

MICHAEL C. JACKSON

# CRITICAL SYSTEMS THINKING

A PRACTITIONER'S GUIDE



WILEY



## **Critical Systems Thinking**



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A Practitioner's Guide

*Michael C. Jackson*  
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**WILEY**

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## **Dedication**

*To my grandchildren –*

Freddie, Henry, and Isaac.

In the hope that *Critical Systems Thinking* can help make the world a better place.

*Hence people deny that Anaxagoras, Thales, and the wise of that sort are prudent ... and they assert that such men know things that are extraordinary, wondrous, difficult, and daimonic – yet useless too, because they do not investigate the human goods. But prudence [phronesis] is concerned with the human things and with those about which it is possible to deliberate. For we assert this to be the work of the prudent person especially – deliberating well – and nobody deliberates about things that cannot be otherwise, or about so many things as are without some end, an end, moreover, that is a good attainable through action. He who is a good deliberator simply is skilled in aiming, in accord with calculation, at what is best for a human being in things attainable through action.*

(Aristotle, c. 340 BCE, *Nicomachean Ethics*, book 6, translated by R.C. Bartlett and S.D. Collins, University of Chicago Press, 2011)



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## Preface

I concluded the preface to my previous book with the statement: ‘But it is definitely my last book’. I probably did the same in earlier books – I do not dare to look. Writing a book asks a lot of those close to you as you need to go ‘missing’ for an extended period. It is exhausting for the writer. There are other things you could be doing. So, what is the excuse for this new book?

I felt there was unfinished business. My previous book, *Critical Systems Thinking and the Management of Complexity* (Wiley, 2019), is a comprehensive overview of applied Systems Thinking (ST), demonstrating how Critical Systems Thinking (CST) could bring order to that diverse field and suggesting how best to use systems approaches in practice. I remain pleased with it, and it has been well received. The book is, however, 700 pages long and contains much (necessary for its purpose) historical and theoretical exposition. It sets a challenge to readers. Though it is one, I am assured, that is worth the effort. My only regret is that I did not manage to present a clear enough account of Critical Systems Practice (CSP) towards the end of that book. It is all there, and you cannot tie everything down, but that account could be better structured. This new book, *Critical Systems Thinking: A Practitioner’s Guide*, seeks to address both these points. It is more accessible, shorter and dwells on history and theory only if essential. The book is designed to provide the most intelligible and direct account of how best to use CST in practice. To my mind, it complements the earlier book nicely.

I felt some frustration. It continues to amaze me that, in a world beset by many complex problems, there is so little recognition of what ST has to offer. From the 1940s to the 1970s, ST led the development of exciting new ideas. This was the era of the formation of the Society for General Systems Research, the Macy conferences on cybernetics, and the Gaither lectures at Berkeley. Systems practice helped transform the postwar Japanese economy (the Deming Management Method); put a man on the moon (Systems Engineering); was involved in such ambitious social experiments as the Norwegian Industrial Democracy Project (Sociotechnical Systems Thinking) and supporting the Allende government in Chile (the Viable

System Model); and was influential in the birth of the environmental movement (System Dynamics and ‘limits to growth’). Today, it is rarely taught in universities and while there has been a resurgence of interest in ST, this is not accompanied by a knowledge of its history, the lessons it can impart, or the breadth and diversity of the systems tradition. I have been working on this for 45 years. I have written numerous books and articles and used ST at work and in consultancy. I have done my apprenticeship and earned my stripes. I have tried to do justice to the approach, but it seems that one more attempt is necessary.

I felt that introducing two new ‘frameworks’ could help me express what CST was about more clearly. The first of these I owe to Zhichang Zhu, who led me on a journey from ‘paradigms to pragmatism’, which at times was difficult for me. I had heard people say what a revelation and liberation it was to abandon the ‘spectator theory of knowledge’, seeking accurate representations of an underlying ‘reality’, and embrace the philosophy of pragmatism, in which theories are seen as instruments to guide action. I now know that this is the case. ST has strong pragmatist roots. I believe that, in this book, I have explained it better by paying homage to and enhancing those roots.

The second ‘framework’ I owe to Cathy Hobbs, who insisted that I provide greater clarity on the phases of CSP and that a mnemonic would help. We came up with *EPIC*, and Cathy supplied the first version of the diagram I use to explain *EPIC*. It is difficult to capture how exactly systems practice should proceed because it needs to be innovative and flexible in response to the exigencies of the situation in which it is employed. The invention of the mnemonic prompted me to spell out what I thought could be achieved. *EPIC* is, of course, a label used with tongue firmly in cheek. It is meant to reinforce my insistence that CSP is an ‘ideal type’ of good systems practice. The concept of an ‘ideal type’ comes from the sociologist Max Weber. I adjust its meaning to make it relevant to practice and not just theory development. I see CSP as an abstract model of good systems practice, derived from research and experience. It cannot and is not supposed to be enacted in pure form in the real world. Its use will be different in every application. Nevertheless, it is essential to guide good systems practice, to reflect on what is occurring during an intervention and adjust as necessary, and to evaluate what has been achieved.

