Received 18 June 2021
Revised 25 September 2021
Accepted 1 October 2021

Practitioners' learning about healthcare supply chain management in the COVID-19 pandemic: a public procurement perspective

Christine Mary Harland
Department of Management, Economics and Industrial Engineering, Politecnico di Milano, Milan, Italy
Louise Knight
Faculty of Behaviourial Management and Social Sciences, University of Twente, Enschede, The Netherlands
Andrea S. Patrucco
Department of Marketing and Logistics, College of Business, Florida International University, Miami, Florida, USA
Jane Lynch
Logistics and Operations Management, Cardiff University, Cardiff, UK
Jan Telgen and Esmee Peters
Public Procurement Research Centre, Barneveld and University of Twente, Enschede, The Netherlands
Tünde Tátrai
Corvinus University of Budapest, Budapest, Hungary, and
Petra Ferk
New University, Nova Gorica, Slovenia

Abstract

Purpose – The procurement and supply of crucial healthcare products in the early stages of the COVID-19 emergency were chaotic. To prepare for future crises, we must be able to describe what went wrong, and why, and map out ways to build agility and resilience. How can this be done effectively, given the highly complex and diverse network of actors across governments, care providers and supply chains, and the extreme uncertainty and dynamism in the procurement system and supplier markets? The purpose of this study was to capture learning from practitioners in "real time" in a way that could frame and inform capacity building across healthcare systems with varying procurement and supply management maturity.

Design/methodology/approach – This exploratory study involved interviews with 58 senior public procurement practitioners in central and regional governments, NGOs and leaders of professional

The authors would like to thank Dr. Tobias Schoenherr for his significant suggestions to improve the article. The research did not receive external fundings.

International Journal of Operations & Production Management
Vol. 41 No. 13, 2021
pp. 178-189
Emerald Publishing Limited
0144-3577
DOI 10.1108/IJOPM-05-2021-0348

organizations from 23 countries, very early in the COVID crisis. Following the first, inductive phase of analysis leading to five descriptive dimensions, the awareness-motivation-capability (A-M-C) framework was applied in a further round of coding, to understand immediate challenges faced by procurement practitioners, how the complex, multi-level procurement system that shaped their motivations to respond and critical capabilities required to face these challenges.

Findings – Developments across 23 countries and practitioners' learning about procurement and supply in the pandemic crisis can be captured in five overarching themes: governance and organization, knowledge and skills, information systems, regulation and supply base issues. Together these themes cover the strengths and gaps in procurement and supply capability encountered by procurement leaders and front-line personnel. They highlight the various facets of structure, resource and process which constitute organizational capability. However, to account better for the highly dynamic situation characterized by both unprecedented rivalry and cooperation, analysts must also pay attention to actors' emerging awareness of the situation and their rapidly changing motivations.

Originality/value – The application of the A-M-C framework is unique in the healthcare supply chain and disaster management literature. It enables a comprehensive overview of healthcare procurement from a system perspective. This study shows how increasing system preparedness for future emergencies depends both on developing critical capabilities and understanding how awareness and motivation influence the effective deployment of those capabilities.

Keywords COVID-19, Procurement, Awareness, Motivation, Capability, Supply markets

Paper type Viewpoint

1. Introduction

> The medical supply system has turned into "Lord of the Flies" [. . .] Every state, major city, and territory, and thousands of hospitals, are being forced into a bidding war, encouraging price gouging and hoarding [1].

These are the damning terms in which US Senator Chris Murphy described the state of procurement systems in March 2020, as they struggled to cope with critical shortages in personal protective equipment (PPE), supplies for intensive care and other essential medical devices. Although procurement professionals made an unprecedented effort to procure essential goods (while also contending with new remote working conditions), it is clear that most – if not all – procurement organizations failed to effectively address all the novel challenges they faced in the early months of the pandemic. The emergency revealed several "black holes" in government procurement systems, such as the failure of national stockpile strategies, unbridled rivalries between federal, state and local procurement organizations and the inability to react rapidly to unexpected events such as "hijacked" cargos, price gouging and delivery of counterfeit and poor-quality products.

Now that private and public sector supply chains are trying to return to a "new normal", it is essential to analyze and reflect on why the speed and global scale of this health crisis, combined with the complexity of the healthcare procurement system, caused so many unprecedented problems (Van Hoek, 2020). With this in mind, between March and May 2020, we conducted interviews with 58 senior international procurement practitioners from local, regional and national procurement organizations, NGOs and procurement professional associations. The interview objectives were to better understand the main challenges these professionals faced as they developed awareness and motivation to act but were limited by their capabilities, and what lessons can be learned to make these systems better prepared to future emergencies.

