Managing the 'new normal': the future of operations and supply chain management in unprecedented times

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Managing the 'new normal': The future of Operations and Supply Chain Management in unprecedented times

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1. Introduction

The opening years of the 2020s have been defined by significant global disruptions, including the Covid-19 pandemic, the UK leaving the EU, the US-China trade war, and the Russian invasion of Ukraine. Each has prompted shockwaves throughout global supply chains, leading to economic bailouts and furloughs, bullwhip effects, sanctions and blockades, each upsetting previous stable flows in global trade and investment. Against this is the backdrop of growing awareness of environmental crisis (with deadly heatwaves, thawing permafrost, and intense floods) and digital technologies reshaping whole sectors, amongst other changes.

This paper reflects on these and other themes presented at the EurOMA Conference of 2021, introducing eight best papers from the conference developed into full journal papers. It attempts to provide an overarching conceptualisation of these papers in relation to the conference theme of managing the ‘new normal’ in unprecedented times and foreshadowing the 2022 conference theme of ‘brilliance in resilience’, highlighting findings from the past year’s disruption and how well operations management and supply chain management has risen to these challenges. Responsiveness to specific context in juxtaposition with universal principles, emerges as a suggested focus. Homogeneity or universality versus heterogeneity or context specificity are a dynamic contrast that underlies the nature of both practice and study. Discussion of this conceptualisation prompts an outline research agenda to take the academic field forward in these volatile and seemingly unpredictable times.

Over the last three years, we have seen the academic profession reacting, as all parts of the economy and society have, to an unexpected major, global pandemic. For journals, this has meant disruptions to the submission and review processes for papers. For conferences, it has meant a shift from traditional in-person conferences, to online-only conferences, and hybrids trying to do both.

The annual EurOMA conference over the past three years demonstrates an example of a reaction to an external change, initially responsive, then more planned, then a return to a more normal mode (albeit this paper is written before the 2022 conference has taken place). Here, in this special issue corresponding to the 2021 conference, a set of the best conference papers have been developed into full journal papers, representing topics considered significant then. As well as introducing these papers, we discuss the theme of the conference, “Managing the "new normal": The future of Operations and Supply Chain Management in unprecedented times', and how the papers reflect an academic discussion on the impact of the pandemic, and more generally, the way in which we conceptualise and react to the nature of unexpected events and how organisations succeed, or fail, in responding to them (Schleper et al. 2021; van Hoek and Loseby, 2021). Risk management and resilience involves considering both predictable and unpredictable events. Abrupt and dramatic change combines with the slow and steady change to produce, at times, a quantum shift in what might otherwise have occurred.

Resilience to the pandemic was greatly aided by the presence of global digital communications (Li et al., 2020; Zouari et al., 2021). Would white collar work have been able to move online
so readily, or global supply chain bullwhips been mitigated so successfully, had the pandemic struck in the 1990s? Governments, businesses and other organisations have been able to manage resources in a significantly different way than possible in the past (Micheli et al., 2021). Such forces – the steady trends and the abrupt shifts; the centralised control and the decentralised emergence – must be better understood to navigate the ever more turbulent waters of the twentieth century world.

**EurOMA 2020-21: A New Era of Turbulence**

The Covid-19 pandemic was first detected in autumn of 2019 in China, spread across Europe during the February skiing season resulting first in dramatic lockdowns in northern Italy, implemented in the UK by late March 2020. For the Warwick Business School, hosting the EurOMA conference in summer 2020, the planned conventional in-person conference demonstrated ‘rapid responsiveness’ to abruptly shift to a wholly online conference (Micheli et al., 2021). The following year, the University of Sussex intending to host the 2021 conference in Berlin could wish for a return to in-person conferences, but ‘scenario plan’ for a fully online conference if the pandemic was not over, with a cut-off point for a decision in April of that year. The design of the conference thus anticipated the constraints of an online-only event, adjusting the schedule to try to reduce ‘zoom fatigue’ and adding online versions of social activity.

The smaller EurOMA Sustainable Operations and Supply Chain Forum went ahead in early February 2020 in person in Nottingham, UK - although with its own experience of disruption in the form of extreme weather affecting the travel plans of many delegates seeking to attend. Some of those presented papers via online video call on an ad hoc basis. The Covid pandemic was still just a news story from a far away country. The ethos of decarbonisation prompted a reflection in the closing plenary that perhaps in future conferences might all be run virtually to reduce their environmental impact. The 2021 conference in La Rochelle, France then had to run fully online because of Covid, not carbon, and the 2022 conference in Zagreb saw a hybrid version, with a limited number attending in person and many others attending online, exploring the benefits and shortcomings of this approach. The future of OM conferences in relation to decarbonization and digitization was then scheduled as a topic for discussion at Euroma 2022, showing how after an abrupt change there is some adaptation as to how things should perhaps (or perhaps not) be run different in the future.