I felt a little unfulfilled. My previous books have been structured as accounts and reflections on the work of others, from which I sought to develop new ideas of my own. That is fine; you need to know a field thoroughly to make a useful contribution. Too much of what goes under the label ST, now that it is becoming popular again, shows little appreciation of what has gone before. It does not build on what has already been achieved or seek to learn from previous mistakes. At best, it ends up reinventing the wheel. That said, I remembered Russ Ackoff insisting that one day I should stop standing on the shoulders of giants and write a book where my own ideas controlled the narrative from beginning to end. In almost all

cases, you should do what Russ advises, and I have attempted to do so. I hope he would approve.

I felt I might be abandoning some aspirations too early. In 1814, Wordsworth wrote about ‘The French Revolution as It Appeared to Enthusiasts at Its Commencement’: ‘Bliss was it in that dawn to be alive, But to be young was very heaven!’ I am a child of the 1960s and have always felt about that period in the same way. Revolution was in the air; minds were expanding; wars were opposed; imperialism was called out; global and class inequalities were challenged; movements for women’s, black and LGBT+ rights were underway; and environmental awareness grew. The music certainly seemed better. Of course, there were issues, but some things did change. Not enough, though. I was talking to John Mingers and suggested we had made some small contribution to management science. He pointed out how trivial that was compared to the ambitions we held in the 1960s. He was right, but what do you say? I could only respond: ‘Better carry on then’.

I felt that I should continue to ‘rage against the dying of the light’. This is hard to escape when you have had cancer for 12 years, another major liver operation in 2021, and you are on a monthly drug regime. I am, incidentally, very lucky. I can still enjoy beer and walking. Hull Kingston Rovers are getting closer to the success that us fans, and especially the owner, Neil Hudgell, deserve. Hull City are improving. Yorkshire County Cricket Club could do with some ST. My everyday life remains largely unaffected, thanks to the NHS, modern medicine, and a skilled surgeon, Professor Peter Lodge. I really should not go ‘gentle’.

In the acknowledgements in previous books, I have referred to many individuals, and I continue to owe them all a huge debt. Here I acknowledge, in addition, some organisations responsible for flying the flag for ST in the United Kingdom. The Open University Systems Group celebrated 50 years of teaching ST in 2021. It has been preeminent in spreading systems expertise through its teaching and the ‘systems thinking in practice’ (STiP) approach. Systems and Complexity in Organisation (SCiO) has gained government recognition as the professional body for systems thinkers. It was instrumental in launching the ‘Systems Thinking Practitioner Apprenticeship’, which has spread the teaching of ST to a wider range of universities and opened opportunities for in-work systems training. Of course, I must mention the Centre for Systems Studies at the University of Hull, which celebrated its 30th anniversary in 2022. It pioneered CST and, I would claim, continues to make significant intellectual advancements in the field leading to improved forms of systems practice. Its previous directors deserve a mention: (me), Bob Flood, Gerald Midgley, Jennifer Wilby, Yasmin Merali and Amanda Gregory. Under its current sole director, Amanda Gregory, it is undergoing a significant renaissance. I also wish to acknowledge three ‘communities’ that I have been involved with recently, which have helped me learn more about ST. I have a lecture series in my name at the University of Hull, kindly sponsored

by Dr. Andrew and Mrs. Valerie Chen. I must prepare by reading the works of the guest lecturers so I can ask sensible questions. I have, as is obvious in this book, learned much from Andrea Wulf, Fritjof Capra, Debra Hammond, Peter Senge, Carlo Rovelli, Dave Snowden and Charles Foster. I worked with a community of systems thinkers to help prepare a report for the Alliance for Health Policy and Systems Research. This project has not yet come to fruition, but I am conscious that our many exchanges have infiltrated my thinking and this book. I therefore thank Cathy Hobbs, Patrick Hoverstadt, Martin Reynolds, Luis Sambo, Anne Stephens and Bob Williams. The third ‘community’ consists of Paul Barnett and the facilitators, guest presenters and participants on the first two cohorts of the ‘Critical Systems Thinking and Management of Complexity’ executive programme that I delivered with the Enlightened Enterprise Academy. Our discussions helped me immensely in refining my thinking for the book. You are all entitled to a free copy.

Sincere thanks to Laura Kenny for some insightful, as well as careful, copyediting. And Brett Kurzman, Becky Cowan and Vishal Paduchuru, as well as Hafiza Tasneem, the Wiley team who believed in the book and brought it to fruition.

