Systems approaches to post-conflict transitions: Potential and practice

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Abstract

This working paper examines the potential role of systems thinking, analysis and innovation in supporting work on post-conflict transitions and the recovery of conflict-affected states. This responds to a surging interest in systems approaches to handle uncertainty and complexity, concerns around the adequacy of linear approached, and a gap in connecting big ideas around systems to a specific, challenge context. To do so, the paper takes on three questions: What is systems thinking? How does systems thinking complement or contradict current thinking and practice around post-conflict transitions? And, finally, for organisations interested in systems approaches, what innovations are necessary to how they work and the systems in which they sit to make this approach possible? The paper finds that systems thinking, tools, and approaches to change show promise, particularly as analytical techniques for building understanding and shared meaning and as a new way of thinking about leverage points and interconnected interventions. The structural or architectural view of systems also lends new insights into terms such as fragility, resilience, and intractability. The paper ends by turning these analyses towards the organisations themselves, concluding with the core systems insight that intervenors are not only part of the system which they seek to support but also that they sit within their own systems and routines. This paper is written with the interests and concerns of post-conflict practitioners in mind; however, it may be of broader interest to scholars of systems thinking and peace and conflict studies.

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1. Introduction

Much of international relations and political science is rooted in a systems-based view of the world (Monteiro 2012). Scholars have long been concerned with questions of equilibrium, geo-political stability and the ways in which economics, geography, demographics, norms and force bring (or prevent) change to the 'international order'.[1] There is also attention to the influence of political systems and, increasingly, appreciation of the systemic nature of bias, including racism, ableism and sexism, and exclusion. These ways of approaching the world encompass both thin and often mechanistic notions of systems, as well as thicker and more nuanced views that take into account power and ideas.

However, as Ropers (2008) points out, the discipline of peace and conflict studies has yet to fully engage with systems thinking.[2] This includes questions of how systems produce and reproduce phenomena, and how to use these insights for peacebuilding:

> In most cases… only selected elements of systemic thinking were applied and primarily used in analysing the 'intractability' of conflicts. Less thought was given to systemic ideas of how to resolve or transform them. (Ropers 2008: 2)

More starkly, Loode argues that 'contemporary peacebuilding practice is still governed by a positivist, reductionist and linear understanding of social change' (2011: 81) — assumptions that systems thinking approaches roundly reject.

There are some hints that this is changing. In 2018, Moe and Steppatut identified a 'pragmatist turn' in peacebuilding, which includes 'the related rise of complexity, hybridity and resilience thinking' (293). This call is tied to greater appreciation of local context and authority, and rejects the liberal peacebuilding approach, with its roots in Western enlightenment concepts, markets, and institutions, that dominated the post-Cold War period (Richmond 2009; Lindén 2009; Paris 2002). There is also increasing recognition that international actors have been poorly equipped to engage with or even perceive local systems. As the UN High-level Independent Panel on Peace Operations notes: 'Some expressed concern that peace operations did not spend enough time understanding existing capacities for peace and protection or conflict mitigation mechanisms and simply replaced local structures with exogenous ones' (2015: 78). These issues have been linked to on-going challenges in international efforts to support post-conflict transitions.

This paper provides an overview of this emerging work, and potential contributions of systems thinking and systems approaches, for practitioners supporting post-conflict transitions,[3] looking

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[1] Useful examples include the work of Deutsch, who engaged with cybernetics in the early 1960s, as well as theorists such as Wallerstein (1974), who notably introduced a macro-sociological, world systems perspective; this turned attention to units of analysis greater than the state, re-mapping the world in terms of core and periphery relationships. This attention to the core and periphery becomes important in critiques of liberal peacebuilding as failing to be emancipatory and instead reinforcing Western institutions — both political and economic — and ways of knowing (Comaroff and Comaroff 2012). For a full review, see Monteiro 2012.

[2] For other early work, see Ramalingam et al 2008, and Korppen and Schmelzle 2008.

[3] This paper focuses on post-conflict transitions, which encompasses issues around peacebuilding, state-building and consolidation. The definition of post-conflict can be slippery, particularly when violence continues or even increases after

across systems thinking, systems analysis and systems innovation.[4] The paper also asks what makes post-conflict systems distinctive and how, and to what extent, systems approaches could enrich existing practice. The paper argues that systems thinking can be understood in three key ways: a way of seeing the world, an analytical toolkit and a set of approaches to intervention rooted in systems. Each of these ways of engaging with systems holds promise for post-conflict stabilisation and peacebuilding, as well as providing insights into the organisational change that may be needed to embed new ways of thinking — particularly if Loode's assessment that linear and reductive approaches remain dominant rings true.

In order to explore these questions, the authors first conducted a review of the systems thinking literature, seeking to encapsulate of its key insights, as well as the main debates. This also enabled us to identify key concepts and authors that further enrich the post-conflict transitions literature. The authors then turned to the limited scholarly literature that focuses on the intersection of systems thinking and post-conflict transitions. A more complete survey of current approaches to peacebuilding and post-conflict transitions, including the presence or absence of systems-based approaches and concepts (whether or not explicitly described as such), is beyond the scope of this work and would be appropriate for further study.

Systems thinking is ultimately an approach to understanding and working with complexity — something familiar in contexts marked by volatility and disruption of social, economic, and political institutions, an influx of external actors and resources, environmental strain and climate change, and limited information. Gray and Burn remind us of the 'dynamic causation of peace and conflict-related phenomena, which defy our attempts at simplification and pre-planning' (2020: 19). This insight resists notions that regions or countries are wiped clean by conflict, leaving a *tabula rasa* to be rebuilt by external actors with new institutions and open markets (Roll 2018). Systems thinking approaches are focused on alternatives to our impulse towards rationalisation; their promise is to help us find a way to take account of complexity and uncertainty while also finding ways to act.

The following paper is divided into seven more sections, beginning with a brief introduction to the concept of systems. The third, fourth and fifth sections focus on systems thinking (systems as a mindset or way of seeing the world), systems analysis (tools for analysing systems) and systems innovation (the deliberate practice of changing systems). These sections are followed by an exploration of post-conflict settings from a systems perspective (section 6) and the attendant challenges of using systems approaches in post-conflict contexts (section 7). The final sections engage in a discussion of the implications for adopting systems approaches (section 8), followed by the conclusion (section 9).

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the cessation of the formal conflict. In the case in civil conflict, there may be no withdrawal of forces, for example, to mark a conflict's end. Accordingly, this paper follows Brown et al. (2011) and takes a process view, recognising a continuum from conflict to peace, along which there are indicators of progress, such as reductions in violence or the return of displaced peoples. This open definition is appropriate to this type of review, which seeks a broad exploration of a topic.

[4] The authors use the term 'systems innovation' to underscore efforts by intervenors to *create* change by affecting a system's structure; this idea is also captured in the term 'organised systems change' (Mair and Seelos 2021) and 'systems change'. We find the latter can be confused with change that happens by design and that which is either unintended or happens independently of an intervention.

2. What distinguishes systems approaches?

Why are some problems chronic and some 'solutions' create no change at all? Why do some problems have inter-generational consequences while others dissipate? Why do some problems recur so consistently across history and geography? Why do some fixes fail? These questions are particularly well-suited to systems approaches and are also highly relevant to those working on post-conflict transitions. So, as a starting point, what does a systems approach to the world mean? This section lays out four core areas of concern: relationships and holism; the nested nature of systems; complexity and adaptation; and interactions between formal and informal systems.