For business operations and supply chains, disruption has been a regular story in the news. The range of impacts from the Covid pandemic – from the very start – saw bullwhip effects in supply chains (Scarpin et al., 2022) (exacerbated by retail panic buying) (Schleper et al., 2021), a surge in demand for personal protective equipment (exacerbated in some countries by emergency reserves having been depleted or expired without replacement), a push for mechanical ventilators (later substituted by less invasive treatments), and the impact of the virus itself on the availability of workforces in factories, transport and warehousing, which in some countries such as China has persisted well into 2022. Alongside the supply chain disruptions directly linked to the pandemic, there have been disruptions due to natural disasters such as floods and heatwaves (Hodgson, 2022), accidents such as the blocking of the Suez Canal (Goodman, 2022), and war (Forbes, 2022).

For those expecting that the only certainty is uncertainty, or that we live in increasingly turbulent times, there is a validation of the speed and unpredictability of change. But we have also seen supply chains succeed in rapidly adapting, for instance with companies providing
operational capacity for personal protective equipment or ventilators (Sarkis, 2021). We have also seen technological and process innovation respond rapidly to this change, from delivering new vaccines in record time (Finkenstadt and Handfield, 2021) to enabling 'white collar' work and education to be undertaken largely remotely (Brammer and Clark, 2020; Howard-Grenville, 2020).

Some companies in the digital economy or in healthcare systems have found they have been able to massively accelerate their growth plans, arriving in two months at a market they forecast would take them two years to reach (Microsoft, 2020; ONS, 2020; Forbes, 2021). Business telephony services have been largely abandoned and replaced by video conferencing platforms. Online access to medical professionals and app-based symptom trackers represent new frontiers in the digital revolution (Heymann and Shindo, 2020). We are thus faced with a situation in the first quarter of the 21st century where the impact of radical change is tempered by the rise of digital communications. Supply chains can adapt rapidly, and medical revolutions can occur faster, because of global digital communication.

2. Conference Themes and the Papers in this Special Issue.

The main themes of the EurOMA conference reflect this of course, with some clear identification of the time delay, given the schedules under which research is conducted and then submitted for acceptance at the conference. In 2021, out of around 300 papers presented, about 25% concerned the role of digital technologies in operations and supply chains (subjects included blockchain, additive manufacturing, industry 4.0, supply chain 4.0, digital twins and artificial intelligence); slightly more than 10% concerned healthcare operations and the Covid pandemic as a supply chain topic both in terms of healthcare related supply chains and the impact of the pandemic on other supply chains. Just under 20% covered sustainability issues (including circular economy, social inclusion and sustainable supply chain management).

Around 20% of papers covered what might be called ‘foundational’ topics in operations and supply chain management, namely those that have been covered for a long time (these included sales, services, SMEs, project management, performance management, process management, revenue management, optimisation, lean and agile). The remaining 25% or so contained topics including ambidexterity, preparing for the future, complexity, paradox, multi-stakeholder engagement and collaboration, psychology and organisational culture.

Following the conference, a number of papers were invited to submit full journal papers, which then went through processes of double-blind peer review. Of these, those that were accepted are as follows, and while selected based on their own quality rather than alignment to the conference theme, they nonetheless, unsurprisingly, reflect the topics described above.

Seuring, Brandenburg, Sauer, Schünemann, Warasste, Aman, Qian, Petljak, Neutzling, Land and Khalid (2022)’s ‘Comparing regions globally: Impacts of COVID-19 on supply chains – A Delphi study’, describes a comprehensive list of supply chain vulnerabilities and highlights different regional variations. The regional similarities and differences point to heterogeneity based on institutional contexts in addition to macro-economic contexts. China’s zero-Covid policy versus that of ‘herd immunity’ elsewhere, international sanctions on Iran, the existing challenges of poverty and lower levels of development in Africa and Brazil, all highlight significant differences in the impact or the pandemic. The challenge of supply chain risk management includes that predictable risks, and subsequent risk mitigation plans, are only part of the reality, hence, unpredictable risks require a different approach.
Sauer, Silva and Schleper (2022)’s ‘Supply chains’ sustainability trajectories and resilience: a learning perspective in turbulent environments’, considers whether firms that adopt sustainability strategies are more resilient to external turbulence. Some of the ten cases explored see resilience as returning to their previous state (the classic cybernetic view of homeostasis), whilst others see disruption as prompts for evolutionary change (akin to the ‘anti-fragile’ concept). The former can be considered an engineer’s approach to resilience, and the other to the biological concept of hormesis, where strain leads to becoming stronger than before (i.e., ecological and social-ecological resilience). This prompts consideration of disruption as a driver for innovation, and firms undertaking transitional programmes based on sustainability may, by definition, be actively incorporating innovation practices where they may otherwise not have been.