Finally, to my dog Mollie, faithful friend of nearly 19 years, who died in 2023. She lived long enough to look at her own memorial stone, inserted into a dry-stone wall on the way to Beverley Westwood, where we walked most days. To my children, Christopher and Richard, who live happy and (almost) independent lives with their partners Tess and Dannie, and who have given Pauline and me, to date, three wonderful grandchildren. And, of course, to my fantastic wife, Pauline. Without her nothing that I do that is good would be possible. She has suffered most from me going ‘missing’ to write this book.

*Michael C. Jackson*  
*Beverley and Runswick Bay, January 2024*



## Acronyms

These acronyms are frequently used in the text and are not always spelled out:

|             |   |
|-------------|---|
| CSH         | Critical Systems Heuristics                                     |
| CSL         | Critical Systems Leadership                                     |
| CSP         | Critical Systems Practice                                       |
| CST         | Critical Systems Thinking                                       |
| <i>EPIC</i> | <i>Explore, Produce, Intervene, Check</i>                       |
| GEMs        | Gender equality, Environments and Marginalized voices Framework |
| IP          | Interactive Planning  |
| SAST        | Strategic Assumption Surfacing and Testing                      |
| SD          | System Dynamics   |
| SE          | Systems Engineering   |
| SOSM        | System of Systems Methodologies                                 |
| SSM         | Soft Systems Methodology  |
| ST          | Systems Thinking  |
| STS         | Sociotechnical Systems Thinking                                 |
| VM          | The Vanguard Method   |
| VSM         | The Viable System Model   |

All other acronyms are clearly spelled out close to where they occur.



## Introduction

*The source of our power lies in the extraordinary technological capital we have succeeded in accumulating and in propagating, and the all-pervasive analytic or positivistic methodologies which by shaping our minds as well as our sensibilities, have enabled us to do what we have done. Yet our achievement has, in some unforeseen (perhaps unforeseeable) manner, failed to satisfy those other requirements that would have permitted us to evolve in ways that, for want of a better word, we shall henceforth call 'balanced'.*

(Özbekan, 1970)

This book seeks to help people take decisions to improve situations that are of concern to them. It does not seek to provide solutions but to provide guidance on taking better decisions, particularly in the face of complexity and uncertainty. In philosophy, the study of human action and conduct is called *praxeology*. This is often understood in the narrow sense of calculating the optimal means of achieving known ends. Humans have become very good at this and, as Özbekan said, have 'accumulated and propagated' 'extraordinary technological capital' in support. The danger, recognised by him, is that the 'analytic or positivistic methodologies' that have enabled us to develop these powerful technologies have shaped our thinking to the extent that we are increasingly their servants rather than their masters. A way of trying to protect against this is to broaden the study of human conduct to embrace Aristotle's notion of *prudence* (*phronesis*), which certainly involves some calculation but in relation to the broader purpose of investigating and pursuing 'the human goods' i.e., what is best for humankind. This requires, in Aristotle's terms, 'good deliberation'. Critical Systems Practice (CSP) is about how to carry out 'good deliberation', giving due attention to human requirements other than those that can be met by employing linear, mechanistic, means-end logic. Perhaps we can then evolve in a more 'balanced' way.

In developing this argument, I needed some ‘catch-all’ concepts. I use *Systems Thinking* (ST) to refer to all the various strands of thought and practice that make use of systems philosophies, theories, perspectives, methodologies, models, methods, concepts and ideas to understand and intervene in the world. This tradition of thought embraces, for me, Cybernetics and Complexity Theory as well as, for example, General Systems Theory, Systems Engineering, System Dynamics and Soft Systems Methodology. I am aware of the differences; indeed, my point is that they are all good at different things. But it helps to have a generic term. This goes for *Systems Approaches* too. To avoid endless lists, I use this concept to refer to all the various systems philosophies, theories, methodologies, etc., employed by those in the broad ST tradition.

The book has three parts. The first traces the emergence of Critical Systems Thinking (CST) and has three chapters. Chapter 1 outlines the achievements and limitations of the scientific method, suggesting that increasing awareness of these limitations and their consequences for humanity and the environment points to the need for ST as a complementary approach, especially in the realm of human affairs. Chapter 2 sets out the challenges this poses to ST and two ways in which it has tried to meet them. The first of these, the pursuit of general systems laws, flounders, because higher levels of complexity give rise to ‘emergent properties’ which cannot be explained with theories appropriate to lower levels of complexity. ST has been more successful in following a second route – developing a range of systems methodologies that engage with different aspects of complexity in different ways. However, this has led to fragmentation. Chapter 3 shows how CST has sought to restore order to a field in which different systems approaches came to be seen as competing. It does so by pointing to the strengths and weaknesses of the different approaches (systemic critique) and suggesting that they could be used in combination (systemic pluralism) to achieve wide-ranging systemic improvement. Systemic pragmatism provides the rationale and justification for CST.

