Guest editorial: The "new normal": rethinking supply chains during and post-COVID-19 global business environment

1. Introduction

The unprecedented disruptive impact of the COVID-19 pandemic on global supply chains has caused unparaleled damage to the global economy. Fortune Magazine reported that 94% of the Fortune 1,000 companies have been affected by COVID-19, with both upstream and downstream supply chain partners being disrupted (Fortune, 2020). As a result, supply sources were disconnected and production facilities were shut down, creating shortages at the retail/customer end and surpluses at the supplier/manufacturer end (Deloitte, 2020).

In short, the COVID-19 outbreak has tested the resilience of global supply chains and has highlighted many challenges. Over the past three decades, researchers and practitioners have emphasised the deployment of strategies such as agile (Iacocca_Institute, 1991; DeVor *et al.*, 1997), lean (Krafcik, 1988; Womack and Jones, 1996), flexible production systems (Browne *et al.*, 1984; Duguay *et al.*, 1997), omnichannel distribution systems (Verhoef *et al.*, 2015; Hübner *et al.*, 2016), coordination and collaboration mechanisms (Barratt, 2004; Fawcett *et al.*, 2012), offshoring and low-cost sourcing (Kinkel and Maloca, 2009; Ellram *et al.*, 2013), and visibility systems to enhance supply chain resilience and robustness (Barratt and Oke, 2007; Brandon-Jones *et al.*, 2014). The unprecedented disruptive impact on supply chains demonstrates that many of the recognised supply chain strategies and mechanisms (Norrman and Jansson, 2004; Natarajarathinam *et al.*, 2009) have not been sufficiently effective to fully mitigate supply chain risks inflicted by COVID-19. The weaknesses of existing supply chain strategies and practices have been exposed after several cycles of COVID-19 disruptions over the past three years. There seems to be a consensus amongst researchers, business leaders and policy-makers that we need to rethink and reimagine new ways of managing global supply chains and finding innovative solutions for the "new normal" global business environment (Mollenkopf *et al.*, 2020; Scholten *et al.*, 2020; Sharma *et al.*, 2020; Micheli *et al.*, 2021; Alexander *et al.*, 2022).

2. Aims of the special issue

In light of the above, we called for papers that would develop new knowledge and design innovative strategies underpinned by robust theoretical underpinnings to innovatively address global supply chains during the COVID-19 global business environment as well as in its recovery phase. In line with the special issue aims, we suggested several themes to potential contributors such as enhancing supply chain resilience and visibility; designing innovative collaborative and coordination mechanisms; mitigating supply chain risks;

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developing decision support systems using big data and business analytics; and redesigning supply chain network structures considering reshoring or nearshoring issues.

2.1 Review of the contributions

We received a total of 23 submissions. After careful screening, six manuscripts were desk rejected some of which did not align with the special issue theme or were out of scope of *IJPDLM* aims. Following *IJPDLM* guidelines, the remaining manuscripts were sent for peer review to two or more experts on the topic. After several rounds of revisions, four papers were accepted for this special issue. These are authored by, in alphabetical order, Acar *et al.* (2022), Mariappan *et al.* (2022), Nikookar and Yanadori (2022) and Spieske *et al.* (2022). A total of 15 authors contributed to these four papers who are affiliated with institutions from six countries, namely Australia, France, Germany, India, Japan and Turkey. Two of the papers are co-authored representing two countries, namely Australia–Japan and India–France. Accepted articles employed several research methodologies, including a questionnaire survey (Nikookar and Yanadori, 2022; Spieske *et al.*, 2022), secondary or archival data (Mariappan *et al.*, 2022), and a case study (Acar *et al.*, 2022). An analysis of the keywords deployed by the authors show that the accepted articles emphasised several keywords of which COVID-19, supply chain resilience and supply chain disruption were the most commonly deployed.

A resilient supply chain is designed and prepared for disruptions (Scholten *et al.*, 2014). COVID-19, supply chain disruptions and supply chain resilience are interconnected topics and are often being used together by researchers. With the substantial magnitude of the COVID-19 disruptions, supply chain resilience has received significant attention from researchers, practitioners, governments and industries (Remko, 2020; Scholten *et al.*, 2020). Therefore, it was not surprising to see that the accepted papers in this special issue have addressed one or more aspects of supply chain resilience.