Marttinen and Kähkönen (2022)’s ‘Fostering firms’ ability to cascade sustainability through multi-tier supply chains: An investigation of power sources’, explores the how the process of sustainability is a matter not just for a firm but for its suppliers. However, the act of engagement between a focal firm and its suppliers to advance sustainability goals is affected by the relative power imbalances between such firms. A powerful customer can potentially exploit its suppliers, such as to use energy conservation goals as grounds to cut prices. Or a powerful supplier may resist attempts by customers seeking to gain greater transparency to disclose the ethical provenance of raw materials. Using resource dependency theory, this paper considers how dependency between suppliers and customers in a multi-tier network can be better understood.

Jia, Hendry and Stevenson (2022)’s ‘Supplier absorptive capacity: Learning via boundary objects in sustainability-oriented supplier development initiatives’, similarly discusses knowledge exchange as part of the interaction between suppliers and customers in relation to sustainability goals. Addressing occupational health and safety requirements in factories, the research considers how initially such requirements are received passively, but then are transformed and reconfigured in ways that suit their local context. This absorptive capacity for learning builds on the dynamic capabilities theory in strategic management and considers how this adaption can reduce the resource drain of complying with audit processes conducted as part of buyer’s sustainability policies.

Harper (2022)’s ‘Implementation of small-series supply network configuration for apparel industry in high-cost contexts: A paradox-based approach’ examines risk and sustainability factors as part of dynamic processes with unresolved contradictions. This paradoxical aspect suggests that context specificity results in tensions that either resolve or remain dynamic and potentially contradictory. This in turn reflects a turbulence in business practice that can be considered alongside the complexity and design of a supply network and the level of its resilience and responsiveness. Broader influences driving re-onshoring, nearshoring and digitization of practices to increase resilience dynamically interact with the underlying principle of cost optimisation as a driver of global trade.

The three remaining papers consider new insights in product development, inter-firm restructuring post-merger and acquisition, and institutional efforts to promote collaboration.

Al Hassan and Micheli (2022)’s ‘How managers’ cognitive frames affect the use of process improvement approaches in new product development’ discusses the nature of failure to implement beneficial practices. Managers are found to have a mindset that is either supporting, conflicting or paradoxical. Again, it is the dynamic tension as to whether they promote, prevent,
or adapt suggested process improvements that is at the heart of the research. This dynamism resides in the decision making of the individual manager as they navigate potentially contradictory aspects in a firm’s strategic objectives. Again, we see that this process of interaction (considered in organizational studies research such as Kaplan (2008) or Reinecke and Ansari (2015)) is relevant in operations and supply chain management. The role of the individual in relation to the role of the organization contributes to consideration of leadership and empowerment in innovation, sustainability, and resilience.

Chae, Son, Yan, and Yang. (2022)’s ‘Supply chains and the success of M&As: Investigating the effect of structural equivalence of merging firms’ supplier and customer bases’ considers the importance of similarity between firms’ supplier networks, particularly the degree of vertical relatedness. A large-scale analysis of the performance of a set of some 279 firms, again using resource dependency theory, highlights the significance of similarity / homogeneity as opposed to the previous papers above highlighting context specificity / heterogeneity. This paper draws useful attention to the connection between M&A and supply chains.

Finally, Aaltonen and Turkulainen (2022)’s ‘Institutionalization of a collaborative governance model to deliver large, interorganizational projects’, describes efforts to institutionalise interfirm collaborative practices in infrastructure projects, which typically have one-off relationships formed just to deliver that project. Establishing new practices at an institutional level are thus difficult, and so again the influence of heterogeneity can be seen. This is however, again, a dynamic relationship. As the authors state, “projects are not only shaped by their contexts but also produce institutional change themselves.” Changes to governance at an institutional level are thus informed by activities of individual projects that can provide best practice (leadership) on new ways of acting.

Overall, the conference themes of new approaches to management in these unprecedented, turbulent times, show a rich and encouraging level of scholarly engagement, prompting new foundations for future research, and highlighting the significant role played by operations and supply chains. In the wake of supply chain disruptions, prompting news headlines perhaps more than ever before, ‘resilience’ has been a topic gaining considerable attention (van Hoek, 2020; Chowdhury et al., 2021). The responsiveness of firms to handling such shocks has meant, in the best cases, shelves not going empty and innovations, especially in healthcare but also in manufacturing, being delivered rapidly. Elsewhere, things have been perhaps less successful, and while we necessarily are reflecting over the ‘turbulence and unpredictability’ of 2019 to 2021, the first half of 2022 is a harbinger of this becoming significantly greater in the coming months and years. The next section of this paper considers previous trajectories and potential disruptions, alongside a conceptual discussion of predictability and unpredictability that might usefully inform future research.

Successive Drivers of Change: Climate, Covid, Conflict.