Systems thinking is firstly concerned with holism and interconnection, taking seriously the idea that the whole is greater than the sum of its parts. As Ackoff summarises, we must be attentive to 'total systems even when a change in only one or a few parts is contemplated' (1971: 661). This is because relationships exist between parts of the system and these relationships create systemic effects or 'emergent properties'. Indeed, it is specifically the interaction between parts, and the creation of a whole, that distinguishes between a 'heap' and a system. Heaps may have multiple parts, but the relationships between the parts are not meaningful to the function of the whole. As Kauffmann memorably quips: 'Dividing a cow in half does not give you two smaller cows' (1980: 2).

In this systems view, peace or conflict can be understood as 'emergent properties of the dynamic interactions between a highly diverse set of causal factors and actors' (Gray and Burns 2020: 19). This focus on emergence also resonates with ideas of positive and sustainable peace (Galtung 1969). Peace is not the absence of violence. Instead, peace is the product of a system. In this 'peace system', the actors, resources, and institutions (formal and informal) that enable the pacific settlement of disputes function, and remain dominant and active, even under great stress. Scholars have argued that systems approaches are thus key to the 'emerging concept of *sustaining peace*, by emphasizing how adaptive peacebuilding embraces uncertainty, focuses on processes rather than end-states, and invests in the resilience of local institutions' (Moe and Steppatut 2018: 298). In this perspective, peace is a *systems effect*.

Secondly, systems thinking is interested in the relationships *between* systems. This means taking seriously that 'wider systems and structures not just as "inert" background and context for interventions' but provide 'clear root *causes*' of the issues we care about (Hoddy and Gready 2020: 571). Systems are nested within each other; this can be represented in a classic bull's-eye model, in which an individual is depicted at the centre with concentric rings of household, village, municipality, etc. radiating outwards. More profoundly, this attention to the relationship between systems may be used to recognise that interventions themselves are nested within systems of belief, resource flows and politics. This is often depicted vertically as an 'iceberg model', with phenomena visible above the waterline (e.g., the burning of houses in a civil conflict) and beliefs and mindsets (e.g., ideas of legitimate ownership, ideas around land) furthest below the waterline. This insight underscores that changes to institutional environments, norms and ideas, and wider systems are necessary for making profound change, as well as for making these interventions sustainable over the longer term, including for the implementing organisation. Furthermore, this

interest in the interaction between systems brings considerable attention to the question of systems boundaries and the analytical significance of where these are drawn, how and by whom.

Thirdly, systems thinking helps us understand complex adaptive systems. Different systems characteristics produce different dynamics. There are several ways to classify these differences; focusing on the degree to which there is agreement around system goals on one axis and predictability on the other, systems be classified as simple, organised, complex and adaptive or random (see summary in Hargreaves 2010: 3). Social environments are generally *complex* (as opposed to the *complicated* nature of a pocket watch or jet engine), and they are characterised by high integration, porous boundaries, dynamism, and non-linearity. These systems are also *adaptive*, meaning that actors take in feedback, learn, and adjust. In other words: when pushed, a system pushes back. As explored by Snowden and Boone, these characteristics require specific strategic actions; in complex systems, for example, practitioners may benefit from using probes — small tests or experiments — to understand the context and feedback, and to clarify direction (2007: 6; see also Snowden 2005).

Due to these feedback processes and loops, these complex adaptive systems are often highly robust and resistant to change, constantly shifting to maintain the status quo. This can be observed in ecology, for example populations of wolves and deer keeping each other in check, as well as in market systems. Housing subsidies, for example, become 'priced in' to house prices, nullifying the intended effect of the subsidy (Bramley 1993). As Foster-Fishman observes: 'Leveraging change in one part will lead to the desired outcome only if concurrent shifts happen in the relational and compositional elements of the system' (2007: 199). This leads to the core insight that adjusting one part of a system may not be sufficient for creating the desired effect, even if there is presumed to be a strong causal linkage (e.g., between housing subsidies and housing costs).

As a corollary, however, the non-linearity and interconnectedness of complex systems also means that a change can come rapidly and unexpectedly, and shift conditions exponentially. This has attracted attention in the growing literature on both natural and social tipping points (see Milkoreit et al. 2016), which links to earlier work by Granovetter (1978) on when and how individuals choose to take part in collective social behaviour, like a riot. The interest in tipping points also resonates with scholarship on punctuated equilibrium in social and political change, which argues that periods of statis are punctuated by radical and deep shifts (Baumgartner and Jones 2010; see also Geels and Schot 2007 on shifts in socio-technical systems). This work provides an important response to theories of incrementalism and systems equilibria, which leave little theoretical scope for social or regime-level change.

Finally, while less prominent in the systems literature, systems thinking can help us identify the relationship between formal and informal institutions: 'It is, I think, a characteristic of large, formal systems of coordination that they are accompanied by what appear to be anomalies but on closer inspection turn out to be integral to that formal order' (Scott 1998: 578-9). Here Scott underlines the critical importance of informal systems — whether unpaid women's work, independent litter pickers or informal remittances — to sustaining what he calls 'high modernist' projects. These projects seek to reconfigure or remake societies; examples include Ujamaa villagisation in Tanzania and the creation of capital cities from scratch, as in Brasilia. The challenges which ensue

from these high-modernist city visions, argues Scott, stem from their efforts towards radical simplification and neglect of informal or invisible (to the intervenors) networks, practices, knowledge, and politics, which he terms *metis*. *Metis* then becomes the basis of resistance, the 'weapons of the weak' (Scott 1985).

Scott is not interested in providing a functionalist or 'how to' guide (e.g., these interventions would have worked if intervenors had just considered the informal). Instead, his work entails a deeper critique of who these interventions are for and for what purpose. These questions have also been asked regarding post-conflict state-building, which, particularly in the early 2000s, have been critiqued for their 'high modernist' aspirations (Heathershaw and Lambach 2008). As Rubin states: 'Studies of state-building operations often try to identify "best-practices" without asking for whom they are best' (2006: p 184). It is notable that critical systems theorists point out that mainstream systems thinking has often failed to adequately incorporate questions of power and interests, including systems analysis in the context of coercion or power asymmetries (Jackson 1991; Midgley 1991).

3.   Thinking in systems

While the recognition that we work in complex adaptive systems may at first seem like an analytical or strategic insight, the recognition of non-linearity and complexity may be understood first as a *mindset, way of seeing the world* or *epistemological stance*. Embracing a systems mindset asks that analysts and practitioners abandon notions of quick fixes, silver bullets and certainty; and it asks that they retain focus on adaptation, feedback loops and unintended consequences. It also asks that they envision themselves as part of the system, implicated in its function, and necessarily having an obstructed view of the action. This idea of systems thinking as around perception is reinforced by Senge: 'Systems thinking… is a framework for seeing interrelationships rather than things, for seeing patterns of change rather than static snapshots' (2006).

