National Preparedness—Towards an Emergent System of Governance

NATIONAL PREPAREDNESS – TOWARD AN EMERGENT SYSTEM OF GOVERNANCE

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Introduction

Public governance refers to the mechanisms, processes, and institutions through which societies organise and govern themselves. It encompasses a variety of forms, ranging from traditional hierarchies to more decentralised and participatory models. The term *governance* is broad and has a neutral connotation, which means that if the term is to be used effectively in analytical discussions, it requires further specification. As Peters et al. (2022) note, incorporating descriptive adjectives is necessary to render the term more precise and relevant to specific contexts or frameworks. In recent decades, the concept of governance has become a focal point across a multitude of academic disciplines. As a result, a wealth of literature has emerged, diving into the many dimensions and implications of governance. Among the diverse types of governance discussed in the literature, several distinct models stand out: *network* governance (e.g., Pierre & Peters 2000) emphasises the decentralised nature of decision-making, relying on a web of interconnected actors and institutions; *participatory* governance (e.g., Grote & Gbikpi 2002) values the direct involvement of citizens in the decision-making process, promoting a democratic approach; *metagovernance* (Kooiman 2003) offers an overarching framework, focusing on the governance of governance itself, to ensure efficient coordination among different governance systems; *adaptive* governance (e.g., Folke et al. 2005) recognises the need for governance systems to be dynamic and responsive to changes in the environment; *anticipatory* governance (e.g., Quay 2010) stresses the importance of forward-looking policies and practices, aiming to prepare for future challenges proactively; *experimentalist* governance (e.g., Sabel & Zeitlin 2012) is built on the idea of continuous learning, with policies being treated as experiments that can be adjusted based on outcomes; *collaborative* governance (e.g., Emerson & Nabatchi 2015) encourages cooperative interactions among various stakeholders, emphasising shared decision-making and common goals; *robust* governance (Ansell et al. 2023) addresses the interdependence of stability and change.

While each of those governance types is rooted in sound theoretical foundations and offers unique advantages, the unpredictable and tumultuous nature of our times, marked by a myriad of intricate, interlinked, and lasting crises, calls for a 1econceptualization of governance. The traditional governance models are inadequate to address the complex challenges of global society. Torfing (2023) posits that societal developments, especially globalisation and digitalisation, ideational shifts from the new public management (NPM) ideology to public value, and major events like financial, climate, and health crises unravel the orthodoxy of public governance. Addressing those challenges necessitates a new *emergent system of governance* that can adapt to the rapidly changing world.

This article explores *the national preparedness system as a complex emergent system* that goes beyond mere knowledge of its constituent parts (for more on regional resilience, refer to the article by Barnes and Lonka in this book). The article reflects insights from complexity science (Cilliers 1998) and argues that emergent governance systems offer an effective and flexible way to respond to complex challenges. The article outlines the characteristics of an emergent system of governance, particularly in the context of a health crisis. It argues that an emergent system of governance has the potential to address the complexities arising from health crises.

The data informing this article were derived from interview responses, workshop discussions, and a Delphi expert panel. The data were gathered as part of two multidisciplinary academic research projects (IRWIN and WELGO) conducted in Finland. The IRWIN project studied governance systems, citizen participation, and information resilience as a facet of national preparedness. In contrast, the WELGO project formulates sustainable strategies for welfare during health crises, drawing insights from the management of the COVID-19 pandemic.

National preparedness in a complex world

In a volatile, uncertain, complex, and ambiguous world (Bennet & Lemoine 2014), government organisations and officials must increasingly confront the distrust and cynicism of their constituents (Sanghee 2018). Simultaneously, the demand for more resilient, effective, and accountable public action is on the rise (Boin & Lodge 2016). This understanding is particularly significant when considering national preparedness. The degradation of trust in governmental institutions can undermine the very foundation of national preparedness initiatives, as public cooperation and support are critical to their effective implementation (Toshkov et al. 2022). Constituents who are sceptical or distrustful may be less likely to adhere to the official protocols or engage in preparedness activities.

The strategic objective of national preparedness is to maintain the continuity of societal activities and critical infrastructure. Strengthening national preparedness extends beyond mere crisis management; it is intricately linked with broader societal pillars like democracy, the rule of law, and fundamental human rights and freedoms. It consists of the skills and knowledge developed by governments, organisations, communities, and individuals to proactively identify, address, and rebound from impending or active disasters. (UNDRR 2023.)

For governments, preparedness may involve formulating policies, conducting drills, or establishing emergency response teams. They might allocate budgets for disaster mitigation, create evacuation plans, or develop early warning systems to alert citizens to possible threats (McEntire & Myers 2004). Businesses and NGOs can play their part by ensuring they

have contingency plans in place. Such plans might involve training employees, securing data backups, or having crisis communication strategies in place. Communities, often at the forefront of many disasters, equip themselves by fostering a culture of readiness (Satizábal et al. 2022), which can manifest as community-wide drills, local resource-sharing agreements, or education campaigns to raise awareness of potential risks and appropriate responses. In addition, citizens play a crucial role in preparedness. Individuals contribute to a larger, collective state of readiness by being informed of potential risks, maintaining personal emergency kits, formulating family evacuation plans, or learning basic first aid (Houston et al. 2019). In essence, preparedness is a collective effort, aiming not only to predict potential disasters but also to ensure that when they strike, the impact is minimised and recovery can happen efficiently.

The aforementioned definition of preparedness could be characterised as adopting a reductionist viewpoint, since it divides preparedness into separate functions and obligations assigned to different entities (governments, organisations, communities, and individuals). While the outlined roles are crucial, this characterisation overlooks something important: the emergent and dynamic nature of preparedness. This article posits that preparedness is not just a sum of its parts but involves complex interactions and adaptability among these entities. A comprehensive perspective would consider the interplay, feedback loops, and adaptive capacities inherent in a truly resilient preparedness system. Drawing on Olsen et al. (2020), we suggest that national preparedness requires a multidisciplinary approach, such as *complexity and systems thinking*.

Complexity thinking: Understanding system interactions and co-evolution

Complexity thinking offers a holistic approach to understanding the world. It recognises the interconnectedness of phenomena, challenging traditional mechanistic views which regard development as linear sequences of causes and effects. Rather than merely breaking things down into components, complexity thinking suggests that the entirety of a system can be different – either qualitatively more or less – than the sum of its parts.