2. Procurement challenges during COVID-19

2.1 Procurement for healthcare as a complex, multi-level system

Procurement and supply chain management for healthcare varies significantly internationally in structure, governance and management. Depending on the public and private healthcare provision mix, many organizations perform healthcare procurement, including procurement offices, regional and national government healthcare departments, hospitals, general medical practices and private sector group purchasing representing insurance-based healthcare

providers (Scala and Linsday, 2021). Stringent public procurement regulations and procedures exist nationally and internationally in trading blocs such as the EU, and they often cover healthcare. Almost 40% of the hospital budget is used to buy different types of supplies and equipment; considering the rising healthcare costs experienced by both developing and developed countries, several governments started using procurement to obtain efficiency and improve health outcomes (European Commission, 2021). Due to the coexistence of private and public actors, healthcare supply chains implement different strategies, and they have different capabilities to respond to emergencies. In different countries, extensive use of distributors, lack of inventory visibility and reliance on foreign countries for several critical goods are among the most important factors that expose healthcare supply chains to vulnerabilities (Rakovska and Velinova, 2018). Additionally, the high fragmentation of actors, system inefficiencies and difficulty to establish collaborations makes it challenging to design and manage healthcare supply chains as a system, and SCM practices are usually adopted at the individual actor-level (e.g. at the hospital level; Dai *et al.*, 2020).

Systems theory/thinking (Checkland, 1999) helps researchers to understand multi-level systems and has been applied to understand supply chains and supply networks (Choi *et al.*, 2001) as complex systems. More than any other event, the pandemic has accentuated the interconnectedness of supply chains and networks (Harland, 2021); this represents a call for action for healthcare supply chains that need to introduce a real supply chain thinking in managing supply markets, as well as the balance between rivalry and cooperation across procurement organizations.

2.2 Procurement for healthcare (un)preparedness for a pandemic

Whether the crisis is a natural disaster, a military conflict, or an epidemic outbreak, procuring critical goods and services during a crisis presents several challenges. Uncertainty is commonplace, delays occur and urgent needs go unmet. So, agility and flexibility are crucial. The last century has already experienced several situations characterized by intense crisis contracting. Still, pandemics and epidemics are the most critical from a procurement and supply chain management perspective due to their impact on human lives (Ivanov, 2020). When looking at the healthcare supply chain literature, discussion about system preparedness to face emergencies (e.g. pandemics, wars, climate catastrophes) is limited. These events cause a rapid surge in demand for critical medical supplies that can be coped only with an appropriate inventory and logistic infrastructure (Leite *et al.*, 2021). The emergency and disaster management research which uses the previous SARS and Ebola outbreaks as the unit of analysis already shows the risks of uncontrolled healthcare supply chain behaviors, with critical medical products being hoarded, procurement organizations lacking visibility on available inventory and insufficient support provided by national stockpiles (Dasaklis *et al.*, 2012). Examples from other natural disasters, such as Hurricane Katrina, also show the need for governments to improve their supply market infrastructure after the crisis to increase future preparedness (McGuire and Schneck, 2010). Although on a smaller case, those events were already suggesting that optimizing inventory strategies and establishing better coordination between agencies should have been a priority to improve healthcare supply chain preparedness (Calnan *et al.*, 2017). Some countries were even able to catch the healthcare "system weaknesses" signals. For example, in 2016, the UK government organized "Exercise Cygnus", a flu outbreak simulation involving 950 officials to understand UK readiness for an epidemic outbreak [2]. The simulation concluded that the UK was clearly not prepared to face an event of this magnitude, with lack of central coordination and intra-state rivalry being the main reasons for failing to satisfy the peak demand for hospital and social care.

Unfortunately, once COVID-19 hit, all the above issues occurred, amplified by the magnitude of this global emergency. Scrutiny of procurement was triggered by buyer rivalry and supplier opportunism, "hijacked" supplies, international piracy, counterfeit and poor-

quality products, price gouging and corruption (Patrucco and Kähkönen, 2021). Public authorities and private healthcare providers competed to secure critical supplies as international borders closed and societies and economies locked down (Kamerow, 2020). Prices rose, so new sources of supply were sought, and opportunistic entrants to the market appeared, increasing risks of fraud and uncertain quality (Atkinson *et al.*, 2020). National stockpiles were allocated with no apparent distribution strategy (Handfield *et al.*, 2020). The result was a free-for-all that should never be repeated.

As a result, these complex, dynamic healthcare supply chains failed to cope effectively with the impact of the pandemic, showing a lack of responsiveness on the procurement side (Scala and Lindsay, 2021). Thus, it becomes imperative, for governments, to learn once and for all from the COVID-19 experience and seriously rethink their procurement systems, increasing their capabilities to coordinate and minimize disruption of supply of critical goods and services and mitigate the effects of emergencies.