Up until 2020, climate change had become a ubiquitous primary concern of many scholars, practitioners and policy-makers. As a ‘grand challenge’ (Howard-Grenville et al., 2014), it had greater prominence for some than concerns over rising mass extinction of species (primarily driven by habitat loss), and was somewhat paradoxically defined as both an urgent emergency, and something requiring a patient, long term plan over decades (UK Govt, 2021; Nissen and Cretney, 2022; Wight, 2020). Whilst in many countries, campaigners took to the streets, politicians had to wrangle over the paradoxes of cutting carbon while keeping the lights on, and investing in alternative clean energy while maintaining existing jobs and incomes. Such
balancing of rising levels of pollution and its dire environmental impact, with the socio-
-economic forces of the modern world are contradictions that sit on the agenda of politicians
and those seeking to influence them. Whilst some countries have passed laws putting a legal
obligation to eliminate carbon from their economies, some governments and industries have
invested in seeking to delay or derail any such attempts. Unfortunately, the atmosphere has
little interest in how society organises itself, and will simply continue to heat up as greenhouse
gas pollution continues to rise. Having built the modern world on fossil fuels as a cheap and
abundant energy source, the attempts to change this have inevitable geopolitical ramifications,
and in turn relate to the fundamental drivers of personal agency.

At the UN Climate Conference in Glasgow, UK, in the autumn of 2021, this paradox appeared
frequently. The attempt to incorporate biodiversity into climate policy via the ‘Glasgow
Declaration on Forests’, seemed immediately skewered by a television news piece (Rannard
and Gillett, 2021) interviewing a Brazilian farmer asking what they thought about government
pledges to halt deforestation. They said that since they were poor, they would continue to cut
trees to sell timber and grow crops, so the pledges were meaningless. This highlights the
contradictory goals, or paradoxes, between reducing poverty and cutting environmental impact,
that emerge when policy making adopts a single-issue approach or one objective is driven
forward without full consideration of the wider forces at play (Paavola, 2008).

An attempt at holistic consideration of poverty and international development alongside
environment and conservation is seen in the UN Sustainable Development Goals (SDGs) (the
‘global goals for 2030’). While flawed in many curious ways, they are the main game in town,
and have successfully produced a brand that has been widely adopted by businesses and
politicians. The SDGs have identified, through a process agreed by all nations of the world, a
set of 17 goals, ranging from ending world hunger, to improving health and education, ending
deforestation and ocean pollution, and enabling secure institutions free of corruption to achieve
justice and equity. While bringing targets to address poverty and human rights with alongside
those of environmental conservation, there are also certain SDGs that hugely support others.
Increasing the level of female literacy, for instance, vastly improves the levels of child health.
Another relates to the presence of conflict.

Peace and stable institutions are a precursor to all other aspects of sustainable development.
SDG Goal 16: Peace, Justice and Strong Institutions (UN, 2017) is reported via the number of
lives lost due to conflict or homicide, and numerous other metrics. Conflicts, with those in
recent years including Yemen, Syria and now Ukraine, as well as many other smaller scale
ones, see the goals of development, sustainable or otherwise, run in reverse. For those that
survive, In tandem to the intense human suffering of those killed, wounded, tortured or
abducted, poverty increases rapidly, reversing any prior trajectory for its reduction. UNDP
(2022a) projects the rate of its rise due to the scale of housing and infrastructure destroyed,
businesses closed and people displaced as a result of the Russian invasion. Yet the impacts on
poverty are felt elsewhere too as the resulting inflation in food and energy prices immediately
impacts the livelihoods other countries. The UN Economic Commission for Latin America and
the Caribbean (ECLAC, 2022) estimates that for a country such as Colombia more than
800,000 people will enter poverty this year as a result of food price inflation caused by the war.
Similar reports note impacts elsewhere, including on international debt repayments and public
spending as well as commodity prices, hampering socio-economic development, and fossil fuel
exploitation, affecting environmental goals (UNDP, 2022b).
This comes on top of the already damaged trajectory for poverty reduction caused by the pandemic (World Bank, 2020). The UN SDG report of 2021 (UN, 2021), produced in the early stages of the pandemic could reflect only on the immediate impacts in its editorial. There, the overload on health services, outlined by SDG 3: Health and Well-being, saw a rapid reversal in decades of improvement in global provision. Alongside this, the abrupt halting of global trade had a huge and immediate impact on SDG 8: Decent Work and Economic Growth, regarding levels of employment. Job losses across the world meant an abrupt rise in poverty. This in turn produces political instability.

In some countries, such as Peru, political instability and weak institutions meant severe crisis as a result of the pandemic. At the time of writing (late spring 2022), China, with stable politics and strong institutions, is still practicing city-wide lockdowns as part of a zero-Covid approach, sending shockwaves through supply chains as factories and ports are affected (Ni, 2022). The slowdown in economic activity in turn reducing demand, presaging lay-offs or furlough schemes, impacting economic development. The global economic shockwaves from the pandemic including rising inflation, particularly from food and energy prices, will continue to affect poverty. The 2022 and 2023 SDG reports will likely paint a picture getting steadily worse not better, on the path to a more secure, sustainable, and prosperous world by 2030.