Systems thinking helps us engage with and prepare for, rather than shy away from, complexity and uncertainty. Durand, who has written on complexity theory and systems approaches to conflict transformation in Myanmar, writes:

> *'While complexity theory cannot predict the outcomes of system interactions, complexity theory can prepare an external observer for the unpredictability of the outcomes created by the system dynamics' (2013: 16; our emphasis).*

He locates the contribution in terms of a practitioner's expectations and preparation. Gray and Burns make a similar point on being 'mindful that unforeseen and unintended consequences are likely when we intervene' (2020: 19). This idea of preparation for the unpredictable is also echoed by de Coning, for whom a key recommendation is that the United Nations and 'other institutions that undertake peace interventions… develop institutional mechanisms for addressing the inevitable unintended consequences of their interventions' (2016: 178).

As noted in the introduction, this stance contrasts with positivistic, utilitarian approaches, most recently captured in the 'what works' or results agenda and evidence-based policy.[5] This includes the dominant approaches of post-conflict intervention. As Loode argues, state-building efforts have often been built on models of simple, linear systems, which 'leads to the assumption that programme and project outcomes can be predicted and planned with certainty. In complex social systems such planning is impossible' (2011: 81). To Loode, complex adaptive systems confound efforts to assert control and rationalisation: 'Command-and-control methods, detailed forecasts and plans are effective only for linear systems and fail to achieve desired outcomes in complex environments that involve vast numbers of interactions where the results cannot be traced to specific causes' (2011: 71). Working in these environments requires a different stance.

This stance may, as a starting place, be multi-disciplinary. As Forrester notes:

> '[A] proper study of systems must usually break down the boundaries between academic disciplines… "The message is in the feedback, and the feedback is inherently interdisciplinary"' (2009: 9).

Multiple problems exist at once, each with unique dynamics; their interactions determine what kinds of approaches may be appropriate. This demands multiple types of information to be brought together and interpreted. This asks individuals to be open to different forms of information, as well as organisations to be able to work across disciplines.

Finally, a systems perspective has implications for how practitioners see their roles in the system. As Senge emphasises, our view of the system is both incomplete and biased: 'None of us see the system. We see our own part based on our own background and history. And we all think we see the most crucial part' (2006). This is a core critique of liberal peacebuilding since the end of the Cold War: despite good intentions, international actors have brought a liberal, Western view of peace that has led to a lack of appreciation for local contexts (Richmond and Mac Ginty 2013, 2015). This observation — that our view of a system is necessarily incomplete and value-laden — may resonate with practitioners in post-conflict or conflict-affected contexts: our understanding of what is happening in post-conflict contexts is often severely limited, whether through access challenges created by well-intended security protocols or language and cultural barriers, if working outside of our nation of origin. Part of the systems mindset is to recognise both our biased and limited view as an unavoidable starting condition.

4. Analysing systems

If systems thinking is a mindset or perspective, systems analysis is a set of tools that brings these ideas to life and represents the world in systems terms, often in maps. Systems analysis enable us to depict hypotheses, capture mental models, map key actors, and identify patterns. Attention to systems helps us understand how and why stocks of something (e.g., number of cod) increase, decrease, or stabilise over time in relation to key drivers (e.g., number of fishing boats, prices of

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[5] see Taylor 2013 on the conflict between systems approaches and evidence-based policy).

cod). The analytic focus is generally how those dynamics are sustained. Most systems analysis begins with questions of actors, resources, boundaries, and relationships.

Systems tool help analysts to not only ask questions about root causes (*Why are we seeing this phenomenon?*) but also to consider how a given system responds to change (*Why is this system resistant to change? Why does the system not cope with certain phenomena? Where are systems delays?*). Systems thinking is generally not about validating the correct strategy, but invalidating strategies based on their violation of known features and understanding the diversity of options. As summarised by Monteiro (2012: 346): 'The point is not to wish away the complexity of systems, rather to make actors and policy makers aware of it.'

While those interested in systems dynamics and modelling may focus on prediction, most of systems work does not assume outcomes of an intervention can be foreseen through analysis nor can they be controlled. Recalling Durand, a 'soft systems' perspective, which seeks to build a fuller, qualitative picture of a situation by integrating multiple viewpoints, suggests that systems analysis is less about predicting outcomes as anticipating, and preparing for, uncertainty and creating shared meaning. Concerns with uncertainty also open new avenues of exploration. For example, what are the potential failure points? Where could an intervenor add redundancy so that future volatility does not create catastrophic social problems? Improvements to how a system responds to changes may be made without needing to predict the full range of future events.

With systems analysis, capturing more detail does not necessarily translate to capturing a situation better. And increasing the scope of analysis does not necessarily translate to a more accurate picture of interactions. This is a common trap, particularly when confronted with highly detailed 'spaghetti and meatballs' causal loop diagrams that attempt to pack as much information as possible into a single picture. An analytical challenge of dealing with systems is that everything appears to matter; this can lead to paralysis. An alternative may be to both acknowledge incompleteness, as discussed above, as well as to be attentive to not only the volume of information but also the scope of analysis and question analytical boundaries (*What is included? What is left out? And why?*). This can also help us choose from between systems analysis tools.[6]

Tools for systems analysis originate in a wide range of disciplines, including: innovation studies (e.g., Geels and Schot's multi-level model), business strategy (e.g., USAID's five R's analysis - Resources, Rules, Roles, Relationships, and Results), marketing (e.g., journey mapping), social networks analysis, engineering (e.g., stock-flow diagrams), cybernetics (e.g., computational modelling), and others. This diversity of origins and theoretical lineage can lead to contradictions between tools. Indeed, one critique of the systems thinking literature is that it lacks theoretical coherence and 'systems thinking approaches … are more taxonomies of methodologies' (Cabrera, et al. 2008: 302). Others, particularly in critical systems thinking, have viewed this diversity as an asset and, in recognising that no tool captures reality fully, that we can choose the best tools for the job (see Jackson and Keys 1984).

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[6] A key operational point here is the need for reflexivity when assessing what is included and what is left out. Who decides these two points also matters.

A key difference between approaches is in regards to positivist or post-positivist ontology and a focus on quantitative or qualitative methods. As will be described below, 'hard' systems methodologies are generally quantitative and focussed on computational modelling (Forrester 1994). By contrast, 'soft' systems methodologies are primarily qualitative, interpretivist, and focussed on multiple perspectives; this makes them more appropriate for analysing social phenomena and building shared understanding. Kunc (2017) makes a further distinction between qualitative and quantitative system dynamics relating to the objective of modelling. Kunc notes the qualitative systems dynamics model is to 'understand the feedback structure of the system' where the qualitative systems dynamics model is to 'test a hypothesis about the structure driving the reference mode of the variable under study' (Kunc 2017, 600).

Ultimately the hard and soft distinction falls less on 'deterministic-versus-open' framing than on quantitative and qualitative methodological preferences. Related system dynamics models such as the total systems intervention (TSI), integrative systems methodology, living systems theory, viable systems model, operations research, have emerged across hard and soft approaches (Schwaninger 2011).

4.1 Hard systems methods

Hard systems methodologies are rooted in systems engineering, and these approaches are more structured and quantitative than soft systems methods. Drawing from a positivist perspective, they assume an objective, observable reality, in which a problem can be both defined and solved. The virtues of the 'hard' approach concern the external validation and testing of primary systems hypotheses through simulation or modelling. Applications include modelling the impact of different interventions over time; for example, Wakeland et al. (2015) used a dynamic model to argue that reducing informal sharing of prescription opioids will be more effective over time than making the drugs harder to inject.

