Book Review

Routledge handbook of the future of warfare

Artur Gruszczak and Sebastian Kaempf (eds)

In his short story, 'Superiority', science fiction writer Arthur C Clarke (1951) writes about an imagined future where the most advanced technological power eventually loses a war because it is constantly updating its systems – introducing them before they become fully operational – while its enemy continues to add to its arsenal of older but usable weapons. It is with this observation – and with a warning not to overemphasise the pace of technological change – that Christopher Coker (2024) opens his chapter 'Thinking about the future of war' in the *Routledge handbook of the future of warfare* (2024) edited by Artur Gruszczak and Sebastian Kaempf. Coker highlights how the pursuit of technological advantage may not always be the automatic gain it is presumed to be. In doing so, he asks us to think carefully about the volatilities and uncertainties inherent in thinking about the unknown future. While it is difficult to do justice to its 39 chapters in a single review, the *Routledge handbook of the future of warfare* is certainly thought-provoking. The unifying theme – accelerated transformation in contemporary society, and its potential effects on warfare – runs across specific chapters on technoscience, military artificial intelligence, military neuroenhancement, and counterspace warfare, but also on broader effects in irregular and unconventional warfare, terrorism, remote warfare, and post-modern warfare. While this may appear confusing at first, the editors have organised the chapters in six sections by considering approaches, systemic variables, concepts and theories, specific technologies and local contexts, and general trends currently emerging informing interpretations of the future.

Part I deals with approaches and methodologies for studying future war. Both the chapter by Heuser and the one by Lacy note the folly of trying to predict future events with precision combat, and also the limits of tools and techniques of scenario planning, horizon scanning, and futures thinking at a time of technological change and transformation. But it is precisely this technological acceleration and geopolitical uncertainty that require thinking about strategic vision – as both intellectual research and practical policy. There have, of course, been recent books on strategic issues such as Coker's *Future war* (2015), Freedman's *The future of war* (2018) and Mick Ryan's *War transformed* (2022) dealing with the relation of science, technology and war and the evolution of warfare. The *Routledge handbook of the future of warfare* serves as a comprehensive yet diverse collection dealing with the main theories and conceptions of warfare (Part III), structural complexity (Part IV), as well as the weaponisation of new domains, such as cyber space, artificial intelligence, and quantum sciences (Part V).

The seven chapters in Part V – 'Technoscience' – strikes the right balance between its focus on technical aspects of the application of technology in warfare, and their potential impact on human society and political domains. Elke Schwarz's chapter on the integration of artificial intelligence (AI) into military operations accurately explains advanced machine learning and neural networks enabled by AI, but does so in the context of moral agency and ethical practice. Austin Wyatt's chapter on lethal autonomous weapon systems engages with questions about meaningful human control, and the debate about autonomy and human–machine teaming. Wyatt comments on the lack of meaningful progress by the international community in adopting a normative approach through an international legal instrument. Similarly, James Der Derian and Stuart Rollo's chapter on quantum warfare, situates the still emerging but nonetheless radical transformation of quantum technology in the context of power rivalries in international security and systemic political changes. The authors conclude that there is a need to develop new practical and ethical frameworks for the quantum future.

Measuring the impact of new and future technologies will need to take into account complex factors, including those in the economy, demography, climate change, ideologies, and other inter-linked factors, which are themselves in constant movement. The editors are careful to emphasise that the focus of the book is prognostic rather than futuristic. This is echoed in the first chapter by Beatrice Heuser, Joachim Isacsson and Olaf Theiler. These authors note that, in the military realm, the normal form of progress is evolutionary and not revolutionary. Short-term prediction forecasting mostly fails when it comes to disruptive new technologies, as these fail to account for the long-term frames for technology development, slow military adaptation and acquisition, and the time needed for their integration into new military doctrines. Time for testing in training before new technologies can be used successfully also needs to be considered. To gain an overall vision of the future of warfare, as Heuser *et al.* (2024:20) conclude, 'there is no way around the detailed engagement with complexity, with multiple and disagreeable future scenarios'. In meeting this challenge, the two editors, Artur Gruszczak, chair of National Security at Jagiellonian University in Krakow, Poland, and Sebastian Kaempf, associate professor at the University of Queensland Australia, have brought together a stellar group of over 40 contributors to produce a comprehensive publication on future warfare. These include leading scholars who may be well known to readers – authorities, such as Mary Kaldor, Alex J Bellamy, Sebastiaan Rietjens, Christopher Coker, James Der Derian, and Beatrice Heuser – but also a number of postdoctoral researchers, PhD candidates, and specialist authors, who offer cutting-edge contributions on the most recent developments. The result is a diverse publication presenting a variety of theoretical and epistemological perspectives to understand the research and debates on the foreseeable future of warfare. There have been very good single author monographs recently, such as Paul Scharre's *Army of none* (2018) and Kenneth Payne's *I, warbot* (2021), but the collection of chapters here offers a wide-ranging yet theme-specific approach that will certainly be of interest to students of strategic studies and international relations attentive to a dynamic overview.

Something ought to be said also about the Routledge handbook series more generally, for instance the *Routledge handbook of war, law and technology* (Gow, Dijxhoorn, Kerr & Verdirame, 2019), as the volumes being produced are rapidly becoming indispensable in university libraries and in researchers' collections. This current handbook is no exception.

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