3. Analyzing procurement for healthcare during COVID-19: the awareness-capability-motivation framework

Direct interviews with public procurement officers and government representatives gave us the chance to capture key learning points and perceived organizational knowledge and skills gaps from a wide range of settings to identify common and differentiating themes and derive insights for future preparedness.

3.1 Data collection

We wanted to gather data early in the crisis to lower the risk of bias and retrospective sensemaking. To accommodate the severe time pressures faced by interviewees, and capitalize on interviewers' experience, we designed the expert interview (Döringer, 2021) around two overarching questions on pandemic procurement and supply (1) *sharing learning* by describing their key lesson learned so far (based on success or failure); (2) *learning from peers* by discussing the most significant challenge(s) they currently face for which they would like to learn from others.

Interviews were conducted from March to May 2020 using contacts within an existing research network. The number of interviews and targets were not predetermined, aiming for data and meaning saturation (Corbin and Strauss, 1990). Interviews were conducted via video links, with follow-up emails and communication with each participant, to verify interview notes and develop interim findings. A final convenience sample of 58 respondents across 23 countries was obtained. Respondents include senior public procurement practitioners such as National Directors of Procurement, State Chief Procurement Officers (CPOs), designated national and local COVID-19 procurers, senior category managers for healthcare and CEOs and board members of national public procurement professional organizations and non-governmental organizations (NGOs), representing an average experience in public procurement of 17 years. We captured data from nations seen as coping relatively well with the pandemic, and those considered to be less effective (in terms of number of cases and PPE shortages), and from countries with a more law-focused approach to public procurement and those with a more strategic, policy-led approach.

3.2 Data coding: themes and conceptual interpretation

The approach used for coding and analyzing the data did not follow a traditional comparative case study but used a three-phase variable-oriented approach. The first phase was inductive; the data gathered from each respondent provide expert insights into their strengths and weaknesses in facing the emergency. The conversational approach enabled identifying issues experienced by the respondents as in a critical incident study design. The focus of the analysis is the issues, not a country comparison. By asking about challenges and successes, respondents

focused on factors critical to performance that may be successful in one jurisdiction or failing in another. Thus, all issues discussed are considered important, and analysis takes account of outliers and extreme cases, as well as frequently mentioned themes. Where factors were mentioned with both positive and negative valence, data were appropriately combined. The nature of the responses gives a temporal aspect to the data, since interviewees spoke of how pre-crisis decisions/structures/capabilities affected their ability to respond to the crisis and of lessons learned and their priorities for improving their future capabilities for crisis response. Further, although public sector levels vary across countries, we tried to isolate information at local, state/national, federal/union levels. As a result of this phase, themes emerging from the interviews were organized in five different areas.

The first, "*Governance*", relates to issues internally to the procurement organization and externally to other buyers, suppliers and stakeholders in the systems. The second, "*Skills and competencies*", relates to individual knowledge and competence of procurement roles and professionals and distinguishes between the professionalism of procurement specialists and the need to shift role boundaries to incorporate supply chain management knowledge. The third, "*Information systems*", relates to the role of digitalization with a clearer, more coherent understanding of the many, varied ways in which the systems in place before the pandemic helped or hindered decisions and activities during the pandemic. The fourth, "*Regulation and procedures*", relate to how procurement systems were able to adapt and align standard procedures to the support urgent requests. Finally, the fifth, "*Supply base management*", relates to vulnerabilities and commitment that procurement organizations experienced in relation to the supply base.

The second phase aimed to identify an appropriate theoretical framework useful to elaborate on the five descriptive themes dynamically. Chen's (1996) awareness-motivation-capability framework (A-M-C) is one of ten theories highlighted by Craighead *et al.* (2020) as potentially helpful in analyzing supply chain management in this pandemic. It comprises three essential, behavioral factors determining firms' actions in response to strategic moves by competitors. It allows explanatory and predictive analyses of the firms' (inter)actions according to their awareness of others' actions, their own motivation to act and their capability to do so (Chen and Miller, 2012). Chen also recognized the appropriateness of A-M-C to be applied to situations of cooperation as well as competition (Chen, 2014), contrasting rivalrous and competitive-cooperative modes. However, most applications of A-M-C relate to the strategic management domain to explain rivalry between competitors, with only very limited application to a procurement and supply chain management context. Due to its ability to capture, along different dimensions, organizations' response to external, unpredictable events, we decided to adopt the A-M-C framework to frame the collected data conceptually. Thus, the third phase consisted in summarizing the findings from the first two phases to develop two complementary accounts, descriptive (based on the five themes) and conceptually framed (leading with awareness, motivation and capabilities).