A key pioneer of hard systems methodologies is Forrester. He applies systems dynamics to operations research through a six-step approach. Step one describes the system, providing an initial hypothesis and theory for why the system is producing 'aberrant' behaviour. Step two converts the system description and hypothesis into level and rate equations. Step three generates a simulation of the system based on the equations. Step four assesses and designs alternative policies and structures, testing within the simulated model. Steps five and six concern the social-activist dimensions external to the research and simulation, around the education and debate with external actors, as well as changes and policies to experiment with 'in the real world' (Forrester 1994).

Some scholars have sought to use systems dynamics models to better understand and even anticipate conflict. The spirit of this work may be traced back to initiatives such as the Correlates of War project[7], which began in the 1960s and uses statistical tools to better understand and even predict conflict. The most notable work has occurred at MIT, which has been a leader in systems dynamics and hard systems methodologies. As Choucri et al. argue, this modelling is 'designed to

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[7] see https://www.correlatesofwar.org

eliminate the limitations of linear logic' (2004: 5), and the work has resulted in a set of ideal type models that illustrate linkages between population, resources, technology, and conflict.

Yet despite these advances, Choucri et al. identify the three Ds — 'distributedness of data, the diversity of threat, and the density of conflict' — as major barriers (2004: 2). As argued by Roll and Swenson (2018), post-conflict contexts provide unique challenges in terms of both data access and data quality. Post-conflict contexts may thus be particularly poorly suited for many types of 'hard' systems methodologies that rely on high volumes of accurate data to create and test valid models, or that require high volumes of accurate data to update and test new models as the situation unfolds. Indeed, overall, systems thinking as a field has experienced the 'death of the super model' based on both practical limitations (the three Ds), as well as the unrealisability of comprehensiveness (see Helfgott 2016: 854 on Ulrich and the problem of holism).

Another concern with the use of hard systems methodology is epistemological; as Lane (2000) notes, the use of simulations and 'hard' approaches creates a deterministic image. Checkland and Poutler make a similar critique; they argue that for hard systems methodology '[i]ts belief is: the world contains interacting systems. They can be "engineered" to achieve their objectives' (2020: 198). The authors continue: 'This is the stance not only of [systems engineering]; this thinking also underpins classic Operational Research, RAND Corporation "systems analysis", the Viable System Model, early applications of System Dynamics and the original forms of computer systems analysis' (2020: 198).

4.2 Soft systems methods

In contrast to hard systems methodologies, soft systems methods approach the world as a set of 'messes' (see overview by Checkland and Poulter 2020), with systems as the heuristic tool to start understanding what is happening. Soft systems methodology brings attention to the social nature of systems (i.e., in opposition to physical or natural systems governed by physics, chemistry and biology), as well as the role of stakeholders in defining the system. Mapping is communicative, interpretive, and subjective. And decisions about what is or is not a problem and what (or who) fits within the scope of analysis are value-laden and reflect power relations.

Soft systems analysis serves as a reflexive device to understand both stakeholders' and analysts' assumptions. For example, a practitioner may ask two different stakeholder groups to map the same system; these maps are then brought together and contrasted to generate a richer, synthetic map, to expose and explore conflicting understandings of the system. This, ultimately, may support joint action. The analytical and consensus-building value of the map holds even if the maps are not usable or comprehensible to outsiders. Accordingly, mapping has become a key tool in systemic inquiry and action research (see Burns 2012), as well as a form of community intervention.

Critical systems theory has built on this soft systems perspective, underscoring not only the importance of subjectivity in soft systems analysis, but interrogating the role of power. This work emphasises that who is doing the mapping and how they draw boundaries around a problem can serve as tools of both inclusion and exclusion. Building on earlier work by Churchman, Ulrich

(1994) suggests that for systems analysis to be emancipatory, it needs to draw the widest possible boundaries and include the largest number of perspectives. As Midgley summarises:

> *Something that appears to be an improvement given a narrowly defined boundary may not be seen as an improvement at all if the boundaries are pushed out. For this reason… as much information as possible should be 'swept in' to definitions of improvement. (Midgley 1998: 467-8)*

Expanding information on the system means 'sweeping in' more viewpoints, as well as making sure to include both the 'affected' and 'involved' (Midgley 1998: 471). Focus on these stakeholders helps reconcile the desire for a non-hierarchical Habermasean 'ideal speech situation', with the reality of limited time, access, and resources.

The question of who participates in mapping and problem definition is central to discussions of the application of systems tools to post-conflict transitions. As Ricigliano argues, systems thinking can prompt analysts to question where they draw boundaries: 'If key actors or social dynamics exist outside one's view of a conflict, then those factors are more likely to be taken as a given and not included in interventions aimed at addressing the conflict' (2011: 19). Systemic action research, which is discussed in greater length in section 5.3, underscores this point and reflects the concerns with voice and representation raised by those in the critical systems thinking school. As Gray and Burns write: 'The people that suffer conflict's most direct consequences require more than most that their peacebuilding concerns to be addressed, but in many cases cannot rely upon "outsiders" to recognise, understand, or prioritise resolution of the problems that "insiders" care about' (2021:17). These are the perspectives that must be 'swept in' to a systems analysis.

4.2.1 Mapping tools: Iceberg models and causal loop diagrams

Soft systems and critical systems methodology centres on creating causal loop diagrams (CLDs) and other maps with community-to-surface latent mental models and assumptions. In recent years, there has been a fluorescence of excellent toolkits that support practitioners in employing systems mapping tools. This includes work on integrating systems thinking into policy design processes and action research (see Abercrombie et al. 2015; UNDP 2022; UK Government Office for Science 2022; The Omidyar Group 2017; many of these have usefully been collected by the Observatory of Public Sector Innovation in their Toolkit Navigator). While a full review of the techniques these toolkits put forward is beyond the scope of this work, two mapping techniques — iceberg model and causal loop diagrams — are highlighted below.

Firstly, a popular systems mapping tool is the iceberg model (Goodman 2002; Kania 2018; Johnson et al. 2020: 45), which encourages analysts to look 'below the waterline' and examine the patterns, structures and ultimately mental models that produce observable phenomena. Analysts working with an iceberg model begin by identifying what has happened. This may include attention to explicit policies, practices, and resource flows. Analysts then move to the next level down, examining the patterns of behaviour or trends that sit below the observed event. This may include relationships and connections, and power dynamics — what Kania describes as the 'semi-explicit level' (2018: 4). Moving another level down, analysts look to the system structures that contribute to or produce these patterns. Finally, deepest below the waterline, are mental models — the implicit level. The value of this tool is to connect events to deeper structures and ways of thinking; this can

shift thinking from seeing an event as the problem to seeing the event as an epiphenomenon, or product, of another issue. The supposition is that to address the event requires addressing issues at the semi-explicit or even implicit levels.

Secondly, causal loop diagrams seek to capture systems dynamics through depicting the relationship between different variables; these diagrams depict the networks of relationships that drive or sustain a set of outcomes. A reinforcing loop escalates a situation; for example, the accumulation of wealth and privilege may be understood as reinforcing dynamics, whereby individuals with greater wealth have access to the cultural and financial capital, and resources, that allow them to maintain that status. By contrast, balancing loops are homeostatic; redistributive policies are a form of balancing loop, whereby the accumulation of wealth is checked. The presence of reinforcing loops is particularly important for understanding non-linearity; namely that inputs and outputs are not linked as may be anticipated. A small stimulus may have a much larger effect than expected or, concomitantly, a large input may have a much smaller effect than imagined.