2.2 Supply chain resilience

Resilience is defined as the way of getting back to normal or "new normal" conditions by destabilising or minimising external shocks or disturbances or threats (Luthar and Cicchetti, 2000). The concept can be used as a survival and steadiness attribute for a system, where a system may comprise of the organisation, materials and technologies it uses and the individuals involved from across the organisation (Kimhi and Eshel, 2009; Linnenluecke, 2017). Our interest is in supply chain organisational resilience, which refers to readiness, response, recovery, survival and growth to external challenges (Van Der Vegt *et al.*, 2015; Scala and Lindsay, 2021).

We consider COVID-19 as an external threat to supply chain organisational resilience. Depending on the conceptualisation of reaching the equilibrium state after any disruption, supply chain organisations may consider either of the two approaches to resilience which are static and dynamic forms of resilience (Desjardins *et al.*, 2015; Mithani, 2020). Static resilience refers to recovery along the same path, with no or limited deviation, and bringing back the system to its previous position with the same goals (Meerow and Newell, 2015; Giustiniano *et al.*, 2018) whereas dynamic resilience functions are to recover and improve. Dynamically resilient organisations follow a different direction for recovery, improvement and adaptation until they reach an alternative equilibrium point, proximate point or a different organisational goal in a new normal business environment (Holling, 1973; Taşan-Kok *et al.*, 2013).

2.3 The "new normal" supply chain and supply chain resilience

According to dictionary.com, the "new normal" is a current situation that is different from what has been experienced or occurred before. We define the "new normal" state of the supply chain as an evolving state or a new equilibrium state that has emerged after several cycles of

disruptive impacts of COVID-19 and one which characterises dynamic resilience. The new normal supply chain works to minimise the disruptive impacts and prioritises recovery with the aspiration of an adjusted state or new goal or new direction (Mithani, 2020). The post-COVID-19 supply chain is at a "new normal" state, and the features of dynamic resilience make it appropriate to discuss the new normal supply chain. Dynamic resilience can be effective for adaptation in the face of new normal recurring challenges. Dynamic resilience can be designed into a supply chain for avoidance, absorption and elasticity making it appropriate in the face of the "new normal". Also, it can be developed or rebuilt through learning and rejuvenation for an alternative equilibrium (Mithani, 2020).

The "new normal" supply chain resilience strategies can be proactive and reactive. Proactive strategies are to "withstand shocks", or to develop more immunity to the crisis, and to develop "recoverability" measures for implementation (Rai *et al.*, 2021). Prior to disruption, strengthening or building the absorptive capability of firms is a key proactive strategy for supply chain resilience (Kim *et al.*, 2015; Ivanov *et al.*, 2018; Hosseini *et al.*, 2019; Ivanov and Dolgui, 2020; Belhadi *et al.*, 2021).

Reactive strategies are for recovery through resistance, learning, reconstruction or redevelopment of the supply chain (Dolgui *et al.*, 2018). Building adaptive and restorative capacity is vital to developing a reactive response to a disruption (Tang, 2006; Manuj and Mentzer, 2008; Biringer *et al.*, 2013; Hosseini *et al.*, 2019).

Recently, Mithani (2020) suggested five mechanisms of resilience in the face of the "new normal" that uniquely contribute to supply chain organisational resilience. These mechanisms correspond to avoidance, absorption, elasticity, learning and rejuvenation. We use these mechanisms as lens to discuss each of the accepted articles.

3. Mechanisms of adaptation in the new normal supply chain and the contributions of the special issue articles

In Table 1, we mapped the accepted articles according to their foci with respect to five "new normal" mechanisms of adaptation to resilience. The articles are primarily framed and

Mechanism of resilience	Explanation	Accepted articles: Acar *et al.* (2022)	Mariappan *et al.* (2022)	Nikookar and Yanadori (2022)	Spieske *et al.* (2022)
Avoidance	The capacity of a system to deflect the shock				✓
Absorption	A mechanism to absorb the unprecedented shock and leave the system unharmed by maintaining the status quo		✓		
Elasticity	The capacity of a system to bounce back, however does not maintain the status quo at all times		✓	✓	✓
Learning	Learning is pursued after the conception of risk; it is cognitive and behavioural reorganisation after being exposed to a threat	✓			
Rejuvenation	Rejuvenation or redevelopment corresponds to recovery that occurs after the unimaginable impact of disruption				✓

Table 1. Mechanism of resilience in a new normal business environment

focused on the elasticity mechanism (Mithani, 2020). In the following, we discuss the contributions of the four articles in relation to the mechanism of resilience.