Part 2 looks at how CST can be translated into practical action through the *EPIC* stages (*Explore, Produce, Intervene, Check*) of CSP. Chapter 4 provides an introductory overview, explains the role of *EPIC* as an ‘ideal type’ of systems practice and links CSP to some related approaches. Chapter 5 details the multiperspectival *Explore* phase and how it employs five insightful ‘systemic perspectives’ – mechanical, interrelationships, organismic, purposeful and societal/environmental – to surface the most important issues that need attending to in a situation of interest. Justification is provided for the choice of these five perspectives. Chapter 6 considers how best to *Produce* an intervention strategy to manage those issues. This rests upon an understanding of what different systems methodologies do well. Five types of systems methodology are identified: engineering, system dynamics, living, soft and emancipatory. Each type is related

to one of the ‘systemic perspectives’ and prioritises the concerns it highlights. Example methodologies are described, and their mode of operation is clarified using case studies. Chapter 7 discusses *Intervene*, the third stage of CSP, considering how best to conduct a flexible multimethodological intervention in accordance with agreement on which systems methodologies, models and methods are best suited to addressing the issues of concern. Chapter 8 looks at *Check*. *EPIC* should be seen as an iterative process which continually identifies and manages new issues as they come to the fore. Nevertheless, attention must be given to evaluating progress both during an intervention and as it comes to an end. *Check* considers the best way of doing this from a CSP perspective.

Part 3 contains Chapter 9. This explains Critical Systems Leadership as an approach that can best take advantage of the current upsurge in interest in ST and overcome the barriers to successful implementation deriving from the way ST is presented and perceived and from various cultural and societal constraints.

The book is a ‘practitioner’s guide’, and the busy reader can be excused for going straight to Parts 2 and 3, which explain CSP and how to succeed in applying it, but that would be a pity. CST has the broad purpose of enhancing ‘good deliberation’ in ways that will allow us to evolve in a more ‘balanced way’ and improve the world in which we live. CSP needs to be understood as a means of realising that ambition.

The structure of the book is summarised in the Table below.

The Structure of the Book.

---

|  |   |
|--|---|
| Introduction                                       |   |
| Part 1: The Emergence of Critical Systems Thinking | Chapter 1: The Scientific Method<br>Chapter 2: Systems Thinking<br>Chapter 3: Critical Systems Thinking   |
| Part 2: Critical Systems Practice                  | Chapter 4: Critical Systems Practice: An Overview<br>Chapter 5: Critical Systems Practice 1 – <i>Explore</i> the Situation of Interest<br>Chapter 6: Critical Systems Practice 2 – <i>Produce</i> an Intervention Strategy<br>Chapter 7: Critical Systems Practice 3 – <i>Intervene</i> Flexibly<br>Chapter 8: Critical Systems Practice 4 – <i>Check</i> on Progress |
| Part 3: Towards a Systems Thinking World           | Chapter 9: Critical Systems Leadership: Overcoming the Implementation Barriers  |
| Conclusion   |   |

---

## Reference

Özbekan, H. (1970). *The Predicament of Mankind, a Quest for Structured Responses to Growing World-Wide Complexities and Uncertainties: A Proposal to the Club of Rome*. University of Pennsylvania.

## Part 1

### The Emergence of Critical Systems Thinking

*The most striking indication of the pathology of our species is the contrast between its unique technological achievements and its equally unique incompetence in the conduct of its social affairs.*

(Koestler, A., 1979, *Janus: A Summing Up*. Pan Books)





# 1

## The Scientific Method

*Inquire of ancient Wisdom; go, demand  
Of mighty Nature, if 'twas ever meant  
That we should pry far off yet be unraised;  
That we should pore, and dwindle as we pore,  
Viewing all objects unremittingly  
In disconnection dead and spiritless;  
And still dividing, and dividing still,  
Break down all grandeur ...*

(Wordsworth, 1814)

### 1.1 Introduction

This chapter outlines the achievements and limitations of the scientific method, beginning with a brief discussion of early Systems Thinking (ST) and how it was pushed to the margins of reputable thought by the success of the Scientific Revolution. The Scientific Revolution began in the sixteenth century with Copernicus's heliocentric account of the cosmos and was consolidated in the early seventeenth century with the establishment of the scientific method based upon mechanism and reductionism. Newton's *Principia*, published in 1687, marked its apotheosis. This was a revolution that encompassed remarkable developments in mathematics, physics, astronomy, chemistry and biology. It inspired the agricultural and industrial revolutions of the eighteenth century which transformed the world in which we live. The chapter goes on to discuss some of the limitations of the mode of thought underpinning the Scientific Revolution. Recognition of these limitations, and their consequences for humanity and the environment on which we depend, has led to a positive reassessment of the value of ST as a complementary approach to the traditional scientific method.