

CRITICAL TRANSITIONS IN WARFARE: THEORY, EVIDENCE AND IMPLICATIONS

Both natural and social systems are characterised by long periods of relative stability with occasional extreme events, such as mass extinctions, the collapse of civilisations, economic crises or swings in the physiological state of an individual. As Marten Scheffer has influentially outlined, such events can be explained by the concept of critical transition – an abrupt change that occurs in a complex system after the loss of resilience, when even a minor perturbation or disturbance triggers a shift to another stable state. From a systemic perspective, the system experiences a shift from one attractor to another, with positive feedback loops playing a key role and overriding negative ones, while the system is also characterised by hysteresis. Colloquially, critical transitions are often referred to as breakage, fracture, collapse, crisis, catastrophe or domino effect.

In contrast to many other disciplines, critical transitions remain under-researched in the military field. Against this background, the author of this presentation has recently provided a theoretical framework for understanding critical transitions in warfare, supported by empirical evidence from the Gaza War (2008–2009) and the first phase of the Russian invasion of Ukraine (2022). The basic idea is that unpredictability and randomness characterise warfare only at the local level, whereas – globally – warfare is predominantly marked by stability. In this respect, the degradation of a small number of elements (sustained losses of personnel, equipment or infrastructure) and/or connections (such as disrupted command and control) only moderately reduces actors' combat power, as it remains close to the original level. However, a much more significant change occurs when the actor (system) loses its resilience. In such a situation, we can expect a rapid decline in combat power and thus vulnerability to defeat. In established military vocabulary, such a development is often described as reaching a culmination point.

The explanation presented is predominantly phenomenological and the challenge remains to pursue the line of research further in order to gain a deeper understanding of the factors that drive critical transitions in warfare. In this sense, one of the goals of research would be to conduct further empirical research and eventually identify a suitable variables on the basis of which we could anticipate a critical transition in warfare. This would have the advantage of enabling decision-makers both to better protect their own forces and to take advantage of opportunities when the enemy appears to be losing resilience and approaching a critical transition threshold. Anticipation of critical transitions in warfare could draw on the set of generic tools that have already been developed by scientists (toolbox of early warning signals), although the use of these tools could potentially be challenging as the complexity of warfare is difficult to model, while the assessment needs to be available in near-real time to be useful in combat decision making.