Figure 1 summarizes the main output of this process. An overview of the main findings is provided in the next section, adopting the A-M-C perspective. Necessarily, we provide a rather linear account moving from awareness to motivation to capability. Especially given the highly dynamic and uncertain setting in which procurement and supply decisions were being made, there are multiple, important links between the three; for example, awareness of impending shortages motivates hoarding which, when observed, encourages rivalry.

4. Healthcare procurement systems' awareness, motivation and capability to perform

4.1 Awareness

Public procurement systems became aware of the emergency and the need to support increased urgent demand for critical medical supplies (typically ordered directly by hospitals

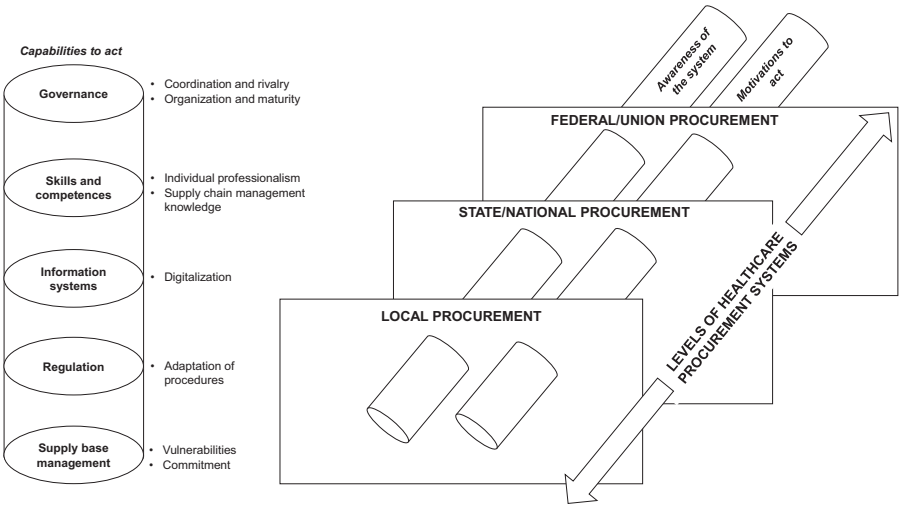

Figure 1.
The A-M-C view of healthcare procurement systems for emergency preparedness

against longstanding framework agreements) at different times, even within the same country. In the US, for example, due to the uncertainty related to the federal government support, States officially involved procurement in emergency operations in different weeks between February and March, with the latest ones facing the hardest time to increase order volumes and find alternative sources.

As governments activated emergency plans, especially in Europe, the UK and the US, there was a false sense of security of procurement organization maturity, leading to unrealistic expectations about state and local procurement systems' ability to navigate the crisis. This perspective started to change as procurement leaders soon became aware of the inadequacy and inappropriateness of emergency stockpiles of healthcare supplies at the federal/union level. In some countries, like Wales and Scotland, this lack of central support left some authorities on their own, revealing the inadequacy of procurement officers' supply chain knowledge. Others such as Australia, China and the Netherlands established central taskforces with buyers joining the system from different levels in the public administration hierarchy e.g. government ministries tried to source directly from suppliers, where usually this was left to procurement or healthcare providers. In some cases, significant events unrelated to the pandemic countered or distracted from pandemic-related pressures, for example elections (e.g. the US, Poland), Brexit (the UK), recovery from other disasters (e.g. Japan).

Those leading procurement and supply initiatives – ministers, government officials and procurement professionals – with initial high expectations of their ability to coordinate a response soon recognized the limitations of information available across the diverse, disconnected healthcare providers and suppliers in the healthcare system. For example, in several countries in Europe (e.g. Italy, Hungary, Portugal and Spain) and South America the lack of prior investment in e-procurement and digital systems (especially at the local level) meant tenders could not be opened, ordering was slowed, and there was no visibility of inventory data.

While previously public procurement organizations paid little attention to suppliers beyond the first tier, they and key government stakeholders became aware of the "extended supply chain". Especially in those countries that lacked central leadership in coordinating the response, volunteers, donors and local manufacturers repurposing their factories to make critical supplies bombarded hospitals, procurement organizations and governments with unsolicited offers to help. This help was a crucial resource for some humanitarian-aid

organizations that could not keep up with demand from less-developed countries. Unfortunately, in several countries (especially those under the EU Directives) it was difficult or impossible to receive and accept these offers, due to the need to be compliant with procurement regulations – which also raised awareness of, and frustration at, the lack of flexibility of procedures during emergencies. Increasing awareness of the severity of shortages and constraints on addressing them fueled extreme buyer rivalry and competition to secure goods from local suppliers. Awareness of the rivalry problem, in turn, drove more rivalry. For example, this was a severe issue in the US, where very few States sought to cooperate rather than compete, and some stole each other's' supplies.