Complexity thinking encompasses various approaches with different emphases, but all share the aim of understanding the development formed by intertwined phenomena, events, and actors. Complexity thinking is not a unified theory but rather a combination of several interdisciplinary theoretical frameworks and directions (Byrne 1998; Mitleton-Kelly 2003). Although the academic community addressing complexity thinking is still in a developmental phase (Gerrits & Marks 2015; Eppel & Rhodes 2018), three schools can be distinguished: neo-reductionism, metaphorical, and critical pluralistic schools (Richardson 2008). The *neo-reductionist school* (also called hard or modelling complexity science) seeks to identify and model the natural law-like principles affecting socioeconomic systems, such as the operation of organisations. The *metaphorical school* represents the soft, figurative line of complexity

thinking. Here, concepts offered by complexity thinking are used metaphorically to stimulate thought. The purpose is not modelling things but seeing them through different lenses. The *critical pluralistic school* is positioned between hard and soft complexity thinking. It rejects the idea of modelling complexity inherent in the neo-reductionist approach. Representatives of the school also distance themselves from the somewhat carefree use of complexity concepts to describe almost any phenomenon typical of the metaphorical school. This article reflects the approach of the critical pluralistic school, which is less interested in phenomena that can be explained than phenomena that cannot.

Complexity thinking acknowledges that many real-world phenomena can be modelled and predicted to an extent but also that there are inherent uncertainties. It is anchored in a realist philosophy of science, which sees the world as made up of layered elements, as exemplified by Karl Popper's (1978) three worlds: physical reality, human consciousness, and cultural entities. Complexity thinking, especially from the critical pluralistic perspective, aligns most closely with realism: It acknowledges that much can be understood, but not everything.

The popularity of complexity thinking has surged, yet distinguishing it from other theoretical frameworks can be challenging. For instance, the theories of Pierre Bourdieu and Anthony Giddens have similarities with complexity research in addressing system self-organisation, non-linear cause-and-effect relationships, and system component interconnectedness. Using theories across different scientific fields is both practical and often necessary, especially when existing paradigms are inadequate (Whetten et al. 2009). Applying complexity thinking to public governance research exemplifies such cross-disciplinary theory borrowing. This appropriation an be vertical when a theory is applied at a different level of abstraction, or horizontal when one is used in a new context. In the governance research realm, complexity thinking, the key conceptual applications reflect both types of borrowing.

In scholarly literature (Kiel 1989; Stacey 1993; Arthur 1994; Kauffman 1995; Holland 1995, 1998; Cilliers 1998; Byrne 1998; Allen 2001; Mitleton-Kelly 2003), the following characteristics are commonly associated with complexity.

Table 1. The elements of complexity in the context of national preparedness.

Concept	Definition	Illustrative examples in the context of national preparedness
Emergence	Emergence refers to the arising of new, unexpected structures, patterns, or processes within a complex system. The properties and behaviours of the emergent whole cannot be fully predicted solely from knowledge of its parts. While it may seem as though things happen spontaneously or without a clear cause, this is not to suggest there's no underlying mechanism or reason. Instead, it means that the intricacies of the interactions between parts	Predicting crises, risks, or shocks in the external environment with precision is inherently challenging. Even with comprehensive historical data and deep knowledge of individual behaviours, accurate forecasts remain elusive. The root of this challenge lies in the nature of complex systems. They are often characterised by numerous non-linear

	can lead to unexpected outcomes. The emergent entity possesses unique attributes that don't exist in the parts individually. Moreover, through a process called downward causation, the emergent entity can exert influence or impose constraints on its components.	feedback loops, where the output or effect isn't directly proportional to the input or cause. When new interactions emerge, or behaviours change within the system, these feedback loops can amplify, diminish, or otherwise modify effects in unpredictable ways. That introduces a high degree of uncertainty, making the system's future state and its reactions to potential disturbances difficult to anticipate with certainty.
Self-organising	Self-organisation is a more or less spontaneous process that occurs without externally applied coercion or control. It transpires when systems exchange information, take actions, and continuously adapt to others' actions rather than being directed by an overarching plan from a central authority. Instead of central planning or management, constant re-organisation takes place to adapt to and find the best fit with the environment.	National security operates within a web of decision-making that spans multiple levels. While some elements can be directly influenced, full control over crisis prevention or preparedness remains elusive. Decisions are made at both the political level and by individual citizens, communities, firms, and local and central government. Additionally, international considerations further complicate the landscape. This decentralised approach makes it challenging to maintain a uniform stance or predictability in crisis management.
Diversity	Diversity is the state or quality of having varied identities, experiences, and perspectives. It serves as a vital source for unpredictable self-organisation and the emergence of novelty. Without diversity, no distinction truly matters.	The national security system encompasses a diverse array of agents, from households and businesses to government entities, NGOs, and regulators. Their interactions are dynamic and interdependent. For example, businesses might collaborate with governments on security supply initiatives, while the media influences public perceptions and is, in turn, shaped by opinion leaders. This network of interactions underscores the interconnected nature of our national security preparedness.
Connectivity, interdependency and co-evolution	Most systems exist within larger systems, and many comprise smaller subsystems. The manner in which agents within a system connect and relate to one another is vital for the system's survival. From these connections, patterns emerge, and feedback is disseminated. At times, the relationships between the agents can be more significant than the agents themselves. Every system exists within its own environment while also part of that environment. As the environment changes, the system must adapt. However, since the system itself is a component of its environment, any change to it affects the environment, thus creating a continuous cycle of adaptation and change. In essence, communities where work transpires are not static; they are in a perpetual state of evolution.	The national security system comprises regulations, strategies, technologies, institutions, business tactics, values, and user practices, all of which co-evolve together. Agents within each sector adapt to the ever-changing environment. For instance, shifts in social media behaviour might necessitate new regulations, while introducing new regulations can, in turn, influence social media behaviour.