The classic distinction between the urgent and the important, where the important but non-urgent gets neglected in favour of the urgent whether important or not, is shaping the future in rapid, real-time bursts. The nature of energy policy in Europe, for instance, sees the economic effect of sanctions against Russian fossil fuels come into dynamic tension with the declared priorities of decarbonisation emphasised at the Glasgow Climate Conference, just a few months earlier (Fisher, 2022). Countries such as Germany having become wilfully dependent on Russian fossil fuels such as with the Nord Stream 2 mega-project, or Hungary traditionally dependent via the nature of infrastructure developed when on the Eastern side of the iron curtain, point to the tensions between a renewed bi-polar world divided between democracy and autocracy, rather than linked through peaceful co-existence and mutual trade.

Sustainable development and wider sustainability issues, whether energy supplies or human rights abuses, have become tightly linked to geo-political issues. Meanwhile, the as yet still unpredictable lurks ahead, whether the implication of something known but whose implications have not yet been widely considered, such as the DWS ESG scandal, where ‘environmental social and governance’ rankings have been accused by law enforcement as examples of effectively corporate fraud. Or, the wholly unknown and unpredictable event that we cannot forecast, and hence only prepare for by being better equipped to react to the unknown.

3. Conceptualization

In considering, the ‘new normal’, is it an expectation to return to some form of stability after a change, as distinguished with the old normal, by definition different from the situation now, yet somehow stable. Or, is it that the ‘era of turbulence’ itself is the new normal, and a return to stability is still some way off? Christopher and Holweg (2011) identified a ‘new era of turbulence’, noting the impacts of the global financial crisis of 2008-11. A follow up, Christopher and Holweg (2017) highlighted ongoing volatility and suggestions on how to respond to it. Rather than seek ways to eliminate it and return to stable process flow (as in classic operations management), they suggest managers should have a mindset that expects volatility and factors it into the design of supply chains. Here, volatility is seen as a ‘new normal’ and a model is proposed to consider the ‘bandwidth’ of cost-effective resilience, as
opposed to seeking cost optimization in what is no longer a stable external business context. The importance of this at an epistemological level is perhaps under-considered in the literature, as management theories relying on clear relationships between variables is confounded by a context in which there is a lack of stability.

There is also a strategic implication. The continued presence of significant and clustered risks makes the classical responsiveness a basic requirement, essentially a hygiene factor. For a firm to establish a differentiating factor something like super-responsiveness becomes necessary. Given a firm’s strategic success being based on the effectiveness of its supply network, the reaction time needed is not just that it can command internally, but that which it can mobilise externally.

By analogy, one might consider the Chinese martial arts training exercise ‘sticking hands’. To encourage rapid reactions, the participants must remain relaxed enough to respond to the movement of their partner so as to remain in contact. It is a subject of training precisely because one can’t help but run on predictions, however subtle, or have a limit to how quickly one can react. Training an organisation and its supply chain to be more responsive is of course greatly improved by digital technologies, but it requires more than just a communication tool, but also the processes and practices embedded into organisational culture to enable this.

In agile project management systems such as scrum, regular scrum sessions and roles of scrum-master formalise rapid responsiveness to changing circumstances in ways that contrast with the search for stable flow found in lean. Purvis, Gosling et al. (2014) considered how given a contrast between a volatile and unpredictable context where agility was required, and a linear, stable context where lean was optimal, a degree of responsiveness as to which of these was present was also needed (which they dubbed ‘leagility’).

What would it mean for a business to do this? And how many instances of this do we already see in theory and practice? Dynamic capabilities highlight sensing and seizing, and opens a substantial range of work in strategic management (Teece et al., 1997). Scenario planning prompts imaging of different possible futures in order to improve sense-making in crisis situations, and in practice some of this emergency planning is useful and others wasteful. During the Covid pandemic, a policy to build emergency hospitals in conference centres was rapidly enacted, but the majority of the most severe cases were in patients with underlying health conditions and hence needed the wide range of facilities of an existing hospital, leading to the emergency centres being massively under-utilised. Such contingency planning was for an imagined flu-based pandemic that was not actually the same as that which occurred with Covid.

What is clear here is that context matters much more than we think in stylised and de-contextualised supply chain studies. The national policies regarding the Covid virus resulted in significantly different outcomes. It is important to better investigate context in theory testing, but also in theory development, on the basis that stability in the external context cannot necessarily be assumed. In one sense, this is a renaissance of contingency theory – what are the unique factors that are important. In another, it may be the need to better consider the nature of economic geography, and institutional – regulatory, cultural – context. Whilst dynamic capabilities, scenario planning and economic geography are all vast fields in their own right, with their own literatures, communities and applications, the next section will consider two examples, increasing in popularity in business and management, with links to the military consideration of the external context. Firstly, a descriptive term for the external environmental
context, and secondly, one that centres different ways in which this external context is understood and reacted to.