4.2 Procurement practitioners' motivations to (re)act

As key actors came to understand the severity of the pandemic and the growing rivalry for scarce resources, national and local procurement organizations were motivated to increase orders and secure supplies, often at any cost and acting independently. Intra-country rivalry was exacerbated in countries with complex procurement systems with autonomous decision-making units at multiple levels (e.g. the US, Canada and the UK). With the supply system breaking down, federal and state governments started stockpiling where possible and preventing critical supplies from being exported legitimately to fulfill orders from other countries; piracy and hijacking exacerbated supply uncertainty. The urgency also motivated governments to relax some procurement regulations wherever possible; this generated flexibility but also "ingenuity", which motivated concerns about a potential increase in corruption, fake products, predatory suppliers and supplies being procured that were not fit for purpose.

In addition to motivating direct interventions to acquire materials, growing awareness of supply problems also inspired efforts to build capacity and capability in the short-term. In some cases, governments established new organizations to lead procurement (e.g. the Netherlands), and elsewhere governments boosted the legitimacy and authority of existing organizations and procurement organizations. In countries such as China, the Netherlands, Poland, Romania, Scotland and Wales, local procurement organizations were motivated to design and operate effective communication channels with other local procurement organizations, government departments and healthcare providers that previously had not been considered necessary. Knee-jerk reactions were evident as some impatient government leaders (e.g. in US, Canada and Russia) rapidly appointed management consultants and logistics experts to centralize and coordinate communication and action. These interventions, in turn, motivated extraordinary procurement practices and decisions.

Procurement leaders urgently needed to map key supply chains and markets and several public organizations in Australia, Europe and South America sourced massive volumes of critical medical supplies directly from international suppliers for the first time. These efforts, often supported by executives with international commercial experience, were successful. However, in other cases, primarily due to a lack of supply chain competencies, procurement organizations ended up buying critical supplies at any price and suffered from price gouging, receipt of fake and/or poor-quality products and lack of attention to local technical specifications and standards.

4.3 Capabilities to cope in a pandemic

Here we present the capabilities highlighted by the interviewees as being important for managing the procurement and supply of critical materials in a pandemic. In the sense used in the AMC framework, capabilities refer to organizational competencies, capacity and resources. It includes skills and competencies as one form of resource. As with awareness and motivation, the evidence for capabilities falls in the five themes: governance, skills and competencies, information systems, regulations and procedures and supply base management. Table 1 summarizes the findings, listing practices that the capabilities

		Capability areas to be developed and sustained to
Governance	Coordination and rivalry	• Coordinate/collaborate across procurement organizations, despite complex organizational structures • Pursue both early emergency procurement of critical supplies and collaborative procurement simultaneously
	Organization and maturity	• Exercise authority and lead the emergency response, grounded in the enhanced status of procurement • Put in place effective methods and levels of communication to cope with the volume, complexity and dynamics of the crisis • Build more agile and responsive organizations, able to move to online working at short notice and sustain parallel work on day-to-day procurement not related to the emergency
Skills and competence	Individual professionalism	• Evaluate new products and vet new suppliers rapidly and effectively to deal with high volumes of unsolicited offers to supply (e.g. donations)
	Individual supply chain management	• Invest in SCM, inventory and distribution management capability in procurement • Scout globally to speed up sourcing from new international suppliers
Information systems	Digitalization	• Act quickly by increasing visibility and transparency • Develop new e-procurement systems to support global scouting • Collate and exchange information quickly across the fragmented information systems • Generate and analyze common data on supply base, technical quality specifications and standards
Regulation and procedures	Adaptation	• Streamline emergency regulations and procedures that allow speed and flexibility to be balanced with integrity and fairness • Support local suppliers to stabilize local economies during emergencies and immediately after • Favor capacity development in local supply markets through adaptation of regulations • Facilitate addressing issues related to supply market capacity, risk and security in existing procedures
Supply base management	Vulnerabilities	• Map supply networks/chains, across multiple tiers and globally for better risk management • Reduce overreliance on single country supply • Build resilience through increased market capacity closer to home in national, regional and local contracting authorities
	Commitment	• Develop effective relationship and network management across suppliers • Deploy project management is needed to enable suppliers to develop capacity over time • Use of trusted intermediaries to establish and manage supplier collaborations effectively (especially internationally)

Table 1.
Key capability areas to be developed by healthcare procurement systems

enable. These synthesize the most important strengths and critical gaps mentioned during the interviews.