Non-linearity and feedback processes	Non-linearity implies that the behaviour of a system may not be directly proportional to its initial conditions or inputs. Thus, non-linear systems can exhibit disproportionality between causes and effects – for example, small causes can lead to large results and vice versa. Feedback plays a significant role in shaping a system's behaviour. Positive feedback amplifies or reinforces a system's response (stimulating), whereas negative feedback tends to stabilise or counteract it (balancing). It's important to note that 'positive' in this context does not mean 'good,' just as 'negative' does not mean 'bad'. Feedback processes often involve a circular dependency, where the outcome of one situation influences the initial conditions of the next. In other words, past events are integrated into and influence future ones.	Agents interact within physical and social networks, sharing information and learning from one another, guided by social norms and institutional rules. These interactions evolve based on dynamic rules that emerge as new objects, policies, and other factors become available. The national security system exhibits non-linear increasing returns due to positive feedback, but it's also balanced by stabilising mechanisms or negative feedback.
Dissipative structures & the edge of chaos	Sometimes, a system may undergo a significant transformation, akin to a phase transition, leading it into a new state influenced by different attractors. The term dissipative structures relates to systems that are far from equilibrium, exhibiting broken symmetries and multiple potential pathways. Complex systems are often driven to the edge of chaos, existing in a state that's neither entirely orderly nor chaotic. The term bifurcation, suggesting a division into two, can be somewhat misleading in this context. In reality, when a system reaches a bifurcation point, it may have a multitude of possible pathways, forming a space of possibilities.	Unexpected events, whether manufactured or natural, can dramatically alter a system's structure, command dynamics, power relationships, interdependencies, and established practices, often without any forewarning or preparation. Such events thrust into focus the resilience and fault tolerance of systems. Concurrently, they can challenge and bring to the forefront issues related to citizens' fundamental rights, such as the freedom of movement and the freedom of assembly. Even when the immediate crisis subsides, the system is unlikely to revert entirely to its original state. A different new normal emerges.
Attractor(s), Simple rules & Path dependency	The patterns that emerge in complex systems can be incredibly varied. Much like a kaleidoscope can produce countless patterns with simple rules, the behaviour of a complex system, despite its apparent randomness or chaos, follows underlying principles. While the non-linearity of a complex system is vast, it is not unlimited – it is constrained by attractors. An attractor is an organising principle guiding a system's behaviour and pulling it towards certain patterns. When a system's behaviour deviates due to some disturbance, it will eventually return to a pattern consistent with its attractor. Because of these attractors, each system displays its unique behaviours, undergoes specific developmental phases, and has its own cognitive patterns, emotional challenges, and attitudes.	Interactions between the agents within a system play a pivotal role in determining its structure and function. However, these interactions are not unfettered but bounded by factors such as regulation, infrastructure, and technological capabilities. Societies often find themselves anchored or locked in to certain aspects of national preparedness due to decisions made in the past. This historical path dependency implies that even if newer risk mitigation methods or preparedness practices present clear advantages, they may not be embraced if they are incompatible with the existing system or its entrenched processes.

The understanding of system dynamics is greatly enhanced by the inclusion of an intervention and change process, which emphasises the importance of being sensitive to crucial factors such as actors' values, interests, choices, and inter-linkages and interdependencies (Uusikylä 2019). The field of national preparedness is characterised by its dynamic nature, featuring fluctuations rather than remaining static. No system remains

indefinitely in a condition of simplicity and stasis, nor does it function in a state of continuous complexity or chaos. Even a slight alteration to the dynamics of a system can have significant consequences for the entirety of the system. In the context of systems linguistics, that phenomenon is commonly known as bifurcation (Mitleton-Kelly 2003, 36). Bifurcation arises when a slight and continuous modification is applied to the parameter values, known as bifurcation parameters, of a system. The result will be an abrupt qualitative or topological alteration of the system's behaviour. A shift in power dynamics or the departure of a significant actor within the national security system can trigger substantial alterations within the transition network. On the contrary, homeostasis refers to the inherent characteristic of a system wherein a specific variable is actively controlled to maintain a state of near constancy.

The presence of a highly controlled environment and the strong influence of powerful institutions typically stabilise the national preparation system. Typically, a system demonstrates both the ability to sustain its viability and the flexibility to adapt and develop. The diversity among the agents allows the system to reorganise its internal structure without requiring the assistance of external agents. The system's open nature means its behaviour depends on interactions. This means that understanding the system is impossible by examining its elements alone; it requires an analysis of'the interactions. Grasping the depth and breadth of these interactions is essential, as they play a pivotal role in determining the behaviour and evolution of these systems over time. Navigating these complex systems necessitates a nuanced understanding, especially in domains of critical importance such as national preparedness.

National preparedness and health crisis – A complexity-informed approach

Complexity thinking offers a nuanced perspective on national preparedness, revealing both challenges and potential solutions. In the following section, we explore the system of governance emerging during *health crises* by considering the previously mentioned characteristics of complexity (see Omand's analysis of the 'nature of crisis' in this book). We propose that i) a shift from emphasising predictability to prioritising adaptability, ii) the significance of decentralisation and empowerment, iii) achieving a balance between retrospective and prospective views, iv) promoting diversity through collaborative endeavours, and v) the fundamental nature of co-evolutionary preparedness together define the intricacies of emergent governance in health crises. The widespread disruption caused by the COVID-19 pandemic glaringly exposed many weaknesses within conventional public administration and governance systems (Ansell et al. 2021). This article recognises these challenges and contends that pivotal moments of a health crisis provide an invaluable opportunity to reimagine and emphasise emergent governance structures: structures

inherently designed to adeptly handle the diverse and unpredictable challenges presented by an ever-evolving global landscape.

From predictability to adaptability

Preparedness models traditionally rely on predictability and assume that the future will mirror past and present patterns. They also aim to ensure that responses can be measured, calculated, and deployed efficiently. However, such models face challenges stemming from the phenomenon of path dependency, suggesting that deviations become more difficult over time once a specific trajectory has been chosen (e.g. Arthur 1989). As a result, these models may struggle to adapt to unforeseen events. In the healthcare realm, such as rapid and widespread outbreaks of diseases or sudden, unexpected strains on healthcare infrastructure, can emerge from seemingly innocuous triggers (e.g., Sharma et al. 2021). For example, a minor oversight in healthcare protocols or a previously unidentified pathogen can escalate into a global health crisis. Such unpredictability, intensified by non-linear dynamics, poses grave risks, potentially destabilising not just the health sector but the very fabric of societal stability (Hwang & Höllerer 2020).

Emergent and non-linear dynamics necessitate a departure from rigid response mechanisms to adopt more fluid strategies. The concept of the adaptive systems framework (Koliba 2018) is central to that transition. An adaptive framework acknowledges the fluidity of emergent phenomena and the inherent unpredictability of non-linear systems. Effectively implementing adaptive frameworks requires societies to prioritise near real-time modifiability and a dynamic process of continuous learning and adjustment (Staber & Sydow 2002). For example, during the COVID-19 pandemic, the process required continuous monitoring of systems and events to permit instant adjustments based on current data (Ferretti et al. 2020). Such a dynamic approach recognises that what worked yesterday might not be optimal today or viable tomorrow.

Furthermore, response strategies must be periodically assessed to ensure that actions align with the evolving circumstances and account for new data, insights, and unforeseen challenges (Forman et al. 2022). Those assessments evaluate outcomes and methods, ensuring the processes themselves are robust and adaptable. In addition, learning from each event is crucial, whether the event was successful or not. A system that continually learns (and also unlearns, Klein 1989) and adjusts based on feedback is more resilient in the face of unpredictability (Duchek 2020). Post-action reviews should become standard practice, ensuring insights are captured and integrated into future response strategies. Harnessing the power of data analytics is another important element. Advanced data analysis, leveraging machine learning and artificial intelligence, can provide predictive insights, detect patterns in large datasets, and offer actionable recommendations (Davenport 2018). This data-driven decision-making helps anticipate threats, even within non-linear dynamics.

