

# Insights from complexity science: More trust in self-organization needed

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Globalization, digitalization, sustainabilization—three major waves of transformation are unfolding around the world. The social upheaval caused by these transformation processes has given rise to populist movements that endanger social harmony and threaten democratic values. What rules and institutions can promote stability in the face of such systemic risks? A new study published by the Institute for

Advanced Sustainability Studies (IASS) offers some surprising answers.

The coronavirus pandemic has demonstrated for the first time how a systemic risk can sweep across our globalized world. It began with the little-noticed outbreak of an unknown illness in Wuhan. Then, like an avalanche, the virus spread swiftly throughout China, then to neighboring countries, and across the globe. As its effects rippled through healthcare systems, disrupted [global supply chains](#), industries, logistics and transportation networks, an initially local event stretched [social systems](#) worldwide to their limits.

This scenario is typical of systemic risks, which are complex, interconnected, and highly stochastic, and to a significant degree non-linear risks with tipping points that can threaten the social fabric of complex societies.

How do people respond to these risks? Large segments of the population continue to place their trust in the institutions of society and abide by the guidance and regulations issued by governments to tackle the pandemic. However, there are sections of society that mistrust these institutions and are skeptical of official pronouncements on the pandemic. Fueled by social media and suspecting that "shadowy powers" are steering events, they turn to populist movements. This example shows how public opinion can diverge suddenly and with little warning, splitting society into two. Such rapid shifts, spurred by a systemic risk such as the current pandemic, can pose a threat to the diversity and cohesion of open societies.

## **Complexity science and the great transformations**

In their study *Systemic Risk: The Threat to Societal Diversity and Coherence*, the two authors, thermodynamic scientist Klaus Lucas and sociologist Ortwin Renn, combine the insights of [complexity science](#)

with conceptual considerations around the management of systemic risks. The study considers the impacts of three major waves of transformation currently unfolding (globalization, digitalization and the sustainabilization), which are leading to changes and dislocations similar to those triggered by the coronavirus pandemic.

## **An example: The nationalist response to globalization**

In the case of globalization, strong counter-movements have arisen that advocate a revival of nationalist and often ethnically-defined policies. These movements seek to exclude or marginalize purportedly 'foreign' elements and promote the introduction of protectionist trade policies. The emergence of these movements follows an erosion of trust in the institutions of society—first and foremost in the democratic pillars of parliament, political parties, and the justice system. More and more often, populist movements are gaining ground, resulting in the increasing polarization of populations.

Digitalization is a similarly disruptive phenomenon: while some sections of society benefit from considerable gains in comfort and efficiency, elsewhere it impinges on personal freedoms and identities, and limits autonomy. In addition, digitalization leads to a concentration of economic and creative power in the hands of a small number of large actors, enabling them to pursue their interests with little democratic oversight. And while digitalized processes provide opportunities to strengthen democratic structures by increasing transparency or facilitating political participation, the advent of digital echo chambers and bots heightens polarization and hinders the social discourse that is indispensable to democratic decision-making.

The third global transformation is the broad process of "sustainabilization," which seeks to bring sustainable principles and developments into the realms of politics, economy, and societal

behavior. This transformation is also attended by ruptures, contradictions, and a variety of related risks. Conflicts frequently arise between processes of sustainabilization and the other major transformations.

According to Renn and Lucas, these unfolding transformations set in motion processes that require societies to adapt to their altered living conditions and should therefore be viewed as systemic risks. The recent success of political parties that did not even exist five years previously and the demise of established parties in European countries such as Greece, France and Italy, are examples of such sudden shifts.

## **Grappling with the dilemma**

The authors argue that many features that characterize and influence complex structures in nearly every domain of nature, technology, and society can be derived from fundamental patterns revealed in dynamic models in physics and chemistry. Applying these findings from complexity science to the structure of social risks offers new insights. In particular, it renders visible the role of self-organization alongside the familiar social steering mechanisms of hierarchy, competition and cooperation. "Its effect is underestimated in almost all social science theories," says Professor Ortwin Renn, Scientific Director at the IASS.

Considering contemporary issues around migration and integration, this insight suggests that social cohesion is not a product of rules, competition or shared values alone; rather, under certain circumstances, new elements can contribute to the basic functionality of the system through self-organization—for example through socio-economic development or cultural achievements. However, this is only possible where new entrants are offered the opportunities for cooperation that they need to develop and realize their potential. Complexity science shows that creative solutions and unusual adaptation processes often

emerge around elements that enter existing structures and, through their own creative processes of adaptation, bring innovations into the system.

At the same time, the rules of competition and hierarchy ideally act as guard rails along an otherwise broad development corridor, correcting cooperative arrangements that emerge through self-organization where these do not contribute to the stability of the system or prove counter-productive. This implies that, in the absence of hierarchy and competition, cooperation could well prevent or endanger cohesion. From the perspective of complexity science, it is indispensable for the stability of a system that important rules for interactions are predetermined in order to limit the creative opportunities for self-organization without prescribing certain actions or establishing prerequisites that would unduly restrict the development corridor.

This requires that systems be constituted in such a way that relationships between agents develop in the process of self-organization so that they, at least in the statistical average, bring about and maintain successful processes of adaptation to changing conditions.

## **Fundamental values as the basis for societal coherence**

The authors recommend the basic values enshrined in the constitutions of countries and the fundamental freedoms noted in the Charter of the United Nations. These values constitute the basic principles of human existence and cooperation. In addition, it is vital that decision-making and regulatory institutions be suitably equipped to enforce their authority. For cooperative models to emerge and flourish, actors must be able to trust in the ability of the governance system to both ensure that all actors play by the rules and to penalize violations where necessary.

In view of the crises facing modern democracies such as migration and populism, societies are well advised to place more trust in the effectiveness of dynamic evolving structures that are open and rooted in self-organization and spontaneous cooperation. Creating favorable conditions for self-organization, is an essential prerequisite for the further humane development of systems and the achievement of greater sustainability in the long term. This suggests that creative and innovative solutions for the conflicts and disruptions that inevitably arise both within and between global transformations are more likely to emerge in such contexts than where cooperation is limited to closed communities of values or in settings defined by the principles of hierarchy and competition. In order to be effective, self-organization must emerge within guard rails that are grounded in fundamental values (human rights) and embedded within an enabling environment that fosters competition and innovation.

**More information:** Ortwin Renn et al, Systemic Risk: The Threat to Societal Diversity and Coherence, *Risk Analysis* (2021). [DOI: 10.1111/risa.13654](https://doi.org/10.1111/risa.13654)

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