These capabilities are proposed as a checklist for consideration, not a recommendation that they are needed across all levels of all healthcare procurement systems. Some measures would

have much more impact in some settings than others. For example, in the US, where the national stockpile strategy was ineffective, opening doors for an uncontrolled rivalry between states due to a decentralized procurement authority, the development of capabilities in the governance area will be strategic. Conversely, in countries such as China, the Netherlands and Australia, where a more central coordination approach was adopted, the focus should be on developing skills and competencies and adapting regulation and procedures. Or again, in European nations such as Italy, Spain, Portugal, Hungary and Poland, that lag behind in the status of the digitalization infrastructure (also because of more decentralized healthcare procurement systems), more investments and capabilities development will be needed in this area.

5. The value of A-M-C in developing and sustaining preparedness of healthcare procurement systems

5.1 Key insights from applying AMC

While the themes identified through the initial round of coding had good descriptive power, in isolation, they did not provide a solid framing to explain performance (failures) in the extraordinarily complex and dynamic context of the early stages of the pandemic. In particular, it was necessary to address rivalry – the factors behind its rapid escalation and mechanisms that might reduce or contain it – which led to the AMC framework. Its use in analyzing our data leads to several observations.

The ubiquitous use of "unprecedented" when talking of the pandemic demonstrates that for all procurement and non-procurement professionals "*there is no business-as-usual during an emergency*". "Every-day", normal views of the procurement system no longer held in the pandemic. One aspect of awareness is the recognition of the emergency itself, and that extraordinary measures were called for. However, at a deeper level, procurement organizations needed to reframe their priorities, norms, standards, etc. fundamentally. Notions of what is efficient, effective, ethical were all challenged and often re-shaped. Furthermore, given the dynamism and uncertainty of the situation, they had to find ways of constantly updating and rethinking their understanding of the situation in support of local, short-term decision-making.

Regarding motivation, our analysis highlights a distinction between "*motivation to act within the crisis versus motivation to improve future preparedness*". Within the crisis, developing awareness of the situation motivated actions related to specific deals, rival buyers, suppliers, etc. On the other hand, it also motivated actions to address capability deficiencies, such as bringing in external experts, implementing new organizational structures and decision-making and communication processes. Communication channels and coordinating inventory data, for example, were explicitly aimed at reducing awareness gaps – reducing uncertainty by enhancing the quality and timeliness of intelligence. Experiences within the crisis also provide the motivation for longer-term developments, to strengthen capabilities, improve intelligence and align incentives.

The interview data show how procurement leaders and front-line personnel faced a series of competing pressures. Performance effectiveness in times of crisis is not simply a function of higher levels of capability. "*Capabilities must be deployed to creatively, flexibly and pragmatically address a series of tensions that are inherent to the crisis setting*". These tensions include, for example:

(1) Procurement professionals within and between levels in the system need to be prepared for inter-buyer rivalry while also aiming to derive greater net benefits through cooperation.

(2) Just as the reliability of the supply system fails, procurement professionals must rapidly find and put their trust in new suppliers and agents.

(3) Regulations need to be eased to facilitate more agile decision-making by the best/trusted personnel, while simultaneously managing the increased risk of malfeasance on the buyer side.

(4) Similarly, agile decision-making depends on more risk-taking and trust in suppliers, while simultaneously managing the increased risk of predatory behavior by suppliers.

These tensions are played out within the crisis. Looking at capabilities and future preparedness, two paradoxes are particularly noteworthy. First, as widely noted in the media and policy development documents (such as in a recent White House report [3]), addressing supply market capacity risk will require greater market intelligence and new capacity closer to home, but this would have to be based on shifting priorities from cost-focused efficiency to valuing supply security.

Digitalization capability presents a second paradox. Those procurement systems operating with centralization of data (if not contracting) fared much better than those without. However, it does not necessarily follow that there will be greater motivation to digitalize as part of preparedness for future crises, since digitalization also reduces opportunities for corruption by leaders within the system.

5.2 Moving forward – opportunities for research and practice

In summary, healthcare procurement systems have been in the global spotlight throughout the COVID-19 crisis, highlighting the need for better coordination in procurement and supply for fairer, better future public health outcomes. Locally, nationally, internationally and globally, preparedness for emergencies should incorporate far more planning of procurement, supply market capacity management and collaboration between contracting authorities. Internationally, trading blocs such as the European Union are communicating and attempting to manage supply flows to their members. This study and many others show how vital it is to gain greater visibility of supply chains and supply market capacities. Within procurement systems and their constituent organizations, increased awareness, motivation and capability are required, particularly relating to governance, knowledge and skills, information systems, regulations and procedures and supply base issues, all of which emerged as the source of critical failings to cope with the pandemic. Awareness of past inadequacies may apparently motivate change, but inertia in the procurement system is considerable, as indicated in the many aspects of capability summarized in Table 1.