Stakeholder-generated CLDs can be a useful analytical tool in post-conflict contexts. As Ropers argues, an analysis of systems dynamics can capture security dilemmas and can help to highlight conflict factors:

> *The added value of this system dynamics analysis is not the listing of the driving factors as such… The advantage of this type of mapping is the detailed contextualisation and visualisation of linkages between these variables that fuel the conflict, e.g., the 'embattled minority complexes', relative deprivation on both sides as well as self-fuelling cycles of militarisation and feudal or secessionist mindsets. (Ropers 2008)*

We can model both escalatory dynamics, whereby intimidation and violence, unchecked or encouraged, swiftly beget more violence, as well as balancing loops whereby violence triggers an effective security response, reducing tensions.

This view is echoed by Gray and Burns: 'The causal pathways depicted by the systems mapping helped the researchers develop customised theories of action for each of these peacebuilding interventions' (2021: 28). They also find value in mapping systems dynamics, particularly around non-linearity and why systems fail to respond to interventions: 'The identification of non-linear patterns such as feed-back loops help us understand why a system's behaviour can change quickly, or doggedly despite forces to the contrary, helping us understand resilience or conflict intractability' (2020: 19). As will be discussed in the next section, the identification of reinforcing loops, for example, can form the basis for a system change strategy — for example, finding ways to strengthen countervailing balancing loops.

Overall, the purpose of mapping or systems analysis in soft-system theory is to generate shared understanding, but not to leverage that for a simulation or related agent-base modelling approaches, as in hard systems analysis. This shifts our focus from modelling and mechanistic descriptions to embracing multiple, rich, partial, and conflicting perspectives. Accordingly, systems analyses are best used as filters for options. Soft systems work moves from trying to discover 'the

truth' to a process of making choices, understanding perspectives, and developing strategies for acting and dealing with unexpected outcomes (Woerman 2010: 121).

4.3 Archetypes and traps

The above discussions have focused on using hard or soft systems methodologies to map dynamics. Another application is the use of systems archetypes, as described by Senge in the *Fifth Discipline* (1990), to identify common patterns. Of particular interest are archetypes that help us to better understand why interventions are not working. For example, we may observe 'fixes that fail'; these are interventions that by targeting a symptom of a problem end up creating unintended consequences that may ultimately aggravate the problem. In recognising these archetypes, systems actors can think about ways to address the issue, for example trying to shift away from addressing a symptom towards greater engagement with root causes (for a typology of systems archetypes, see Kim and Anderson 1998).

A good example is the idea of systems traps, as described at length by Meadows (2008). A systems trap begins with an intervention that creates the desired effect. However, as in a 'fix that fails,' the intervention does not address root causes. Faced with this failure:

> [T]he intervenor applies more of the 'solution,' disguising the real state of the system again, and thereby failing to act on the problem. That makes it necessary to use still more 'solution'. The trap is formed if the intervention, whether by active destruction or simple neglect, undermines the original capacity of the system to maintain itself. If that capability atrophies, then more of the intervention is needed to achieve the desired effect. That weakens the capability of the original system still more. The intervenor picks up the slack. And so forth. (Meadows 2008: 133)

These archetypes become useful for creating a vocabulary to describe these challenges, as well as helping those involved to take action to begin unwinding unhelpful dynamics.

This 'fixes that fail' cycle, whereby the intervention intensifies and weakens the capacity of the system, resonates with concerns with capacity, institutional legitimacy, and dependency in post-conflict contexts. Wilén, for example, has raised the concern that a United Nations (UN) mission can '[become] a competitor with, for example, the government for the best staff and is therefore prone to taking capacity instead of building it' (2009: 342). This dynamic can intensify, forming a trap, if decreased state capacity increases the demand for international intervention. The challenges and contradictions of international actors building local ownership has been recognised in the post-conflict literature since the 1950s and it was revived in the 'local turn' in the 2000s (Mac Ginty and Richmond 2013). As Wilén's fieldwork in Burundi and Liberia underscores, building local ownership is challenging, resulting in what she describes as 'organised hypocrisy': 'On the one hand, there is time pressure in situations where the UN is expected to act fast; on the other hand, the implementation of capacity-building and local ownership requires time' (2009: 347). Such dynamics are well suited for analysis using archetypes and other forms of systems analysis.

5.   Systems innovation

Hunger, poverty, environmental degradation, economic instability, unemployment, chronic disease, drug addiction, and war, for example, persist in spite of the analytical ability and technical brilliance that have been directed toward eradicating them…

They will yield only as we reclaim our intuition, stop casting blame, see the system as the source of its own problems, and find the courage and wisdom to restructure *it.*

(Meadows 2008: 4; emphasis original)

What does it mean to 'do' systems innovation? This section looks at practices that spring from a systems view of the world and systems analysis. We also expand this to explore approaches to working with complexity and uncertainty; as de Coning argues, incorporating complexity thinking enables 'mediators and other peace practitioners to become more confident in coping with uncertainties and more comfortable experimenting with adaptive approaches' (2019: 38). Systems thinking enables practitioners and analysts to 'see in systems'; this perspective undergirds strategies for systems innovation, which distinguishes systems innovation from other approaches to change that may also have systemic affects.[8]

There are multiple, at times conflicting, definitions of systems innovation; writers use a wide range of terms, including systems change, institutional entrepreneurship and socio-technical transformation. For the purposes of this paper, we define systems innovation as *deliberate changes to either parts of a system or how those parts fit together*. Foster-Fishman usefully emphasises that systems innovation is 'an intentional process designed to alter the status quo by shifting and realigning the form and function of a target system' (2007: 197; see also Mulgan and Leadbeater 2013: 7). As noted previously, systems change and systems innovation may be used interchangeably; while systems change is used more widely, the authors appreciate that the term *systems innovation* suggests deliberate action.

In practical terms, systems innovations seek broader change through reconfiguring the relationship between system actors or parts, recalling the insight from both causal loop diagrams and iceberg models. Systems innovation always occurs in context; institutions, organisations and relationships which shape systems behaviour over time (Senge 1990). Change often involves restructuring institutions, here understood as both formal and informal norms and rules (Fligstein and Mara-Drita 1996), to produce different outcomes. Changing these relationships has the potential to change the phenomena that emerge from the system; similarly, strengthening some relationships may reduce the likelihood of the system reverting to the prior state.[9] Unlike other forms of change that

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[8] Management and organisational scholars have become particularly interested in systems change, which has generated its own literature. This work is summarised well by Mair and Seelos in a piece advocating for greater attention to organised systems change, which they define as 'efforts by organisations to alter the conditions that generate the characteristics of social problems' (2021: 2-3). This work engages with thinking on robust action and strategies for organisations working with uncertainty.

[9] While not covered here, we would like to highlight the UNDP's own recent work (2022) on portfolio approaches to systems innovation; this methodology combines work on systems framing and mapping with the identification of a suite or portfolio of responses. This resonates with the ideas of robust action and experimentation discussed in section 5.3.

may have widespread or even systemic effects, systems innovation takes the architecture of the system as a starting point and uses systems analysis to inform whatever interventions are made.