Lastly, flexible response strategies built on the premise of adaptability ensure that societies are equipped with both the tools and a mindset to address the inherent uncertainty of emergent phenomena. Heino et al. (2022) suggested that imagination can improve preparedness by tailoring complexity and unpredictability to fit the preparedness apparatus. By fostering a culture of agility, adaptability, and continuous learning, societies can transform the challenges of emergent and non-linear dynamics into opportunities for resilience and advancement.

Decentralisation and empowerment

Centralised decision-making processes can be cumbersome and often struggle to address the intricacies of a rapidly unfolding scenario (Janssen & van der Voort 2020). Specialised institutions frequently lack awareness of the operations of other agencies, and this reciprocal lack of knowledge can result in service deficiencies, policy shortcomings, and planning failures (Torfing 2023). During the COVID-19 pandemic, a centralised approach resulted in delayed responses due to the time required to process information, decide on a strategy, and relay that strategy to the affected regions. Moreover, selecting an overarching one-size-fits-all strategy centrally without considering individual regions' unique circumstances and needs is likely to produce suboptimal outcomes (Capano & Lippi 2021). The challenge is that certain regions may find themselves grappling with strategies that are either too stringent or too lenient for their specific circumstances. Such a top-down approach can lead to significant inefficiencies, with some areas being underprepared without adequate resources and others being burdened with ill-fitting measures that might not address the unique epidemiological or socioeconomic realities on the ground.

The multifaceted challenges make the shift towards decentralisation and empowerment paramount. Given the inherent diversity in regional susceptibilities, transmission dynamics, and healthcare capacities, it is vital to recalibrate the approach from strictly centralised to one that values and integrates regional expertise (Capano & Lippi 2021). While there is continuous debate about the pros and cons of decentralisation versus centralisation (e.g., Saltman 2008), decentralisation, defined as the distribution of decision-making authority away from a central body, allows local entities greater control over their affairs. In a health crisis, such a system allows local and regional entities to craft responses tailored to their unique epidemiological landscape and socioeconomic conditions (Desmidt & Meyfoordt 2023). Drawing on Cairney (2020, 106) the question is not *without* of a central authority, but "*despite* a centre or despite attempts by central government to control outcomes". For instance, when a surge in infections affects a specific region, it would possess the flexibility to allocate resources, enact stricter measures, or even mobilise local communities without waiting for directives from a central authority. Such autonomy reduces administrative delays (Kauffman et al. 2019) and promotes a more.

Empowerment complements decentralisation by providing local communities with the tools, resources, and agency to address challenges proactively (Sellers & Lidström 2007, for more on *collective* agency, refer to Kallunki's article in this book). When local health authorities, community leaders, and frontline workers are empowered, they transition from mere passive recipients of national directives to become active players in designing and implementing solutions. Their knowledge of community structures, traditions, and concerns enables them to drive context-specific interventions (Trickett 2009). For instance, they can ensure that public health messages are culturally relevant, that testing centres are accessible, and that vulnerable populations are adequately catered for. Fostering grassroots initiatives is crucial. Those initiatives often arise within the community and can leverage local insights, traditions, and trust networks to drive health campaigns, dispel myths, and encourage adherence to health guidelines (David et al. 1993; for more on 'network analysis', refer to the article by Johanson et al. in this book).

However, that is not to suggest we should abandon national frameworks and central policies. Rather, the decentralised actions should operate within the contours of broader national strategies and standards. To illustrate, while a region might decide on its testing protocols or quarantine measures, they should be aligned with national standards to ensure consistency, quality, and interoperability across regions (Hick et al. 2020). Their strength lies in their ground-level reach and ability to connect with individuals on a deeply personal level.

The balance between retrospection and prospection

New challenges can reveal approaches and paradigms that were once effective to be outdated or even counterproductive. Retaining outdated practices can jeopardise a society's current and future success (Beck 1997) – something often starkly revealed by health crises. While prior experience is crucial (de Graaf et al. 2021), a society that leans too heavily on its past disease control strategies might find itself woefully ill-equipped to tackle the nuances and rapid spread of viruses (Wayne et al. 2013). However, while no two crises are the same, each provides valuable insights for future challenges. By overlooking or underestimating the significance of historical moments and socio-political landscapes, a society might nurture strategies that are increasingly uncoordinated both with its present needs and the global health landscape. For example, Singer et al. (2020) identified how politics and media influenced the response to Ebola and Zika virus outbreaks in the USA, with public opinion initially elucidated before converging into a bipartisan perspective on Zika. Public health officials failed to recognise the impact of elite cueing on policy and how politics can skew the public perception of disease risk.

It is necessary to balance retrospective and prospective reflection to develop robust preparedness strategies for health crises (Ansell et al. 2021). The approach emphasises the

integration of historical analyses into contemporary planning, ensuring that societies not only bounce back from their challenges but also bounce forward by learning from the past (e.g., Hynes et al. 2020; Rajala & Jalonen 2022). It is essential to recognise that past health interventions, strategies, and campaigns can serve as invaluable blueprints. Lessons learned from previous victories over diseases can offer insights into effective public health communication, community mobilisation techniques, and even vaccine distribution strategies (Thébaud-Mony 2020).

While acknowledging success narratives, it is crucial to be aware of historical pitfalls. Research has established that every health crisis, regardless of its management efficacy, inevitably involves oversights, delays, or misjudgement (Cooper 1981). Analysing those instances facilitates identifying potential weaknesses in the current health infrastructure (Carney & Weber 2015). For instance, if bureaucratic barriers or communication breakdowns delayed the response to an epidemic in the past, important lessons prompting the overhaul of contemporary emergency response protocols can be drawn. Indeed, comprehensive evaluations of events such as the COVID-19 pandemic, undertaken by numerous countries and various agencies, emphasise the continual need to refine and enhance our response mechanisms (OECD 2022).

Furthermore, societies embracing the balance of historical and prospective reflection can better contextualise the socio-cultural and political underpinnings of past health decisions. Understanding the co-evolution of policymaking and its dynamic socio-cultural environment highlights how decisions and societal contexts have mutually influenced each other (Ike et al. 2020). Such insights could guide targeted interventions in the present, ensuring that strategies are effective, culturally sensitive, and inclusive.

Diversity through collaboration

Collaboration among diverse actors, including health organisations, research institutions, and government bodies, strengthens a nation's capacity to mount an effective response to health crises (Kim et al. 2022). At its best, collaboration harnesses expertise, resources, and perspectives, potentially enabling pluricentric coordination. Torfing (2023) defines pluricentric coordination as multiple centres of decision-making that, while formally independent, are functionally interdependent. However, intricate interconnections and dependencies can be a double-edged sword. For instance, when a research institution identifies a new contagious disease variant, failure to effectively communicate the information or harmonise subsequent actions across a healthcare ecosystem can create significant disruption. This may lead to an infodemic, characterised by the spread of false information and unsourced health recommendations through various digital media platforms (Mheidly & Fares 2020). Hospitals might find themselves unprepared for a sudden influx of patients, or public health messaging can be inconsistent, leading to public confusion

and panic. Moreover, related sectors, like transportation, or education, can also be impacted. A decision in the transportation sector to limit travel could impact the availability of medical supplies.