3.1 Avoidance mechanism

The avoidance mechanism can be internally embedded in the supply chain system through absorptive capacity (Hosseini *et al.*, 2019). It is a proactive approach through which a supply chain can avoid or deflect the adverse shock and keep the supply chain system unharmed (Durach *et al.*, 2015). The avoidance strategy aims to deflect the external shock or disturbance without delay (Mithani, 2020). Examples of avoidance in a new normal environment are the selection of alternative suppliers from diversified regions, use of multiple suppliers to avoid the supply risks, having multiple buyers to avoid buyer disruption, having alternative production facilities and maintaining better collaboration and partnership with third-party logistics service providers to prevent the negative impact of supply chain disruption within the supply chain (Chowdhury and Quaddus, 2017; Ivanov *et al.*, 2018; Hosseini *et al.*, 2019; Kaufman, 2020).

Only one special issue article (Spieske *et al.*, 2022) addressed the avoidance mechanism of resilience. Spieske *et al.* (2022) emphasised on the avoidance mechanism for the automotive supply chain network (ASCN) by increasing product component commonality or standardisation, establishing joint contingency planning across the supply network and localising manufacturing.

3.2 Absorption mechanism

The absorptive mechanism is a proactive and quick response approach to absorb any unprecedented shocks created by the external environment and then bringing the system to a new equilibrium state or in a new direction. In the absorption mechanism, the response time is instantaneous or response time lag is infinitesimally small. Hence, "absorption" as a mechanism can be a special form of "elasticity" (Mithani, 2020). Building absorptive capacity is the key to absorbing the unprecedented shocks of a disaster (Hosseini *et al.*, 2019). Extra capacity building and holding extra inventory to absorb unexpected demand are examples of the absorption mechanism of resilience (Dolgui *et al.*, 2018).

The special issue article by Mariappan *et al.* (2022) focuses on building a proactive strategy through an absorption mechanism for supply chain resilience. Through a machine learning-based framework for predicting shipment times, these authors suggest developing a new capability for e-pharmacy organisations to work on disruption-proof shipment time prediction of therapeutics, diagnostics and vaccines. Mariappan *et al.* (2022) suggest the application of big data and analytics for demand assessment and shipment planning and decision support systems in this respect.

3.3 Elasticity mechanism

Elasticity is a resistance mechanism that can be a proactive or reactive technique to bounce back after the disturbance through a quick recovery process to a new equilibrium state. Amongst the mechanisms of resilience, elasticity is the most common conceptualisation of resilience in organisational studies and supply chains (Linnenluecke, 2017; Giustiniano *et al.*, 2018; Hosseini *et al.*, 2019). Elasticity for disruptive action in the supply chain could be built up through redundancy, agility, flexibility, visibility and information sharing (Ali *et al.*, 2017; Ivanov 2017).

Redundancy could be built up in a supply chain through a proactive strategy with high safety stocks, additional production capacity provided by contract manufacturers, multiple sourcing and multiple production locations (Ali *et al.*, 2017; Ivanov 2017; Hosseini *et al.*, 2019).

Agility measures are a reactive resistance strategy in supply chain resilience (Iacocca_Institute, 1991; Wieland and Wallenburg, 2013). Change is one of the key drivers of agility (Abdelilah *et al.*, 2018), while flexibility and speed are the two main elements of agility (Kidd, 1994). The article by Mariappan *et al.* (2022) emphasised redesigning the supply chain structure to achieve a greater level of agility and adoption of different technologies to enhance the flexibility and responsiveness in supply chain processes. Spieske *et al.* (2022) suggested developing agility through supply chain collaboration, manufacturing localisation and visibility and information exchanges beyond the first-tier ASCN suppliers.

Flexibility in resilience is an adaptative operational ability with extra capacity development in changing environments with minimum time and effort (Ali *et al.*, 2017; Ivanov 2017; Abdelilah *et al.*, 2018; Hosseini *et al.*, 2019; Katsaliaki *et al.*, 2021). Spieske *et al.* (2022) suggested for more flexible production and logistics operations to address challenges to maintain delivery promises. For logistics flexibility, the authors suggested building adaptive capacity through alternative transportation modes and routes. During the COVID-19 disruption, to bypass border crossing restrictions, the studied case companies adopted an alternative transport route by switching the mode of transport from sea to air freight. For flexibility in ASCN production, they suggested coordinated and adaptive manufacturing set-ups such as shifting the various phases of production across the network and geographies and increasing product component commonality.