Box 1: Places to intervene in the system, in increasing order of effectiveness

12. Constants, parameters, numbers (such as subsidies, taxes, standards).
11. The sizes of buffers and other stabilising stocks, relative to their flows.
10. The structure of material stocks and flows (such as transport networks, population age structures).
9. The lengths of delays, relative to the rate of system change.
8. The strength of negative feedback loops, relative to the impacts they are trying to correct against.
7. The gain around driving positive feedback loops.
6. The structure of information flows (who does and does not have access to information).
5. The rules of the system (such as incentives, punishments, constraints).
4. The power to add, change, evolve or self-organise system structure.
3. The goals of the system.
2. The mindset or paradigm out of which the system — its goals, structure, rules, delays, parameters — arises.
1. The power to transcend paradigms.

(Meadows 1999: 3)

Work by Meadows (1999) has been particularly influential in using systems thinking to help practitioners to conceptualise how interventions affect systems. Meadows establishes a 12-point hierarchy of what she calls leverage points (see Box 1). These points range from approaches that may be easier to implement, but have less profound systemic effects (for example, shifting incentives), to interventions that are difficult to execute, but promise more profound and systemic change (for example, shifting ideas about the purpose of the system itself). The implication of this hierarchy for practitioners is not to abandon initiatives that focus on incentives or parameters, for example, but to recognise their limitations. As she writes: 'Whatever cap we put on campaign contributions, it doesn't clean up politics' (1999: 6). We may also consider complementing these approaches with ones that are particularly geared towards a systems view of a problem or issue.

This framework brings attention to the value of connecting parts of a system and increasing information flow structures (point 6). It also asks us to consider feedback loops and opportunities for strengthening balancing or homeostatic feedback loops (e.g., increasing freedom of information to improve government accountability; point 8). The discussion of levers has been brought together with systems analysis by Foster-Fishman. He writes that systems innovation requires first systems analysis ('understanding different perspectives concerning the problem situation' and 'locating root causes to systemic problems by identifying system parts and their patterns of interdependency that explain the status quo') and then, in reference to Meadows' leverage points, 'using this information to identify leverage points that will cultivate second-order change' (2007: 201).

Bringing this work to the post-conflict arena, de Coning reflects on Meadows and the lessons for peacebuilding practice:

> *Meadows found that we devote most of our energy on aspects that, counterintuitively, only have weak leverage. In the peacebuilding context this will be things such as skills, equipment and*

procedures. These are weak leverage points because on their own they don't change the system within which they function. (De Coning 2019: 36)

This suggests the potential value of the leverage points framework to help those involved in peacebuilding work to consider more profound levers and even consider how to combine different types. This idea of a portfolio approach and engaging levers for change has been usefully identified in the UNDP's *Systems Change: A guidebook for adopting portfolio approaches* (2022), although Meadows' system for comparing leverage points is not explicitly presented.

Finally, this work asks us to consider the extent to which organisational effort, resource and research are being spent on levers that are mismatched with core goals and aims. This has been explored by CDA in their resource manual on designing post-conflict systems innovation. For example, the CDA manual highlights levers, including the conflict system paradigm, linkages that create destructive dynamics, information flows and access, and conflict drivers. These potential levers are then matched with strategies, including shifting system goals, disrupting conflict chains, creating new information flows and building new institutions for dispute resolution — for example a special unit dedicated to land disputes (CDA 2016: 42). This work by CDA provides a good example of linking insight into systems dynamics to intervention design.

5.1 Building new systems or changing sub-systems

One of the challenges of moving from systems theory and analysis to practice is the question of entry points and scale; in other words, how can small-scale or nascent initiatives generate systemic shifts? Do changes need to be big? Here work by Seelos and Mair (2018) is instructive. The authors suggest that there are two key strategies. First, actors may seek change to a sub-system, for example a small and somewhat isolated geographic region, that then serves as a model for other regions, inviting connection and mimesis. This strategy aligns with probative and iterative testing models. The other strategy involves building a new, parallel system, eventually drawing actors from the incumbent system into the new system.

The first approach, changing a sub-system to engender mimesis and connection, is illustrated through the case of Gram Vikas in India, which focuses on community development and gender. After unsuccessful efforts to isolate and improve functional sub-systems, such as healthcare, Gram Vikas' leaders shifted to a focus on geographical or spatial sub-systems. These sub-systems were easier to isolate, and the organisation was able to insist on forms of project governance that were gender-inclusive; over the next three years, these forms of inclusive governance became embedded and routinised. For Seelos and Mair, 'This archetype directly transforms the architecture of a lower-complexity sub-system to alter behaviour that generates more desirable outcomes' (2018: 37). This approach has been reproduced across thousands of sites, with the expectation that if new gender roles become embedded in community practice, they will be reproduced generation to generation. This theory of change resonates with a multi-level model of innovation, in which a niche innovation (a 'hopeful monstrosity') escapes to become embedded in the socio-technical regime that constitutes the status quo.

Interesting parallels may be drawn to work on zones of peace and peace communities, which also focuses on isolated sub-systems as sites of resistance to conflict (see Idler et al. 2015). Case studies in Anderson and Wallace's 2012 collection, *Opting Out of War*, provide examples of communities, defined by ethnic, religious, political and/or spatial boundaries, that refused to take part in civil conflicts. These cases include the Muslim community in Rwanda, which performed both active and passive resistance during the genocide. The case authors suggest that strong community cohesion, and even insulation from state structures reaching back into the colonial period, enabled this group to 'opt out' of the conflict. Other cases are explicitly spatial. For example, the peace community of San José in Colombia constructed a small fence that was 'entirely symbolic, yet clearly delimited the territory' (2012: 136) in which members would not participate in the ongoing conflict.

Seelos and Mair (2018) illustrate the second approach, changing a system by building a new, parallel system, through the case of Sekem, a community-based organisation working on agriculture. According to the authors, the organisation faced initial hostility from the community and government, which it addressed early through providing services that created immediate benefits. The organisation then began to model new agricultural practices and provided a hub for preferred employment. The success of these demonstration projects invited neighbours to begin adopting and experimenting with the tools. As the authors state: 'In this archetype, an existing system is not directly transformed but rather lured toward a new trajectory by the attracting forces of a newly built system with desirable properties' (Seelos and Mair 2018: 37). This resonates with an observation attributed to futurist Buckminster Fuller: 'You never change things by fighting the existing reality. To change something, build a new model that makes the existing model obsolete' (Quinn 2000: 37).

5.2 Linkages and changing systems architecture

A distinguishing feature of systems innovation is its interest in systems architectures or structures, namely linkages between parts of the systems, including flows of information and the presence (or absence) of delays and feedback loops. This resonates with the quote from Meadows that opened this section; a core thesis of systems approaches is that change comes when systems are *restructured*. This also connects with work focused on shifting systems through new forms of coordination, defining systems change as 'changing the way a majority of relevant players solve a social challenge' (Fisher in Mühlenbein 2021).