**VUCA and Cynefin**

With the post-pandemic world now defined by conflict and its global impacts, terms from the informal vernacular of the military spring to mind. Used by soldiers to discuss their operating environment, the abbreviation ‘VUCA’ for ‘Volatile, Uncertain, Complex, Ambiguous’ has come to enjoy some popularity in management literature (Bennett and Lemoine 2014). The expectation in conflict is of a state of chaos, ‘the fog of war’, where situational awareness is all important, and where order is ultimately established through victory, of one side or the other. It is this transition from chaos to order that is significant.

One way to approach this at an academic level is to consider the counter example. For VUCA, we can contrast with something stable instead of volatile, certain instead of uncertain, simple instead of complex, clear instead of ambiguous. This leads to the pleasingly efficient ‘SCSC’ for ‘Stable, Certain, Simple, Clear’, which could perhaps be simplified further as a 2CS environment – a desired environment where things are known (and hence must be fundamentally knowable, which thereby relates to their being stable, and clearly (and hence accurately) defined, and so forth. Notably, these categories are not necessarily themselves wholly exclusive. And indeed, the term is one coined by military practitioners not theoreticians as a solid conceptual model.

A more solid conceptual model popular with both military practitioners and management academics is the Cynefin framework (Snowden 2002, Snowden and Boone 2007), which distinguishes between known knowns, known unknowns, unknown unknowns, and unknowables - most famously alluded to by US Defence Secretary Rumsfeld in the aftermath of the attack on New York in the 11th of September 2001. The Cynefin framework is a sense-making meta-model (a model of models), distinguishing ordered, hence stable and so known or knowable decision situations (labelled the simple and complicated domains), with those that are unordered, hence unstable, unknowable, or only retrospectively knowable (labelled chaotic and complex domains). The classification between contexts as to whether they are fundamentally characterised by complexity and un-addressable ambiguity is then contrasted with that where ambiguity can be overcome, or situations where things are stable and known. Notably, there can be a dynamic interplay between these domains as contexts change, represented by curved lines between the four domains. See Figure 1.

The contrast made by Snowden (2002) indicates the domain of the structured and ‘unknown but knowable’ as being the realm of classic operations research, or ‘analytics’, where sufficient data and mathematical analysis can produce relevant insights that were not immediately obvious. The even simpler structured decision context, where everything is known and straightforward, is the realm of classical bureaucracy or ‘standard operating procedure’.

The unstructured realms are more relevant to the idea that the new normal is one of turbulent unpredictability. Here, the ‘complex domain’ is that inspired by the mathematics of complex adaptive systems, where there are a multiple influencing factors that interact with each other and can do so in non-linear fashions. Here order emerges from chaos, whereby a relationship between cause and effect can be determined only in retrospect. Consider an aircraft crash. It
would not have been possible to predict the crash (otherwise it could have been avoided), but afterwards it is possible for investigators to determine the cause (such as in the cases of MH-17 in 2014, or TWA800 in 1996).

The chaotic realm, again informed by the mathematics of chaos theory, sees phenomenon displaying such non-linearity that determining cause and effect and modelling it is essentially impossible to do with any accuracy. The mathematical principle of ‘sensitivity to initial conditions’ means that failing to account for something very tiny can mean that a model will soon deviate from actuality. It is futile in such conditions to ask ‘what is the dependent variable’ and seek to determine cause and effect (a familiar approach in quantitative research in operations and supply chain management scholarship) as there is such a high degree of non-linearity and equifinality that such an attempt will fail to produce a useful outcome. One chaos mathematician described the singular focus on linear equations to the neglect of the non-linear in science as equivalent to describing the contents of a zoo as a collection of elephants and non-elephants.

The contrast of the ‘unordered-complex’ context with the ‘ordered-complicated’ context has been subject to conceptual development in the field of supply chain management with work such as Choi et al. (2001) and Pathak et al. (2007). Here, complexity leading to emergence can be managed by decentralisation of decision making, in contrast to situations that are ordered, which are amenable to classical command-and-control / predict-and-provide approaches to supply chains. From the perspective of Cynefin, and the reflection on the opposite to VUCA, what is missing from research focused on viewing things as complex is the consideration of the interplay between the two sides of unordered complexity and the stable and ordered. How to manage in the age of the ‘new normal’ is to be more responsive to whatever the context is - respond to the chaotic and complex, seek to move towards the stable and predictable, where control is possible, but ready to let go of it to allow emergence.

Snowden and Boone (2007) specifically discuss the management responses for each of the four domains. For the structured and simple domain where everything is known, it is bureaucracy. For the structured but ‘complicated’ domain it is ‘analysis’. For the unstructured complex domain it is to engage stakeholders (since the situation is understood differently by many different actors and so a better understanding can be gained just from trying to gather these many perspectives. Checkland (2000) called this ‘a soft system’, where the perspectives of different observers could help establish the nature of what was happening, in contrast to the hard systems of management science, where impartial, accurate measurement was the route to understanding. Finally, in the unstructured chaotic realm, there is nothing to do but attempt to impose order (changing the situation to one that is controllable), or waiting until other forces bring about calm.