To increase flexibility, Nikookar and Yanadori (2022) in their article emphasised capability and capacity building in supply chains through people skills and social networking skills of supply chain managers. The decision-making patterns of supply chain managers and their decisions play an important role in addressing the disruptive impacts of COVID-19. However, most of the extant literature failed to focus on manager-level roles and skills in dealing with supply chain resilience. Nikookar and Yanadori (2022) addressed how supply chain managers' pre-existing social capital skills can support decision-making during supply chain disruption and help organisations in developing resistance to new normal supply chains. The study shows that in addition to interfirm relationships, quality individual-level interpersonal relationships are important for supply chain resilience. Supply chain managers' personal ties with their advisers can improve supply chain flexibility which increases resilience.

Supply chain visibility enhances supply chain agility (Dubey *et al.*, 2018; Baah *et al.*, 2021). Increasing supply chain visibility in the upstream and downstream supply chain inventories, demand and supply conditions, and production and purchasing activities as a proactive strategy can protect a supply chain from disruptive impacts (Christopher and Peck, 2004; Chopra and Sodhi, 2014; Hosseini *et al.*, 2019). Information sharing and exchange between supply chain actors prior to and after a disruption can help to increase visibility and increase collaboration to build resistance to the disruptive impact on supply chains (Christopher and Peck, 2004; Saghafian and Van Oyen, 2012). Spieske *et al.* (2022) in this special issue suggested ASCN visibility and information sharing beyond the first tier of the supply network to enable better prediction of potential future disruptive impacts. These authors suggest collaborative exchange of knowledge and information and learning for joint planning and for preparedness in developing resistance in new normal supply chains.

3.4 Learning mechanism

Learning is a process of recalibration (Mithani, 2020). It is the ability to learn from past disruptions and develop better plans and actions for future disruptions (Ponomarov and Holcomb, 2009). It is a reactive mode of resilience that is related to learning and knowledge management for humans, organisations, supply chains and the social system. The process of learning is to rethink and reassess organisational and supply chain capacity and develop contingency plans to deal with new normal conditions to minimise disruption and make the global and local supply chains work more effectively (Pavlov *et al.*, 2017). Through learning,

a supply chain can regain functionality in pursuit of a different goal. Recalibration can also be conducted through education and training, and innovation (Ponomarov and Holcomb, 2009; Han *et al.*, 2020). Only one article in this special issue (Acar *et al.*, 2022) addressed the learning mechanism of resilience. Acar *et al.* (2022) concluded that a learning culture (a reactive mode of resilience) helps organisations to improve adaptative capabilities to be more resilient during a pandemic at the organisational level. The article also found that larger organisations and multi-national companies are better equipped through their more robust and formal organisational learning culture to cope with the COVID-19 pandemic crisis compared to local small companies. Acar *et al.* (2022) suggested cultivating trust-based relationships with suppliers, which mediates the relationship between organisational learning culture and supply chain resilience.

3.5 Rejuvenation

Rejuvenation is a reactive and long-term mode of recovery. It is also related to humans and the social system for alternative recovery or redevelopment. The rejuvenation mechanism could be developed through building restorative capacity, which will require contingency plans, such as extra resources such as a budget, and knowledge and skills to rebuild supply chain structures or to restore manufacturing facilities and supplier capacities (Biringer *et al.*, 2013; Gajendran and Oloruntoba, 2017; Hosseini *et al.*, 2019; Han *et al.*, 2020).

Reconstruction constitutes the development of capabilities to make supply chains more flexible and agile, which may help in mitigating future risks of demand disruption (Mithani, 2020). During the COVID-19 pandemic, many supply chains have responded through restorative capacity using upgrade, reconstruction or redevelopment strategies to tackle the disruptive impacts. Examples of recovery and redevelopment include buying products from local suppliers (The-Premier-Victoria, 2020), bringing back the production facilities onshore (Wickware, 2020) or sourcing from near shore (SCMP, 2020). Other possible approaches include innovating with technologies such as three-dimensional (3D) printing to make products promptly to fulfil the specific needs of workers at the frontlines of the pandemic (Forbes, 2020; Larrañeta *et al.*, 2020).

As part of rejuvenation, Spieske *et al.* (2022) suggested localising or nearshoring as a long-term strategy to increase supply chain resilience for the ASCN. The authors also suggested initiating reconstruction measures for supply chain structural adaptations, particularly by making adjustments to manufacturing capacities, logistics networks, procurement activities and to the safety stocks in the supply chain network. Lastly, they emphasised top management coordination to ensure a smooth transition in making these structural changes.

4. Concluding remarks

This special issue focuses on four high-quality articles that address key gaps in existing supply chain theories and practices and will support the development of innovative strategies to mitigate supply chain disruption and build resilience. We expect these articles to deliver timely research that can help policy-makers, practitioners, managers and researchers to handle disruptions in the "new normal" global business context.

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