To explore this, we can consider the case of Georgia's joint approach with UNDP to understanding and intervening in domestic violence. The approach, established by UNDP Behavioural Insights Team, UN Women, ServiceLab and Forset, applied a behavioural sciences framework to understand bystander inaction and low levels of survivor support for intimate partner violence. This meant connecting and addressing the reasons why different parts of the support and reporting system were underdeveloped and underperforming. The concern was driven by the scope of cases, with a 300% rise in domestic conflict calls for the Georgian Emergency and Operative Response Centre between 2013 and 2016 (Sandroshvili 2019). The programme led to a social-behavioural intervention focusing on social media as a medium for increasing verbal support, empathy, and

normalisation of support-seeking. The experiment served as a sense-making activity, establishing the need for further grounded evaluation of how parts of the system are interacting to produce the existing state of violent outcomes.

This case is mirrored by Iceland's approach to domestic violence, published by the OECD in the *Working with Change* report. This work involved mapping the current system, identifying areas of isolation or duplication, and better understanding current performance. The passage of new legislation enabled actors to create new linkages between service providers and the police, as well as to introduce a team-based, client-centred approach. Crucially, these teams rejected an administrative timeline for addressing cases of domestic violence and opened space for a longer-term approach. They also sought new feedback mechanisms to help monitor change and engaged in fundamental work around reframing the problem at hand, which involved reconceptualising domestic violence as a social harm rather than a private matter.

Each case focuses on improving the state of information flows within under-used and under-connected parts of existing systems. However, moving from establishing more connections or robust and reliable connections to system restructuring is a long-run endeavour; this requires changes to the preferences, orientations, and mental models of actors within the system. This restructuring points towards how leverage points interact: information flows, by improving connections, can assist with long-run mental model and paradigm change.

5.3 Participation and systemic action research

As discussed in the previous section, soft systems methodologies are focussed on the creation of shared meaning. In a given workshop, a facilitator may take multiple communities through an exploration of 'what is the problem at hand', with the aim of exposing latent assumptions and mental models among actors and beginning to forge shared understanding. Joint mapping is used not only to analyse a problem, but also to potentially shift how participants see the situation, and to create new linkages and trust between isolated actors — a form of systems innovation or intervention in and of itself.

Gray and Burns bring together ideas of action research and systems innovation in systemic action research (SAR), as discussed in their 2021 paper on work in Myanmar. They argue that SAR constitutes a form of bottom-up peacebuilding, rooted in systems thinking and complexity theory. In practice, the SAR process unfolded first through a round of systemic inquiry, led by local researchers, to understand perspectives on local peace, development, and humanitarian issues. These interviews were shaped into narratives and then participants drew rich maps depicting causal relationships. The maps were then used to create and prioritise a set of potential interventions. The identified interventions were then taken forward, with robust oversight from stakeholders. The authors conclude that this approach 'helped address the significant challenges of "process exclusion" and "content exclusion" that are characteristics of other peacebuilding processes in Kachin State' and may prove more robust over the long term (Gray and Burns 2021: 31).

This potential connection between sustainability and SAR is shared by de Coning (2019), who has pioneered adaptive peacebuilding as a means of working with complexity and uncertainty. He notes that 'national and local peace agreements reached through self-renewing and inclusive peace processes have proven to be more resilient when roles and responsibilities, including for implementation, are distributed among a broad group of participants' (2019: 37). The author underscores that the organisation of peace processes is integral to their success, suggesting the importance of connections and information flows between actors. The author also links this to the resilience of a self-organising system. He argues: 'Self-organisation facilitates and modulates the flow and processing of feedback information, for instance through developing a shared understanding, participatory decision-making, or monitoring mechanisms' (2019: 37). These approaches focus on building a robust, self-organising system.

5.4 Robust action and experimentation

Finally, while less explicitly oriented around the language of systems innovation, it is worth noting the literature on robust action and approaches to wicked problems, which are defined by their complexity, uncertainty, and evaluative nature (Ferraro et al. 2015: 3). Drawing from the pragmatist tradition, Ferraro et al. (2015: 11) explore strategies for working in these environments, focusing on the three elements of participatory architecture (e.g., multi-stakeholder forums), multi-vocal inscription (e.g., the creation of shared meaning and language that enables coordination without requiring consensus) and distributed experimentation. Examples of this type of work include multi-lateral initiatives on sustainability, including the Global Reporting Initiative and the United Nations' Principles for Responsible Investing.

These activities resonate with work on peace transformation and dialogues; bringing actors together to create a shared language and understanding of conflict has been the basis for this work for decades. Less prominent in the peacebuilding literature, however, is the focus on experimentation. Those interested in robust action embrace distributed experimentation as a means of enabling actors to be responsive and agile in the face of constant change and uncertainty. This contrast between 'experiments' and 'solutions' is well articulated in a recent UNDP paper on portfolio approaches to systems change:

> *In complex development challenges where rational cause and effect dynamics often defy possibility, we need to approach problem-solving in a different way. Experimentation is a valuable method for doing so. It allows for the discovery of new context and information that can help decision makers comprehend and make appropriate decisions around how to address specific challenges. (UNDP 2022: 33)*

This shifts the focus from grand plans and strategies to thinking about the next three steps, leaving space for learning and adjustment. Furthermore, it can assist in identifying emergent behaviour in a system that is otherwise hidden when the system is stable and under less stress.

In the context of peacebuilding, this experimental, agile ethos is echoed by de Coning. He argues that peacebuilding approaches need to fit with the behaviour of complex systems:

Complex systems cope with challenges posed by changes in their environment through co-evolving together with their environment in a never-ending process of adaptation. This iterative adaptive process uses experimentation and feedback to generate knowledge about the system's environment. (de Conig 2018: 305)

He calls for adaptive peacebuilding as a

'pattern of practices that experiment with an inductive, iterative and adaptive approach… the capacity of UN agencies to successfully pursue their peacebuilding aims relies to a large degree on the ability of their people in the field to make the organisation responsive to parties in the local context' (2019: 38).

It is notable that de Coning zeroes in on organisational factors, and whether or not systems and routines within UN agencies are conducive to this type of work.

6. Post-conflict contexts as systems

If a systems approach suggests the world can be understood in terms of systems, then what *typifies* post-conflict systems? Are there structures or architectures that help us to understand post-conflict environments? And help us understand why certain interventions may succeed or fail? As Ricigliano argues, 'Peacebuilders need to look for the main drivers of big systems change: the key factors — structural (basic systems and institutions), attitudinal (widely held group attitudes and beliefs), and transactional (how key people work together to deal with conflict)' (2021: 19). So, how can we describe these systems and their structures?

As noted in the introduction, the definition of 'post-conflict' is challenging and has been approached in terms of negative peace, often for the purposes of coding[10], as well as on a conflict to peace continuum, as per Brown, Lander and Stewart (2011). For the category of 'post-conflict' to be meaningful, we posit that post-conflict states can be distinguished from those that share similar economic or social characteristics. Empirical work by Collier et al. reinforces this view and it finds that the 'average risk that a post-conflict society reverts to conflict within the decade [at] 40%. This is far higher than the risk faced by the typical low-income country' (2008: 474). This suggests that there are structural features (or clusters of features), including political institutions and settlements, that drive instability beyond economic constraints and have a lasting impact.