4. Concluding Remarks

Returning to the themes appearing from the eight papers selected for this special issue, we see some useful parallels across the domains of the stable and unstable external business environment. We have the importance of stakeholder engagement and dialogue in seeking to address a complex context. Those stakeholders may be immediate suppliers and customers, or those in the wider context. We see the importance of context in terms of supply chains, as well as wider society, the context of different economies, trading partnerships, cultures, different nations, legal systems. We see the role of manager cognition and behavioural factors in how to address operations and supply chain issues, including network design factors, and process
improvement. Each of these extends theory in novel ways, addressing aspects of the divide between the stable and unstable external contexts, and the remedies for the latter around increased communication.

Seuring et al. (2022) concerns the importance of regional context for supply chain management, contrasting Iran under sanctions, the manufacturing centres of China, advanced consumer economies of Europe and North America, the distinct contexts of India, Pakistan, Brazil, the many countries of Africa and so forth. Sauer et al. (2022), considers the mindset of firms in relation to external turbulence, distinguishing those that bounce-back and return to a previous state with those that ‘bounce-forward’ to achieve a new state. Marttinen and Kähkönen (2022) and Jia et al. (2022) investigate the nature of relationships between organisations and related communications, regarding stakeholder power imbalances and leaning processes, respectively. Aaltonen and Turkulainen (2022) similarly explore how learning from one-off projects can inform the institutionalization of collaboration. Each adds understanding to the ‘unstructured-complex’ context of the Cynefin framework and the role of communication in addressing it.

Al Hassan and Micheli (2022) and Harper (2022) both reflect the nature of mindset in how to respond to external context, echoing Snowden and Boone (2007) as well as prior work on framing as a way to resolve contradiction and paradox (typically to benefit one’s position) (Kaplan 2008, Reinecke and Ansari 2015). Chae et al. (2022) considers heterogeneity versus homogeneity in supply networks in the context of M&A, highlighting the significance of the wider context in the value that such takeovers or partnerships might generate. Homogeneity indicates similarity, which indicates simplicity and structure. Heterogeneity meanwhile indicates variety and hence complexity.

Each of the eight papers includes suggestions for future research building on the findings presented. Consideration of this in light of the conceptualisation provided above prompts the following suggestions. Chae et al. (2022) highlights that future research could be done into the relevance of structural equivalence or difference of supply chains, or other supply chain factors, for post-M&A performance. Notably, they suggest that quantitative analysis alone is insufficient but that qualitative assessment is needed. This suggests that at a network-level view the classic Domain 2 analysis needs to be complemented by plural, contextually nuanced Domain 3 consideration. To quote, “M&A studies that take a network view should take the qualitative characteristics of the network (e.g. directionality, contents of the ties, etc.) into consideration beyond focusing on quantitative structural measures.” (Chae at al., 2022). The context of a firm within an industry and the inter-industry links implicit in its supply chain are important, and hence prompts a wider view of context – and heterogeneity.

For Al Hasan and Micheli (2022), their qualitative research into the role of cognitive frames in process improvement is heterogenous, suggesting a need for future research involving more homogenous sets of participants to try to build more robust tests (Domain 2), or to seek the antecedent factors in cognitive framing, or alternatively conduct longitudinal studies into how they change over time – pointing to the need to understand changes in the perception of the organisational environment.

Similarly, Harper (2022) sees the specific context of the research conducted as needing further exploration in other contexts. The perspectives of different stakeholders and how these dynamically change (again, a Domain 3 approach), the resolution or persistence of paradoxes, and how the different contexts of different organisations can be better understood, are all suggested as future research areas. Jia et al. (2022) note that their study considers
absorptive capacity from an organisational scale only, and that future research could build on their findings either at the level of the individual (manager cognition in learning processes – as with Al Hasan and Michelis, 2022), or at the wider cross-supply chain level – as with Aaltonen and Turkulainen (2022).

Each of these papers highlights limitations in their particular research as being related to the context specificity / homogeneity or the context of the level of analysis, and hence future consideration of the adjacent contexts or levels. Aaltonen and Turkulainen (2022), for instance, having looked at institutional levels, suggest future consideration of national contexts or industry contexts in affecting the dissemination of good practice in collaborative working. They also suggest looking into other forms of project governance models, and the role of organisational values in potentially shifting industries away from traditionally adversarial ways of working.

Seuring et al. (2022) note a number of limitations in their study in capturing supply chain responses to the Covid-19 pandemic. But with climate change impacts and geo-political tensions becoming more severe in the future, research is needed into how resilience of supply networks is affected by network characteristics and levels of collaborative working. They also highlight the need for research to better address the specific contexts of Africa, China and Iran in this respect.

