upstream and downstream linkages, in the different process and activities that produce value in the form of products and services in the hands of the ultimate consumer”.

Furthermore, they define resilience as “the ability of a system to return to its original state or move to a new, more desirable state after being disturbed” (ibid.)
As such they create a resilient supply chain framework with four major factors:

- Supply chain (re)engineering; **Supply chain collaboration**; Agility; Supply chain risk management culture

Knowledge as network asset for sharing

- ▶ Viewing knowledge as **an organisational asset**, managers pay increasing strategic attention to development of capabilities to understand, visualize, mine, apply, refine, and transfer the knowledge and experience available to the company (Grant, 1997).

Therefore, Scholten and Schilder (2015) add *knowledge* as another system-level factor.

From the knowledge-based view we are mindful that any attempt to integrate highly specialised knowledge across organisational boundaries requires businesses to enhance their capabilities of deploying resources and coordinating activities in line with any intended micro-structural changes in control mechanisms, resource commitment, and relationship management.

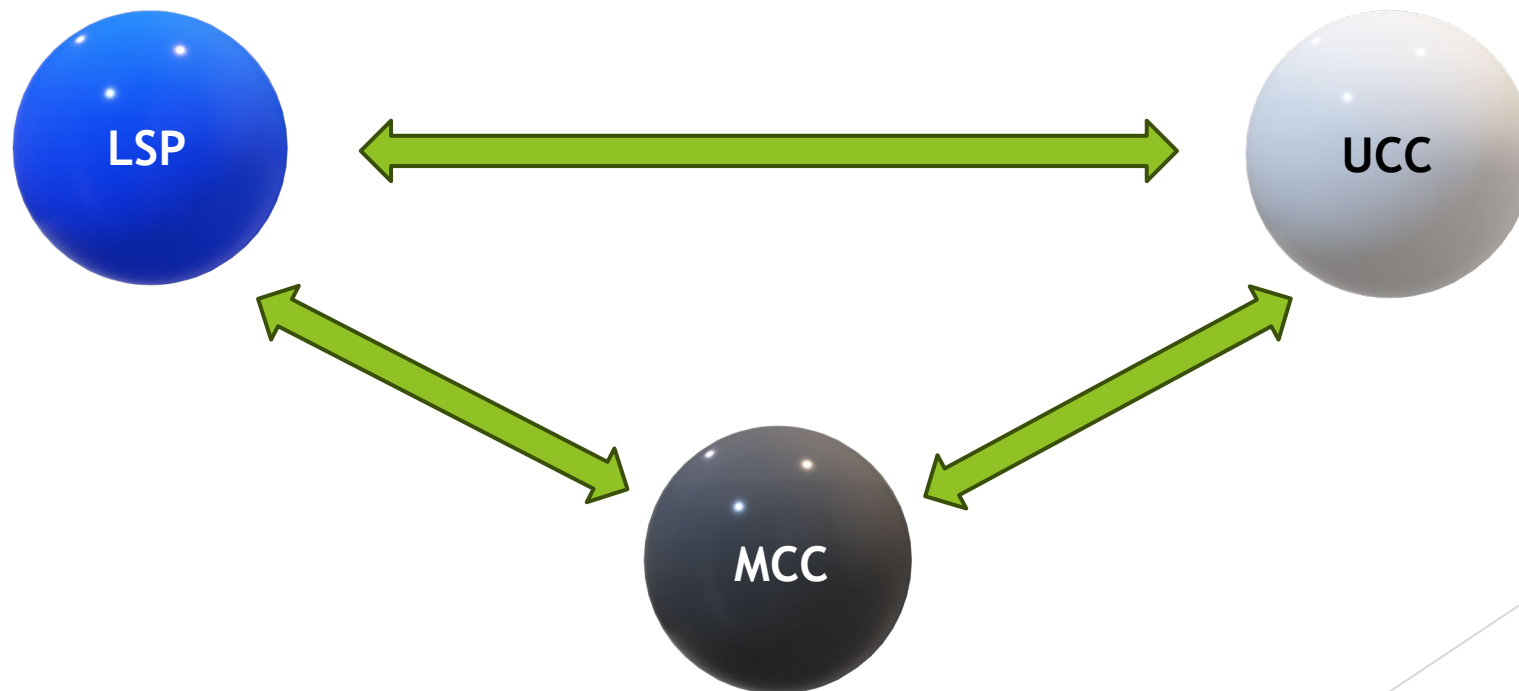
Supply chain collaboration: From market transactions to inter-organisational relationship (IOR) management

More like horizontal rather than vertical integration, network approach helps identify collaborative opportunities and better manage inter-organisational relationships.

For instance, collaboration between warehouse management systems and transportation management systems can improve operational efficiency and sustainability (Jamili et al., 2022). In their study of order picking and dock door scheduling, they find that collaboration between the two activities leads to 32% decrease in the total tardiness of shipping trucks and an average 61% overall improvement.

