# Critical Systems Thinking for Successfully Coping with COVID-19 and the Future.

15 April 2021



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System thinking has been well recognised as a fruitful approach to solving complex or 'wicked' social problems. Rittel and Weber (1973) define wicked problems as ill-defined, ambiguous, and unstructured problems that can never be solved completely but at best be re-solved; or in other words, solved over and over again, because each solution to a wicked problem generates unintended consequences that need to be solved over a period of time.

Systems thinking refers to the practical application of systems ideas to solve complex environmental, social, and organisational issues, including wicked problems. Although the history of systems thinking can be traced back to the days of ancient Greek philosophers, it emerged in the 1950s as a new discipline (first within operations research and then across other disciplines) that promotes holistic and multi-disciplinary thinking compared to earlier scientific management methods.

Covid-19 is one of the most complex, wicked problems faced by our global society since World War II. Despite the well-established knowledge base in systems thinking applicable for public sector policymaking and crisis management, there has been some criticism of the inadequate or incorrect application of systems thinking approaches to solve problems related to the pandemic. Hence this article first describes systems thinking's main approaches (i.e., hard systems thinking, soft systems thinking, and critical systems thinking). Then it explains their applicability in different problem contexts in relation to the COVID-19 crisis. Finally, it concludes by highlighting the importance of critical systems thinking to better cope with such situations in the future.

The first wave of systems thinking (hard systems thinking) assumes that the goals of a problem can be clearly defined ('tamed' problems in Rittel and Weber [1973]); as explained by Jackson (2001), models can be built to capture the logic of the problem and find optimum solutions. The solutions are evaluated in terms of their efficacy and efficiency. System engineering, system dynamics, complexity theory, and organisational cybernetics are some examples of methodologies in this tradition. In the case of the COVID pandemic, there were many attempts to build dynamic interactive models to identify the direct and indirect effects of COVID-19 on hospital capacities and various social-economic issues. However, as shown in a recent study by the United Nations, there have been delays in identifying these systemic models and taking timely actions such as lockdown and trace-test-quarantine measures, leading to increased deaths in some nations.

The second wave of systems thinking (or soft systems thinking) is applicable for solving, social problems involving a variety of stakeholders, where the goals cannot be fully agreed upon. Hence, as Jackson (2001) explains, models are built to understand the perceptions of the real world by various stakeholders and debate and generate the most desirable and feasible solutions rather than optimal solutions. The solutions are evaluated in terms of their effectiveness, meaningfulness, and elegance. Soft systems methodology, social systems design, and interactive planning are some example methodologies in this tradition. In the case of COVID pandemic, such efforts of appreciation of a variety of stakeholder views seem to have been flawed in many nations. For example, as shown in a recent study by the United Nations, there have been several disputes between central government vs. local state authorities (e.g. disputes regarding lockdown strategies) and politicians vs. health specialists (e.g. disputes regarding mask-wearing) across many nations. Also, there have been some illusory public beliefs built up among the general public in some nations that they were having a superior immune system resulting in many unfortunate deaths. Such weaknesses in implementing conflicting, biased, and irrational solutions and policies could have been moderated by using soft systems thinking methodologies.

The third wave of systems thinking (or critical systems thinking) applies to problems with even more diversity, heterogeneity, and turbulence, where it is impossible to agree upon common goals or a system to find appropriate solutions. Hence, as Jackson (2001) explains, models are constructed to reveal the sources of alienation and disadvantage. These wicked problem situations inherently involve multiple incommensurate views, and both goals and the problem context continually change at each iteration of action. Hence, the response to such problems needs to be executed via an appreciation of genuine pluralism, critically reflective practice and a continuous process of intervention. The solutions are evaluated in terms of diversity, emancipation, and ethicality beyond mere efficiency and effectiveness. Total systems intervention (TSI), Critical systems heuristics (CHS), and Critical systems practice (CSP) are some of the popular methodologies in this tradition.

In the case of the pandemic, there is little evidence of the use of critical systems thinking methodologies despite the presence of many experts in these areas around the world and scholarly journals such as 'systemic practice and action research'. These methodologies could have been effectively used at the initial stage of the pandemic to frame the priorities from the perspective of the most vulnerable yet neglected groups (e.g. hospital staff and care homes) to reduce the high number of deaths in these communities. Also, the use of such methodologies could have helped to better understand the reasons for higher infection rates among minority ethnic groups (e.g. unique cultural practices and nature of work). What is more, critical systems thinking methodologies such as CSP could have also helped to identify a greater number of radically different (creative) solutions, such as the conversion of fashion textile manufacturing to mask manufacturing and vacuum manufacturing to ventilator manufacturing; for example, how the airline industry could have responded differently by reinventing their systems and business models?

Looking forward, the author invites all leaders, managers, consultants, policymakers, and the like to make better use of systems thinking methodologies, particularly critical systems thinking, and more effectively mix, match and combine systems thinking methods to suit various problem contexts. It is hoped what is learned during this crisis can contribute to better solutions to the crises that come next.

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