In contrast, a decision in the educational sector regarding school closures can reverberate into workforce availability if parents must stay home. An initiative or decision made with the best intentions in one corner of the health sector can send unpredictable ripples throughout the entire system. Research has identified learning loss due to the closure of schools (Engzell et al. 2021), and loneliness and worsened mental health outcomes experienced by people because of lockdowns (Allen et al. 2022). These ripples can intersect and interact in unforeseen ways, potentially amplifying threats or even inadvertently creating new ones. While invaluable in fostering a broad-based response, this complex web of interdependencies also requires meticulous coordination to ensure that actions in one sector don't inadvertently compromise the effectiveness of the whole. Consequently, these unpredictable ripples can lead to confusion among the general public, exacerbating the challenges faced by health sector (Finset et al. 2020).

Developing a holistic approach combining various methods and tools makes it possible to address the challenges presented by the diverse and interconnected landscape of actors. For instance, platforms for knowledge translation, which encompass organisations, initiatives, and networks that support evidence-informed policymaking, can be instrumental in offering pertinent and timely evidence. This approach may bridge the divide between science, policy, practice, and politics (El-Jardali et al. 2020). That bridging function ensures that there is a coherent and unified source distributing timely and accurate information to all stakeholders during health crises. Fostering a collaborative environment encompassing professionals from diverse sectors is crucial. Such interdisciplinary collaborations can ensure that decisions made in one domain consider the implications in another (Nicola et al. 2020). It is imperative to understand the medical implications and potential ramifications on, say, medical supply chains when contemplating measures such as travel restrictions.

While these proactive measures are essential, reactive strategies – operating through feedback loops – remain critically important. Real-time reporting mechanisms, integrating insights from frontline workers to local health departments and the general public, can significantly enhance the adaptability of response strategies. In an ever-evolving landscape, strategies do not always produce the desired outcomes. For instance, Oh (2022) has suggested that the development within the hierarchical model transitioned from a rigid top-down system to agile governance, emphasising enhanced collaborative and managerial capacity. That transition underscores the importance of an underpinning philosophy of continuous learning, making regular review and adjustment of strategies based on evolving realities not just beneficial but essential.

Co-evolutionary preparedness

Despite the current slowdown in economic globalisation trends, many challenges, such as disease epidemics and misinformation, do not respect national borders. The world is interconnected with nations deeply enmeshed in a complex web of socioeconomic and political relationships (e.g., Brown 2008). While fostering opportunities for economic growth, technological advancements, and collaborative initiatives, these bonds also mean that events in one corner of the world can produce ripple effects on even the most distant shores. A stark manifestation of this interconnected vulnerability appears during health crises, where a disease outbreak in a single region can quickly become a global concern. The COVID-19 pandemic underscored the sheer scale and speed at which a health crisis in one location can impact the global community, highlighting the importance of international cooperation and preparedness in a deeply interconnected world. That scenario strains healthcare systems and can lead to significant socioeconomic disruptions, from plummeting stock markets to halting international travel and trade. The cascade effect of that health crisis (Quigley et al. 2020) underscored how deeply nations are tied to global dynamics. While the globalised framework is essential for rapid information exchange and collaborative research efforts, it also exposes every nation to the vulnerabilities of others, making preparedness a shared responsibility.

Understanding global contexts is important (see, e.g., Stepheson 2013 on multi-level governance), but nations must prioritise tailoring strategies to their unique socio-cultural, economic, and healthcare contexts. An effective strategy for this tailored approach is establishing units dedicated to monitoring health trends (Troisi et al. 2021). These specialised units can provide invaluable insights into localised health patterns, ensuring a deeper understanding of national vulnerabilities and strengths. For instance, units monitoring the spread of infectious diseases could identify specific regions or demographics at heightened risk (Greene et al. 2021). Data analytics and real-time tracking would enable such units to provide predictive modelling, highlight potential health crises, and also allow policymakers to act pre-emptively.

Preparedness is not only about monitoring and reaction but is intrinsically linked to adaptability, which creates a need for multisystemic resilience. Multisystemic resilience "implies an interaction between nested or contingent and co-occurring systems…that help one or more of these systems do better than expected when disturbed" (Ungar 2021, 6–7). The national health landscape is in continuous flux, shaped by many factors ranging from urbanisation and climate change factors to changing lifestyles. The shifting situation requires health policies to do more than just react to ongoing transformations and evolve to be fit to address future ones. Even as nations prioritise their internal dynamics, they must recognise that their health ecosystems are part of a larger global narrative (The Lancet 2021). The

emphasis is on co-evolving: adapting national strategies by learning from both internal experiences and selected global lessons, without being entirely dictated to by global trends. This co-evolutionary approach ensures that while a nation remains open to global insights, it will retain its unique strategic health trajectory rooted in its specific reality.

Collaborative national networks can further support this co-evolutionary stance. Fostering partnerships between government bodies, research institutions, healthcare providers, and community organisations can catalyse a cohesive and comprehensive response to health challenges. Deeply entrenched within the national context, such networks ensure a multifaceted approach to preparedness, where strategies are co-developed, tested, refined, and implemented synergistically.

Conclusions

National preparedness is more than the sum of its parts; it embodies intricate interactions among them. Recognising this complexity leads to an understanding of emergent governance that calls for a significant departure from traditional governance models. Instead of focusing solely on the various levels of authority and their distribution, emphasis should be on the detailed connections that bind them (Torfing 2023). We can draw several conclusions from the discussion presented above.

- *The imperative shift from predictability to adaptability:* While historically, governance systems were constructed around the principle of predictability, a dynamic and turbulent environment underscores the need for adaptability. It is no longer sufficient to merely anticipate and manage scenarios. Instead, an adaptable governance framework is crucial, where systems remain agile, endorsing flexibility and facilitating rapid responses to unforeseen challenges.
- *Decentralisation as a cornerstone of effective governance:* Centralised structures, while ostensibly offering a semblance of order, often harbour inefficiency that is prone to emerge under strain. The push towards decentralisation appears not merely as a tactical response but a philosophical shift, recognising the wisdom embedded in localised, context-specific responses. Swift and context-specific decisions can be made when local units and authorities are empowered. Such decentralisation accelerates response times and fosters community trust, which is essential for robust governance in times of uncertainty.
- *Navigating the past and future:* While indispensable, learning from the past should not be the foundation for future strategies. Over-emphasis on retrospection can stifle innovation. An effective governance model appreciates the duality of drawing insights from the past while proactively strategising for future contingencies. This dual approach ensures that governance remains both rooted in experience and poised for innovation.