Sauer et al. (2022) note that a large number of contextual factors (contingencies) influence supply chain resilience and that research needs to consider spatial, temporal and functional ‘scales’ as different groups of contexts. They highlight limitations that also prompt future work as being around the regional context of their study (European firms), the need to capture data from dyads of triads in supply chains, and then the need for more conceptual development and longitudinal study, given the ongoing nature of turbulence (here, specifically that of the Covid pandemic, but noting its links to future, cascading sources of instability).

The overarching theme across the papers in this special issue seem to concern the importance for future research to make a better account of context in seeking to understand how best to respond to unstable and unpredictable times. Responsiveness to a dynamically changing context suggests a need to better understand what is particular about the processes used in organisations and supply networks that are ‘super-responsive’. Aspects of this are seen across the papers above, each highlighting areas to explore next. The institutional context also prompts a need to understand the interplay of legislation on operations, how multiple parties might be orchestrated in order to achieve optimum outcomes, such as understanding systems-level costs in decarbonization, healthcare provision, or other SDG outcomes.

The Role of Operations and Supply Chain Management Scholarship

The account presented in this paper is a rough-and-ready account of the state-of-the-field, reflecting as it does the limited time between the acceptance of papers within the short period of time since the last conference and target for publication ahead of the next. The range of topics covered across the 300 papers of the 2021 conference or the 500 papers of the 2022 conference deserves greater analysis and insight. Many clear overlaps between categories exist, such as supply chain resilience and healthcare, or digital technology and sustainability. Within each category there is also grounds for better sub-division, where the track titles of ‘circular and sustainable’ or ‘ethical and responsible’ could readily break down into more specific
topics. This again reflects the need to reconsider homogeneity against heterogeneity. Lumping together topics into one area where greater specific focus is possible points to the ongoing evolution of the scholarly field of operations and supply chains, and its possible bridges to computer science and data management, manager cognition and organisational behaviour, strategic management and inter-organisational partnership, international business and governance, and so on and so on.

We might then conclude by considering what is the role of the operations and supply chain management academic in response to the volatile and turbulent world of the early twenty-first century? What is it about this field of study as contrasted with those just mentioned? Rather than assume that those in strategic management, organisational studies or human geography have any greater revelations, we might instead focus inward on what is unique about our field? We are concerned with a phenomenon of the business function, as marketing or HRM people are, and so have a pragmatism in our approach. Hence, reasonably strong links to practice and implementation.

What is the nature of academic research in practice? How do academics have impact? What is the function of conferences and of journals – in an age of rapid change prompted by digital technology and decarbonisation, of unpredictable shocks and industrial-scale violence on our land?

Operations management has been seen as problematic in terms of rigour and being too pragmatic with the use of theories. Is it, as Tranfield, Denyer et al. (2003) have said about management studies in general, akin to practice-focused subjects such as medicine or architecture, and less pure an academic undertaking as maths, theoretical physics or economics? Over the pandemic, some university leaders have called on their operations and supply chain scholars to help improve processes needed to support their students and develop their impact. The current crises show that our research outputs – such as on disruptions - have been highly relevant, and so it is perhaps rather more a question of the importance of application – how to get the right insights to the right people at the right time - than further extension of theory, risking ever more obscure additions to ‘theory’. As Snowden’s (2002) Cynefin framework suggests, whole paradigms of epistemology may be upended by the assumption that things are more linear and predictable than they really are.

While building links with other disciplines may, as with the plural perspectives suggested for understanding complex contexts, be valuable in awareness of alternative paradigms, the perspective of operations and supply chains suggests strong foundations from which to stand firm. The EurOMA conference submissions continue to demonstrate solid, practical explorations of relevant topics, responding to both new technological capabilities, and increasingly urgent societal challenges. In the wake of the 2022 theme, ‘brilliance in resilience: the role of operations and supply chain management in achieving a sustainable future’ we can hopefully feel assured that we are doing something useful and providing yet more insights from the upheavals of recent years, whilst being aware that we must stay attuned to how much more there is to do.

References

The eight papers in the special issue


**Other references**


Unstructured / unordered

Complex contexts: the domain of emergence (unknown unknowns).
Cause and effect only visible in retrospect. (stakeholder engagement).
Response: Decentralise decisions

Chaotic contexts: the domain of rapid response (unknowables). No cause and effect relationship can be determined.
(Intuition / leadership)
Response: Impose order, encourage emergence or leave alone.

Structured / ordered

Complicated contexts: the domain of experts (known unknowns)
Cause and effect can be determined but are not immediately obvious (classic scientific method / operational research)
Response: Expert analysis

Simple contexts: the domain of best practice (known knowns)
Structured-simple; cause and effect familiar and obvious. (standard operating procedures)
Response: Bureaucratic / automatic