Forms of supply chain collaboration (Jamili et al., 2022)

- ▶ Retailers can find a logistic service provider (LSP) to establish a horizontal collaboration (Kimberly-Clark and Unilever collaborated with Kuehne+Nagel, whereby a joint manufacturing consolidation centre (MCC) was created)
- ▶ Retailers and manufacturers can also use urban consolidation centres (UCCs) created by many local authorities, akin to the business model of Last Mile Delivery services in one of my studies (Zhang, 2019)



High asset specificity & low transaction costs

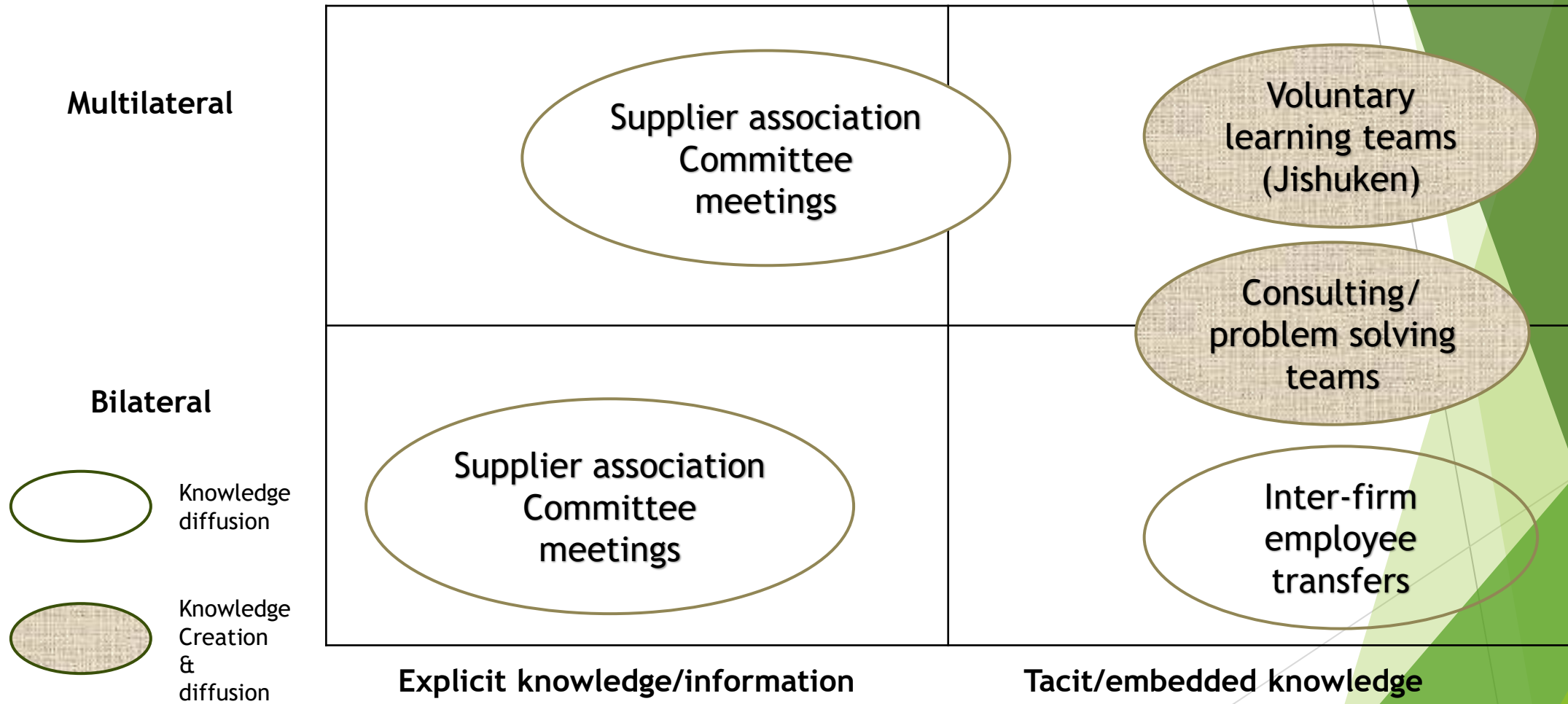
Dyer (1997) found that Toyota and its specialised supplier group (the network called *Keiretsu* 系列 in Japanese) achieved lower transaction costs even when they engaged in higher asset-specific investments.

Further, Dyer & Nobeoka offer insights in their 2000 study on the following:

- 1) the supplier association (a network-level forum for creating a shared social community, inculcating network norms, and sharing (mostly explicit) knowledge;
- 2) Toyota's operations management consulting division (a network-level unit given accountability for knowledge acquisition, storage, and diffusion within the network;
- 3) voluntary small group learning teams (*Jishuken* 自主研究会 *self-learning*), or a sub-network forum for knowledge sharing that creates strong ties and a shared community among small groups of suppliers;
- 4) interfirm employee transfers (some job rotations occur) at the network level.