- *Championing diversity through collaborative endeavours:* The multifaceted crises defy siloed solutions. The solution lies in harnessing the power of diversity through collaborative endeavours, which brings diverse expertise and perspectives to the table and paves the way for comprehensive and adaptive strategies.
- *Embracing co-evolutionary dynamics*: Static governance models are ill-suited to address today's dynamic challenges. Governance must evolve in tandem with the challenges it seeks to address. That evolution requires an integral emphasis on co-evolutionary preparedness, where governance mechanisms are continually refined in response to emerging threats and evolving scenarios. Such a proactive and evolutionary approach ensures governance remains both relevant and resilient.

In weaving together these threads of thought, complexity theory offers more than just a new lens upon emergent governance, instead creating a rich tapestry of introspection, questioning, and potential reinvention. The framework outlined invites envisioning governance as equipped to respond to crises but also fundamentally attuned to the intricate dance of complexities inherent to an interconnected world. Building on Bhaskar's observation (2008, 37), we deduce that emergent governance encapsulates "the flux of phenomena that constitute the actual".

References

Allen, James, Darlington, Oliver, Hughes, Karen & Bellis, Mark, A. (2022). The health impact of loneliness during the COVID-19 pandemic. *BMC Public Health,* 22, 1654. Doi:10.1186/s12889-022-14055-2

Allen, Peter, M. (2001). What is complexity science? Knowledge of the limits of knowledge. *Emergence: Complexity and Organization,* 3(1),24–43.

Ansell, Chris, Boin, Arjen & Keller, Ann (2010). Managing transboundary crises: Identifying the building blocks of an effective response system. Journal of Contingencies and Crisis Management, 18(4), 195–207. Doi:10.1111/j.1468-5973.2010.00620.x

Ansell, Christopher, Sørensen, Eva & Torfing, Jacob (2021). The COVID-19 pandemic as a game changer for public administration and leadership? The need for robust governance responses to turbulent problems. *Public Management Review*, 23(7), 949–960. Doi:10.1080/14719037.2020.1820272

Arthur, Brian, W. (1989). Competing technologies, increasing returns, and lock-in by historical events. *The Economic Journal*, 99(394), 116–131. Doi:10.2307/2234208

Arthur, Brian, W. (1994). *Increasing Returns and Path Dependence in the Economy*. Ann Arbor, MI: University of Michigan Press.

Beck, Ulrich (1997). *The Reinvention of Politics: Rethinking Modernity in the Global Social Order.* Cambridge: Polity Press.

Bennet, Nathan & Lemoine, G. James (2014). What a difference a word makes: Understanding threats to performance in a VUCA world. *Business Horizons,* 57(3), 311–317. Doi:10.1016/j.bushor.2014.01.001.

Bhaskar, Roy (2008). *A Realist Theory of Science.* London: Routledge.

Boin, Arjen & Lodge, Martin (2016). Designing resilient institutions for transboundary crisis management: A time for public administration. *Public Administration*, 94(2), 289–298. Doi:10.1111/padm.12264.

Brown, Garrett, W. (2008). Globalization is what we make of it: Contemporary globalization theory and the future construction of global interconnection. *Political Studies Review*, 6(1), 42–53. Doi:10.1111/j.1478-9299.2007.00144.x

Byrne, David (1998). *Complexity Theory and the Social Sciences*. London: Routledge.

Cairney, Paul (2020). *Understanding Public Policy. Theories and Issues.* London: Palgrave Macmillan.

Capano, Giliberto & Lippi, Andrea (2021). Decentralization, policy capacities, and varieties of first health response to the COVID-19 outbreak: evidence from three regions in Italy. *Journal of European Public Policy*, 28(8), 1197–1218. Doi:10.1080/13501763.2021.1942156

Carney, Timothy, J. & Weber, David, J. (2015). Public health intelligence: Learning from the Ebola crisis. *American Journal of Public Health*, 105, 1740–1744. Doi:10.2105/AJPH.2015.302771

Cilliers, Paul (1998). *Complexity and Postmodernism Understanding Complex Systems*. London: Routledge.

Cooper, Richard, M. (1981). Responding to a health crisis. *Journal of Occupational Medicine*, 23(10), 705–709.

Davenport, Thomas H. (2018). From analytics to artificial intelligence. *Journal of Business Analytics*, 1(2), 73–80. Doi:10.1080/2573234X.2018.1543535

David, Chavis, M., Florin, Paul & Felix, Michael R. J. (1990). Nurturing grassroots initiatives for community development: The role of enabling systems. In Slavin, Simon, Mizrahi, Terry & Morriosn, John D. (Eds.) *Community Organization and Social Administration – Advances, Trends, and Emerging Principles*. New York, NY: Routledge.

de Graaf, Beatrice, Jensen, Lotte, Knoeff, Rina, & Santing, Catrien (2021). Dancing with death. A historical perspective on coping with Covid-19. *Risks Hazards Crisis Public Policy*, 12(3), 346–367. Doi:10.1002/rhc3.12225

Desmidt, Sebastien & Meyfoordt, Kenn (2023). Be prepared! Local politicians' proclivity for local government adaptive capacity building in response to COVID-19: the role of risk perceptions. *Public Management Review*. Doi:10.1080/14719037.2023.2165699

Duchek, Stephanie (2020). Organizational resilience: a capability-based conceptualization. *Business Research*, 13, 215–246. Doi:10.1007/s40685-019-0085-7

El-Jardali, Fadi, Bou-Karroum, Lama & Fadlallah, Racha (2020). Amplifying the role of knowledge translation platforms in the COVID-19 pandemic response. *Health Research Policy and Systems,* 18:58. Doi:10.1186/s12961-020-00576-y

Eppel, Elisabeth, A. & Rhodes, Mary, L. (2018). Complexity theory and public management: A 'becoming' field. *Public Management Review*, 20(7), 949–959. Doi:10.1080/14719037.2017.1364414

Emerson, Kirk & Nabatchi, Tina (2015). *Collaborative Governance Regimes.* Washington, DC: Georgetown University Press.

Engzell, Per, Frey, Arun & Verhagen, Mark, D. (2021). Learning loss due to school closures during the COVID-19 pandemic. *PNAS*, 118(17)e2022376118. Doi:10.1073/pnas.2022376118

Ferretti, Luca, Kendall, Michelle, Zhao, Lele, Nurtay, Anel, Abeler-Dörner, Lucie & Fraser, Christophe (2020). Quantifying SARS-CoV-2 transmission suggests epidemic control with digital contact tracing. *Science*, 368:6491. Doi:10.1126/science.abb6936

Finset, Arnstein, Bosworth, Hayden, Butow, Phyllis, Gulbrandsen, Pål, Hulsman, Robert, L., Pieterse, Arwen, H., Street, Richard, Tschoetschel, Robin & van Weert, Julia (2020) Effective health communication - a key factor in fighting the COVID-19 pandemic. *Patient Education and Counseling*, 103(5), 873–876. Doi:10.1016/j.pec.2020.03.027.