Performance cannot be explained in terms of capability alone. As Chen and Miller (2014) found in the context of commercial firms competing in a market, performance also depends on actors' awareness of the competitive arena and others' moves within it and their motivation to act. The integration of the A-M-C constructs is critical for understanding the relevance and deployment of capabilities in the crisis. Their combination with the descriptive themes allows a more holistic, nuanced understanding of the procurement system in a state of extreme flux.

These areas suggest directions to orient future public and private procurement research. Coping in global crises has not featured substantially in SCM research till very recently. The application of A-M-C is relevant to researching supply in other crises where supply market capacity and rivalry for scarce resources are important features of global procurement and supply systems. As Craighead *et al.* (2020) have argued, SCM research will benefit from reaching outside our existing theory toolkit. Here we show how AMC is one such theory that can help understand and tackle wicked supply problems such as those arising from the climate crisis, poverty and displaced communities. Future studies can then use this theoretical perspective as a basis to provide a predictive framework that can be used as a resource for public procurement leaders to prepare for future crises. Ultimately, focusing the attention on these capabilities should improve planning for and performance in future crises.

Notes

1. See https://www.murphy.senate.gov/newsroom/in-the-news/no-national-response-one-senators-alarming-account-of-the-first-days.

2. See https://www.gov.uk/government/publications/uk-pandemic-preparedness/annex-a-about-exercise-cygnus.
3. See https://www.whitehouse.gov/wp-content/uploads/2021/06/100-day-supply-chain-review-report.pdf.

References

Atkinson, C.L., McCue, C., Prier, E. and Atkinson, A.M. (2020), "Supply chain manipulation, misrepresentation, and magical thinking during the COVID-19 pandemic", *The American Review of Public Administration*, Vol. 50 Nos 6-7, pp. 628-634.

Calnan, M., Gadsby, E.W., Kondé, M.K., Diallo, A. and Rossman, J.S. (2017), "The response to and impact of the Ebola epidemic: towards an agenda for interdisciplinary research", *International Journal of Health Policy and Management*, Vol. 7 No. 5, pp. 402-411.

Checkland, P. (1999), *Systems Thinking. Rethinking Management Information Systems*, Oxford University Press, New York.

Chen, M.-J. (1996), "Competitor analysis and interfirm rivalry: toward a theoretical integration", *Academy of Management Review*, Vol. 21 No. 1, pp. 100-134.

Chen, M.J. (2014), "Presidential address – becoming ambicultural: a personal quest, and aspiration for organizations", *Academy of Management Review*, Vol. 39 No. 2, pp. 119-137.

Chen, M.J. and Miller, D. (2012), "Competitive dynamics: themes, trends, and a prospective research platform", *Academy of Management Annals*, Vol. 6 No. 1, pp. 135-210.

Choi, T.Y., Dooley, K.J. and Rungtusanatham, M. (2001), "Supply networks and complex adaptive systems: control versus emergence", *Journal of Operations Management*, Vol. 19 No. 3, pp. 351-366.

Corbin, J.M. and Strauss, A. (1990), "Grounded theory research: procedures, canons, and evaluative criteria", *Qualitative Sociology*, Vol. 13 No. 1, pp. 3-21.

Craighead, C.W., Ketchen, D.J., Jr and Darby, J.L. (2020), "Pandemics and supply chain management research: toward a theoretical toolbox", *Decision Sciences*, Vol. 51 No. 4, pp. 838-866.

Dai, T., Zaman, M.H., Padula, W.V. and Davidson, P.M. (2020), "Supply chain failures amid Covid-19 signal a new pillar for global health preparedness", *Journal of Clinical Nursing*, Vol. 30 Nos 1/2, pp. e1-e3, doi: 10.1111/jocn.15400.

Dasaklis, T.K., Pappis, C.P. and Rachaniotis, N.P. (2012), "Epidemics control and logistics operations: a review", *International Journal of Production Economics*, Vol. 139 No. 2, pp. 393-410.

Döringer, S. (2021), "'The problem-centred expert interview'. Combining qualitative interviewing approaches for investigating implicit expert knowledge", *International Journal of Social Research Methodology*, Vol. 24 No. 3, pp. 265-278.