Toyota's network-level knowledge sharing processes

(Dyer & Nobeoka, 2000, p. 360)



Competition, cooperation, and collaboration

We argue that possessing both competitor orientation and alliance orientation (Chen et al., 2022; Kandemir et al., 2006) has become a business norm for strategic approach to network partnership, including supply chain, management.

Table 1. Characteristics of Competition, Cooperation, and Collaboration

	Competition	Cooperation	Collaboration
Trust	Arm's length	Secured by contracts	High
Motivation	Extrinsic	Extrinsic	Intrinsic
Information and communications	Tightly held	Selective	Open, shared
Goals	Succeed over competitors	Work together to achieve desired outcomes	Work together to achieve new solutions

Source: adapted from Snow (2015, p. 435)

Distance still matters (Ghemawat, 2001)

Ghemawat's (2001) CAGE (cultural, administrative, geographic, and economic) framework provides a view of distance in varied measures what levels of opportunities and risks the choice of location may endanger when businesses consider global expansion.

Drawing on his insight and applying the framework for our analysis I recommend we add another dimension of relational distance to measure the levels of opportunities and risks embedded in the network of partnerships and manufacturing supply chains.

Trust relationships as micro-structural ties (Zhang, 2018)

- ▶ Trust can reduce transaction costs and the level of risk, discourage opportunistic behaviour, and improve partner cooperation (Williamson, 1993; Zaheer et al., 1998; Zhang, 2018).
- ▶ A better understanding of the process of building trust, and the functions of boundary spanning will enhance supply chain management through knowledge transfer, innovation, augmentation of social capital, and effective leadership.
- ▶ In the process of building trust, I recommend considering the following strategic factors from the perspective of network analysis (a) network governance; (b) ownership structure; (c) resource commitment; and (d) inter-partner relationship management.

I have proposed an analytical framework to examine the relationship between trust/distrust and the levels of uncertainty and complexity, which is pertinent for our discussion of the micro-structural ties for managing supply chain resilience.

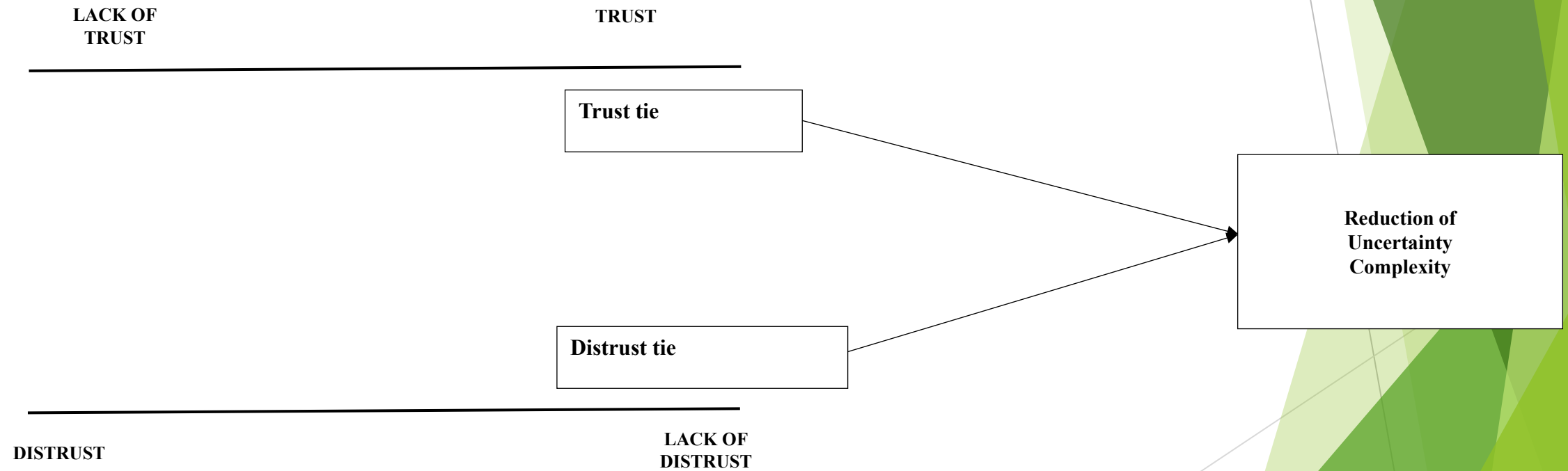


Figure 2.4 Micro-structural Ties of Trust/Distrust Connecting IORs (Zhang, 2018, p. 27)

Thank you for your
attention!
Any questions?