Folke, Carl, Hahn, Thomas, Olsson, Per & Norberg, Jon (2005). Adaptive governance of social-ecological systems. *Annual Review of Environment and Resources*, 30, 441–473. Doi:10.1146/annurev.energy.30.050504.144511

Forman, Rebecca, Azzopardi-Muscat, Natasha, Kirkby, Victoria, Lessof, Suszy, Limaro, Naomi, Gabriele, Nathan, Govin, Pastorino, May, Permanand, van Schalkwyk, CI , Torbica, Aleksandra, Busse, Reinhard, Figueras, Josep, McKee, Martin & Mossialos, Elias (2022). Drawing light from the pandemic: Rethinking strategies for health policy and beyond. *Health Policy*, 126(1), 1–6. Doi:10.1016/j.healthpol.2021.12.001.

Fuchs, Christian (2003). Some implications of Pierre Bourdieu´s works for a theory of social self-organization. *European Journal of Social Theory*, 6(4), 387–408. Doi:10.1177/13684310030064002

Gerrits, Lasse & Marks, Peter (2015). How complexity sciences can inform public administration: an assessment. *Public Administration,* 93(2), 539–546. Doi:10.1111/padm.12168

Greene, Sharon, K., McGough, Sarah, F., Culp, Gretchen, M, Graf, Laura, E., Lipsitch, Marc, Menzies, Nicolas, A. & Kahn, Rebecca (2021). Nowcasting for real-time COVID-19 tracking in New York City: An evaluation using reportable disease data from early in the pandemic. *JMIR Public Health Surveillance*, 7(1):e25538. Doi:10.2196/25538

Grote, Jürgen, R. & Gbikpi, Bernard (2002). *Participatory Governance: Political and Societal Implications*. Opladen: Leske+Budrich.

Heino, Ossi, Heikkilä, Matias & Rautiainen, Pauli (2022). Caging identified threats – Exploring pitfalls of state preparedness imagination. *International Journal of Disaster Risk Reduction*, 78, 1–12. Doi:10.1016/j.ijdrr.2022.103121

Hick, John, L, Hanfling, Dan, Wynia, Matthew, K. & Pavia, Andrew, T. (2020). Duty to plan: Health care, crisis standards of care, and novel coronavirus SARS-CoV-2. *NAM Perspectives*, 5:10.31478/202003b. Doi:10.31478/202003b

Holland, John, H. (1995). *Hidden Order: How Adaptation Builds Complexity*. New York, NY: Addison-Wesley.

Holland, John, H. (1998). *Emergence: From Chaos to Order.* Cambridge, MA: Perseus Books.

Houston, Brian, J., Schraedley, Megan, K., Worley, Mary, E., Reed, Katherine & Saidi, Janet (2019), Disaster journalism: fostering citizen and community disaster mitigation, preparedness, response, recovery, and resilience across the disaster cycle. *Disasters*, 43(3), 591-611. Doi:10.1111/disa.12352

Hynes, William, Trump, Benjamin, Love, Patrick & Linkov, Igor (2020). Bouncing forward: a resilience approach to dealing with COVID-19 and future systemic shocks. Environment Systems and Decisions, 40, 174–184. Doi:10.1007/s10669-020-09776-x

Hwang, Hokyu & Höllerer, Markus, A. (2020). The COVID-19 crisis and its consequences: Ruptures and transformations in the global institutional fabric. *The Journal of Applied Behavioral Science*, 56(3), 294–300. Doi:10.1177/0021886320936841

Ike, John David, Bayerle, Henry, Logan, Robert A. & Parker, Ruth M. (2020) Face masks: Their history and the values they communicate. *Journal of Health Communication*, 25(12), 990–995. Doi:10.1080/10810730.2020.1867257

Janssen, Marijn & van der Voort, Haiko (2020). Agile and adaptive governance in crisis response: Lessons from the COVID-19 pandemic. *International Journal of Information Management*, 55: 102180. Doi:/10.1016/j.ijinfomgt.2020.102180.

Kauffman, Stuart, A. (1995). *At Home in the Universe: The Search for the Laws of Self organization and Complexity*. Oxford: Oxford University Press.

Kaufmann, Wesley, Taggart, Gabel & Bozeman, Barry (2019). Administrative delay, red tape, and organizational performance. *Public Performance & Management Review*, 42(3), 529–553. Doi:10.1080/15309576.2018.1474770

Kiel, Douglas, L. (1989). Nonequilibrium theory and its implications for public administration. *Public Administration Review*, 49(6), 544–551. Doi:10.2307/976576

Kim, Yushim, Ku, Minyoung, Oh, Seong Soo (2022). Public health emergency response coordination: putting the plan into practice. In Wardman, Jamie K. & Löfstedt, Ragnar (Eds.) *COVID-19 – Confronting a New World Risk*. London: Routledge.

Klein, Jonathan, I. (1989). Parenthetic learning in organizations: Toward the unlearning of the unlearning model. *Journal of Management Studies*, 26(3), 291–308. Doi:10.1111/j.1467-6486.1989.tb00729.x

Koliba, Christopher (2018). Governance network performance: A complex adaptive systems approach. In Keast, Robyn, Mandell, Myrna, P. & Agranoff, Robert (Eds.) *Network Theory in the Public Sector – Building New Theoretical Frameworks.* New York, NY: Routledge.

Kooiman, Jan (2003). *Governing as Governance*. London: Sage.

McEntire, David, A. & Myers, Amy (2004) Preparing communities for disasters: issues and processes for government readiness. *Disaster Prevention and Management*, 13(2), 140–152. Doi:10.1108/09653560410534289

Mheidly, Nour & Fares, Jawad (2020). Leveraging media and health communication strategies to overcome the COVID-19 infodemic. *Journal Public Health Policy*, 41, 410–420. Doi:10.1057/s41271-020-00247-w

Mitleton-Kelly, Eve (2003). *Complex Systems and Evolutionary Perspectives of Organizations: The Application of Complexity Theory to Organizations*. London: Pergamon.

Morrison, Keith (2005). Structuration theory, habitus and complexity theory: elective affinities or old wine in new bottles? *British Journal of Sociology of Education*, 26(3), 311–326. Doi:10.1080/01425690500128809

Nicola, Maria, Alsafi, Zaid, Sohrabi, Catrin, Kerwan, Ahmed, Al-Jabir, Ahmed, Iosifidis, Christos, Agha, Maliha & Agha, Riaz (2020). The socio-economic implications of the

coronavirus pandemic (COVID-19): A review. *International Journal of Surgery*, 78, 185–193. Doi:10.1016/j.ijsu.2020.04.018.