European Commission (2021), *Expert Panel on Effective Ways of Investing in Health (EXPH), Opinion on Public Procurement in Healthcare Systems*, Publications Office of the European Union, Luxembourg, available at: https://ec.europa.eu/health/sites/default/files/expert_panel/docs/027_public_proc_healthcare_sys_en.pdf.

Handfield, R., Finkenstadt, D.J., Schneller, E.S., Godfrey, A.B. and Guinto, P. (2020), "A commons for a supply chain in the post-COVID-19 era: the case for a reformed strategic national stockpile", *The Milbank Quarterly*, Vol. 98 No. 4, pp. 1058-1090.

Harland, C. (2021), "Discontinuous wefts: weaving a more interconnected supply chain management tapestry", *Journal of Supply Chain Management*, Vol. 57 No. 1, pp. 27-40.

Ivanov, D. (2020), "Predicting the impacts of epidemic outbreaks on global supply chains: a simulation-based analysis on the coronavirus outbreak (COVID-19/SARS-CoV-2) case", *Transportation Research Part E: Logistics and Transportation Review*, Vol. 136, 101922.

Kamerow, D. (2020), "Covid-19: the crisis of personal protective equipment in the US", *BMJ*, Vol. 369, m1367.

Leite, H., Lindsay, C. and Kumar, M. (2021), "COVID-19 outbreak: implications on healthcare operations", *The TQM Journal*, Vol. 33 No. 1, pp. 247-256, doi: 10.1108/TQM-05-2020-0111.

McGuire, M. and Schneck, D. (2010), "What if Hurricane Katrina hit in 2020? The need for strategic management of disasters", *Public Administration Review*, Vol. 70, pp. s201-s207.

Patrucco, A.S. and Kähkönen, A.K. (2021), "Agility, adaptability, and alignment: new capabilities for PSM in a post-pandemic world", *Journal of Purchasing and Supply Management*, Vol. 27 No. 4, 100719.

Rakovska, M.A. and Velinova, S.V. (2018), "A taxonomy of healthcare supply chain management practices", *Supply Chain Forum: An International Journal*, Vol. 19 No. 1, pp. 4-24.

Scala, B. and Lindsay, C.F. (2021), "Supply chain resilience during pandemic disruption: evidence from healthcare", *Supply Chain Management*, Vol. 26 No. 6, pp. 672-688.

Van Hoek, R. (2020), "Research opportunities for a more resilient post-COVID-19 supply chain – closing the gap between research findings and industry practice", *International Journal of Operations and Production Management*, Vol. 40 No. 4, pp. 341-355.

Further reading

Finkenstadt, D.J. and Handfield, R. (2021), "Blurry vision: supply chain visibility for personal protective equipment during COVID-19", *Journal of Purchasing and Supply Management*, Vol. 27 No. 3, 100689.

About the authors

Christine Mary Harland PhD is Gianluca Spina Chair of Supply Strategy at the Politecnico di Milano, Italy. Her research interests are in the use of public procurement as a lever of government policy, procurement for healthcare, collaborative procurement and humanitarian supply chain management.

Louise Knight PhD is Chair of Public Sector and Healthcare Procurement at the University of Twente, the Netherlands. Her research adopts a systems perspective on the development of strategic procurement by public and non-profit organizations and networks. This includes capability and capacity building, supply market dynamics and scenario planning.

Andrea S. Patrucco, PhD, is an Assistant Professor of Supply Chain Management at Florida International University College of Business, US. His research interests are Supply Chain and Purchasing Management, focusing on performance management and organizational design in Public Procurement and orchestration of Buyer-Supplier Relationships. Andrea S. Patrucco is the corresponding author and can be contacted at: andreastefano.patrucco@gmail.com

Jane Lynch, PhD, is a Reader in Procurement for the Logistics and Operations Management (LOM) section, Cardiff Business School, Cardiff University. Her research themes include public procurement, social procurement and effective collaboration.

Jan Telgen PhD is an Emeritus Professor of Public Procurement and Applied Mathematics at the University of Twente, the Netherlands and managing director of the Public Procurement Research Centre PPRC, a social enterprise. His research interests are in policy implementation through public procurement and supplier selection methodologies.

Esmee Peters is a PhD candidate within Public Procurement and consultant and researcher for the Public Procurement Research Centre PPRC. Her research interests lie in innovation and policy implementation within public procurement.

Tünde Tátrai is a Professor at the Corvinus University of Budapest, Institute of Business Economics. Her research field is public procurement and e-public procurement.

Petra Ferk is an Assistant Professor for Public Administration at New University, Slovenia and a founder of the Institute for Public-Private Partnership. Her research interests are supplier selection methodologies, environmental LCC in procurement and e-procurement.