

Systemic Resilience as a Response to Covid-19

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Systemic resilience is needed to deal with Covid-19 and future shocks...

System resilience is a term of rising popularity during the Covid-19 pandemic. Governments worldwide have the opportunity to adopt a systemic, anticipatory approach to reinforcing resilience as a response to the interconnected challenges facing modern societies. These challenges, such as natural hazards, ageing population, global migration, and digitalisation are compounded by their potential to disrupt cyber, information, societal, and infrastructural systems with lasting consequences. Traditional approaches of risk assessment and management focus primarily upon hardening systems so that they are able to absorb threats before breaking. However, these approaches are inappropriate, prohibitively expensive or both for many of the issues governments will have to deal with.

The systems approach can promote cross-sectoral, multidisciplinary collaboration in the process of policy formulation: it takes proper account of the crucial linkages between issues generally treated separately within different specialisations and scientific and institutional “silos.” In order to promote positive social and economic change, a range of policies have to be integrated, including educational, demographic, employment, well-being, as well as technology and innovation policies. Systems thinking provides a methodology to achieve a better understanding of the behaviour of complex systems and to improve the assessment of the consequences of policy interventions.

...because the world economy is becoming more interconnected and complex...

Growing complexity and interdependence have made various systems (economic, public health, cyber, etc.) susceptible to widespread, irreversible, and cascading failure. Serious disease outbreaks such as Covid-19 are the result of systemic properties, and in this case, emergence in particular. Emergence describes a process whereby a situation arises through the interaction of a number of actors and influences, without any intention to create that situation. Helbing (2013) and others have noted that the consequences of failing to appreciate and manage the characteristics of complex global systems and problems can be immense. A recent paper published by the UK Royal Society (Johnson et al. 2020) shows that emerging infectious diseases in humans are frequently caused by pathogens originating from animal hosts, and that virus transmission risk is highest from animal species that have increased in abundance and even expanded their range by adapting to human-dominated landscapes. Impacts on ecosystems due to changes to socioeconomic systems, such as the introduction of intensive agriculture, play a role in creating or aggravating epidemic risk. One study looking at the emergence of infectious diseases calculated that since 1940, intensive agriculture has been associated with more than 25% of all infectious diseases that emerged in humans and more than half of all infectious diseases that spilled over from animals to humans (Rohr et al. 2019).

Striving for maximum efficiency and optimisation, such systems have neglected resilience against disruptions

¹ The views expressed in this article are those of the author and do not necessarily represent the official views of the OECD or of the governments of its member countries.

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(Marchese 2012) whose shocks may leave governments, the public, and the environment in a weakened state. More specifically, the concentration of industrial capacities and economic activity into smaller and more efficient sectors, up to the international level, has produced highly lucrative yet fragile supply chains and economic exchanges whose disruptions could have sweeping effects in unexpected areas. While this has provided considerable opportunities, it has also made the systems we rely on in our daily lives (e.g., international supply chains) vulnerable to sudden and unexpected disruption, as the result of either an external shock, the way the system has self-organised, or a combination of both (Juttner and Maklan 2011; OECD and FAO 2019). The 2011 earthquake and tsunami in Japan, for example, exposed the limits of just-in-time supply chain organisation, and highlighted the importance of flexibility, diversification, and adaptability (Fujimoto 2011; Golan et al. 2020).

...leading to cascading and irreversible failures

Such risks have been thoroughly described by leading economists and scholars since the onset of the 2007–2009 financial crisis, yet primarily in an abstract context, although Andrew Haldane, the Bank of England’s Chief Economist, did argue in 2009 that “the spread of epidemics and the disintegration of the financial system – each is essentially a different branch of the same network family tree” (Haldane 2009). A key question, therefore, is focused not upon whether systemic risk would cause substantial cascading losses to the international economy, but rather on what type of disruption would trigger such a chain of events in the first place.

Resilience offers new approaches to policymaking...

Resilience, or the ability to recover from and adapt to unexpected threats, has been a focus of specific parts of public administration, for instance military and public health authorities. Resilience must become a core philosophy within system management and operation to ensure these systems are able to continue to function despite disruptions like Covid-19. Rather than rely solely upon the ability of system operators to prevent, avoid, withstand, and absorb any and all threats, resilience emphasises the importance of recovery and adaptation in the aftermath of disruption.

...to prepare, absorb, adapt and recover from shocks...

Such a mind-set acknowledges that the infinite universe of future threats cannot be adequately predicted and measured, nor can the effects thereof be fully understood. Resilience acknowledges that massive disruptions can and will happen and it is essential that core systems have the capacity for recovery and adaptation. Consideration must be given not just to hardening the healthcare system but a range of critical systems connected to it. This involves examining how risk is absorbed and mitigated by these systems, how they will recover, adapt, and preferably “bounce forward” (Linkov et al. 2018a, 2018b; Ganin et al. 2016, 2017).

...such as Covid-19...

The Covid-19 outbreak has led to a crisis with considerable cascading losses for public health but also for much of the global economy, with concordant high social costs. National governments are struggling to absorb the shock generated by the pandemic, but in time the international community will overcome the crisis and begin the recovery phase. The crisis shows how important it is to keep resources in reserve for times when unexpected upheavals in the system prevent it from functioning normally (and the argument can be made for not depleting natural resources). Given the interdependence of our economies and social systems, the pandemic highlights the need for strengthened, evidence-based international cooperation (building on existing frameworks for emergency preparedness) - to tackle systemic threats and help avert systemic collapse.

...with specific policy recommendations to enhance systemic resilience

Based on OECD NAEC reports and the resilience literature, specific recommendations for building resilience to contain epidemics and other systemic threats include: 1.) ensure that systems, including infrastructure, supply chains, economic, financial, and public health systems, are designed to be resilient, i.e., recoverable and adaptable. 2.) Develop methods for quantifying resilience so that trade-offs between a system’s efficiency and resilience can be made explicit and can guide investments. 3.) Control system complexity to minimize cascading failures resulting from unexpected disruption by decoupling unnecessary connections across infrastructure and making necessary connections controllable and visible. 4.) Manage system topology by designing appropriate connections and communications across

interconnected infrastructure. 5.) Add resources and redundancies in system-crucial components to ensure functionality and 6.) Develop real-time decision support tools integrating data and automating selection of management alternatives based on explicit policy trade-offs in real time (Hynes et al. 2020).

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The Migrants and Systemic Resilience Hub (MigResHub) facilitates research and debates on how migrant workers affect the resilience of essential services during the Covid-19 pandemic and similar shocks in the future. MigResHub is a joint initiative of the EU's Migration Policy Centre (MPC) and Migration Mobilities Bristol (MMB) at the University of Bristol.

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