OECD (2022). First lessons from government evaluations of COVID-19 responses: A synthesis. OECD Policy Responses to Coronavirus (COVID-19). https://www.oecd.org/coronavirus/policy-responses/first-lessons-from-government-evaluations-of-covid-19-responses-a-synthesis-483507d6/

Olsen, Odd, E., Juhl, Kirsten, Lindøe, Preben, H. & Engen, Ole, A. (Eds.) (2020). *Standardization and Risk Governance: A Multi-Disciplinary Approach.* London: Routledge.

Pierre, Jon & Peters, Guy, P. (2000). *Governance, Politics and the State*. Basingstoke: Macmillan.

Popper, Karl R. (1978). Three Worlds. The Tanner Lecture on Human Values. The University of Michigan, April 7, 1978. Available: http://www.bengin.net/jbc/dokumente/guteDenker/popper80%20on%20human%20values.pdf, katsottu 9.11.2018.

Quay, Rway (2010). Anticipatory governance. *Journal of the American Planning Association*, 76(4), 496–511. Doi:10.1080/01944363.2010.508428

Quigley, Mark, C., Attanayake, Januka, King, Anrew & Prideaux, Fabian (2020). A multi-hazards earth science perspective on the COVID-19 pandemic: the potential for concurrent and cascading crises. *Environment Systems and Decisions*, 40, 199–215. Doi:10.1007/s10669-020-09772-1

Rajala, Tomi & Jalonen, Harri (2022). Stress tests for public service resilience: introducing the possible-worlds thinking. *Public Management Review*, 25(4), 762–786. Doi:10.1080/14719037.2022.2048686

Reed, Michael & Harvey, David L. (1992). The new science and the old: Complexity and realism in the social sciences. *Journal for the Theory of Social Behaviour,* 22(4), 353–380. Doi:10.1111/j.1468-5914.1992.tb00224.x

Richardson, Kurt (2008). Managing complex organizations: complexity thinking and the science and art of management. *Emergence: Complexity and Organization*, 10(2), 13–26.

Sabel, Charles F. & Zeitlin, Jonathan (2012). Experimentalist governance. In Levi-Faur, David (Eds.) *The Oxford Handbook of Governance*, 169–184. Oxford: Oxford University of Press.

Saltman, Richard B. (2008). Decentralization, re-centralization and future European health policy. *European Journal of Public Health*, 18(2), 104–106. Doi:10.1093/eurpub/ckn013

Sanghee, Park (2018). Challenges and opportunities: The 21st Century public manager in a VUCA world. *Journal of Public Administration Research and Theory*, 28(2), 299–301. Doi:10.1093/jopart/mux042

Satizábal, Paula, Cornes, Isabel, de Lourdes, María, Zurita, Melo & Cook, Brian, R. (2022). The power of connection: Navigating the constraints of community engagement for disaster risk reduction*. International Journal of Disaster Risk Reduction,* 68:102699. Doi:10.1016/j.ijdrr.2021.102699.

Sellers, Jefferey, M. & Lidström, Anders (2007). Decentralization, local government, and the welfare state. *Governance*, 20(4), 609–632. Doi:10.1111/j.1468-0491.2007.00374.x

Sharma, Sunil, K, Bangia, Aashima, Alshehri, Mohammed & Bhardwa, Rashmi (2021). Nonlinear dynamics for the spread of pathogenesis of COVID-19 pandemic. *Journal of Infection and Public Health*, 14(7), 817–831. Doi:10.1016/j.jiph.2021.04.001.

Singer, Phillip, M, Willison, Charley, E. & Greer, Scott, L. (2020). Infectious disease, public health, and politics: United States response to Ebola and Zika. *Journal of Public Health Policy*, 41(4), 399–409. Doi:10.1057/s41271-020-00243-0.

Staber, Udo & Sydow, Jörg (2002). Organizational adaptive capacity: A structuration perspective. Journal of Management Inquiry, 11(4), 408–424. Doi:10.1177/1056492602238

Stacey, Ralph (1993). *Strategic Management and Organisational Dynamics*. London: Pitman.

Stephenson, Paul (2013). Twenty years of multi-level governance: 'Where does it come from? What is it? Where is it going?' *Journal of European Public Policy*, 20(6), 817–837. Doi:10.1080/13501763.2013.781818

The Lancet (2021). Editorial: COVID-19: learning as an interdependent world. *The Lancet*, 398:10306. Doi:10.1016/S0140-6736(21)02125-5

Thébaud-Mony, Annie (2019). Tuberculosis control for COVID-19: Screening should be universal. *NEW SOLUTIONS: A Journal of Environmental and Occupational Health Policy*, 30(3), 168–172. Doi;10.1177/1048291120957238

Toshkov, Dimiter, Carroll, Brendan & Yesilkagit, Kutsal (2022). Government capacity, societal trust or party preferences: what accounts for the variety of national policy responses to the COVID-19 pandemic in Europe? *Journal of European Public Policy*, 29(7), 1009–1028. Doi:10.1080/13501763.2021.1928270

Torfing, Jacob. (2023). *Rethinking Public Governance.* Cheltenham: Edward Elgar Publishing.

Trickett, Edison, J. (2009). Community psychology: Individuals and interventions in community context. *Annual Review of Psychology,* 60(1), 395–419. Doi:10.1146/annurev.psych.60.110707.163517

Troisi, Roberta, De Simone, Stefania, Vargas, Maria & Franco, Massimo (2021). The other side of the crisis: organizational flexibility in balancing Covid-19 and non-Covid-19 health-care services. *BMC Health Services Research*, 29;22(1):1096. Doi: 10.1186/s12913-022-08486-1

UNDRR, United Nations Office for Disaster Risk Reduction (2023). Definition of preparedness. Available at https://www.undrr.org/terminology/preparedness

Ungar, Michael (eds.) (2021). *Multisystemic Resilience. Adaptation and Transformation in Contexts of Change*. New York, NY: Oxford University Press.

Uusikylä, Petri (2019). *Endeavour to Find Evidence. The Role of Evaluation in Complex Systems of Governance.* University of Helsinki, Publications of Faculty of Social Sciences 130/2019. Helsinki: Unigrafia.

Wayne C. Koff, Burton, Dennis, R., Johnson, Philip, R., Walker, Bruce, D. King, Charles, R., Nabel, Gary, J., Ahmed, Rafi, Bhan, Maharaj, K. & Plotkin, Stanley, A. (2013). Accelerating next-generation vaccine development for global disease prevention. *Science*, 340:1232910. Doi:10.1126/science.1232910

Whetten, David, A., Felin, Teppo & King, Brayden, G. (2009). The practice of theory borrowing in organizational studies: Current issues and future directions. *Journal of Management*, 35(3), 537–563. Doi:10.1177/0149206308330556