This section highlights this question, focussing particularly on the concepts of fragility, resilience, and intractability. We find that despite the growing interest over the last five years in systems approaches to post-conflict transitions and peacebuilding, there has been relatively little work examining or describing the structural features that drive or maintain these phenomena. Hoddy and Gread remind us that structures that 'steer human activity are continually reproduced and occasionally transformed by the actors implicated in them… Structures may be social, cultural, political, economic, and so on, and are experienced in terms such as poverty, discrimination, and the lack of access to public services' (2020: 563). This section is a starting place, suggesting

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[10] see Caplan and Hoeffler 2017

some potentially interesting directions for further research and analysis. Finally, we note that, as well as recognising the robust debate in critical peace and conflict studies around the use of fragility, resilience, and intractability, and we specifically highlight the areas in which these conceptions are different to those used in the systems literature.

6.1 Fragility

The field of conflict studies generally takes a descriptive, rather than structural, approach to fragility. It emphasises the outcome or expression of fragility: a state that is unable to deliver on core *functions*. The term seeks to capture weaknesses in authority, legitimacy, and capacity (Call 2010). Fragility is viewed largely as an institutional problem and, from a political perspective, as a crisis of legitimacy. This view of state fragility emphasises 'the importance of social cohesion for successful state building' (Grimm et al. 2014: 203). However, this has been critiqued as weakly theorised and these tools often fail to distinguish between the 'symptoms, correlates and causes of fragility' (Ferreira 2017: 1300). As with concepts like weakness and failure, the term state fragility may also be critically analysed as a discourse deployed by international actors (see Grimm et al. 2014).

By contrast, systems thinkers have long been interested in concepts of fragility as collapse or failure in the face of stressors. Meadows draws a distinction between fragility and robustness, focussing on the importance of redundancies and diversification as a hedge against shocks. She writes: 'Multiple pathways and redundancies is more stable and less vulnerable to external shock than a uniform system with little diversity. Don't put all your eggs in one basket' (2008: 3-4). In this view, fragility is a product of a lack of diversity and redundancy.

Adopting this structural or systems approach to post-conflict settings, de Coning views state weakness or fragility as a reflection of a system's *in*ability to adapt. He writes:

> Fragility can thus be understood as a complexity deficit, i.e., as a system that has insufficient or limited capacity to self-organise. In this context, a lapse into violent conflict can be thought of as a social system collapsing as a result of a loss of complexity. (de Coning 2016: 173)

The response, then, is to focus on rebuilding the ability of a system to self-organise and repair. This is done, he argues, through the re-establishment of linkages and relationships that are the mark of complexity, and give systems resilience in the face of stress or shock. The further implication of de Coning's argument is a view that, 'These systems are not fixed through outside intervention: they "fix" themselves. External fixes won't stick if they have not been internalised, and it is thus the local adaptation process that is the critical element for sustainability' (2016: 173). This argument suggests the importance of bottom-up and locally owned approaches, as has been explored in the literature on participatory approaches to peacebuilding and the limitations of external interventions.

Work by Osaghae makes the argument that state fragility, and these limited capabilities, must also be understood as reflecting long histories of colonialism and global *systems* of exclusion and exploitation. He argues that in post-colonial African states:

> …characteristics of weak institutions, poverty, social inequalities, corruption, civil strife, armed conflicts, and civil war are not original conditions, but are rooted in specific historical contexts. It

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is essential to understand both the external and internal factors of fragility if such states are to get the assistance and empowerment that they need. (Osaghae 2007:691)

The importance of considering continuities between conflict and post-conflict periods is emphasised in work by Choucri et al. on pre- and post-conflict systems dynamics. The authors argue:

Post conflict situations are often shaped by the nature of the conflict and the dynamics of pre-conflict conditions. The situational realities of pre- and post-conflict is highly complex. To focus on each phase separately is to impose artificial linearity in complex situations, distorts the causal interconnections and obscures that which is 'real'. (Choucri et al. 2004:2)

Seeing these interconnections and resisting ahistorical periodisation pushes back against a linear view of conflict. It also is a rejection of approaching a post-conflict state as a 'blank slate' or 'petri dish', as has been critiqued in the state-building literature.[11]

6.2 Resilience

As with fragility, resilience in a purely structural view differs from how it has been understood in contemporary peacebuilding practice. Taking a perspective common in engineering, mathematics and even ecology, 'resilience is merely viewed as bouncing back to the same state or condition' (Cutter 2016). Meadows writes:

A single balancing loop brings a system stock back to its desired state. Resilience is provided by several such loops, operating through different mechanisms, at different time scales, and with redundancy—one kicking in if another one fails. (2009:76)

In this perspective, resilience is a system's ability to 'snap back' despite an intervention — to 'resist a perturbation and/or return to the equilibrium after having been subjected to a shock' (Helfgott 2016: 853). This is sometimes discussed in terms of 'inherent resilience', which speaks to the capacity to withstand shocks. The presence of rice stockpiles, for example, increases the inherent resilience of a community to food shortages; homeostatic feedback loops hold systems in equilibrium.

As both Cutter and Helfgott point out, this structural view of resilience has largely been supplanted by one that focusses on transformation, particularly in the social sciences. This is true, as well, in the peacebuilding discourse. As Helfgott writes, 'Many scholars… increasingly avoid the use of terms meaning "staying the same" or "recovering", and prefer the concepts of renewal, regeneration, and reorganization' (206: 853). Resilience is now understood to be 'a dynamic process that includes feedback, adaptive learning and change' (Cutter 2016: 111) — quite different from the homeostatic idea put forward by Meadows. The term 'adaptive resilience' helps to distinguish from 'inherent resilience', and draws attention to the dynamic capabilities needed in a system to change and adjust in the face of shocks.

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[11] For example, focussing on the case of Timor-Leste, Roll (2014), Hohe (2002) and others have argued that the outcomes of these efforts — from elections to disarmament, demobilisation, and reintegration — can only be understood when pre-conflict networks are brought into view and when these are understood as having histories that span the conflict period.

This focus on adaptive resilience remains dominant in the post-conflict literature and peacebuilding practice, particularly in light of concern with equilibrium or status quo conditions. In the 2000s, key international actors have turned to the concept of resilience as an alternative to top-down approaches to addressing fragility and support in post-conflict transitions (Bargués-Pedreny 2015). These approaches put strong emphasis on looking to local capabilities to resist a return to violence and reimagines those in the international community in a supporting or facilitating role. Of interest, Bargués-Pedreny suggests that this move towards local resilience makes it more difficult to 'promote structural change' and that 'peace can hardly be conceptualised, and agreements or settlements are constantly deferred and problematised' (2015: 125-6).

6.3 Intractability

As with fragility and resilience, the concept of intractability has been of particular interest to systems scholars who have sought to use systems dynamics tools to understand why conflicts are so difficult to resolve (see Ricigliano's reflections on a systems analysis of the Israel-Palestine conflict 2011).

Firstly, Loode argues that examining reinforcing and balancing feedback loops, and how they can hold systems at low levels of conflict, improves upon explanations focused on weak institutions and state fragility. He describes the balance between feedback loops and how they preserve a problematic equilibrium even if causal factors are addressed:

> *Positive feedback loops in complex systems bind together elements that are necessary for action initiation and maintenance. They are normally balanced by negative feedback loops, which dampen system dynamics and constrain actions by other elements that are linked… Removing one or more causal elements of the conflict as part of peacebuilding initiatives will likely not result in a conflict de-escalation because the remaining elements continue to fuel the conflict. (Lorde 2011: 75)*

As an alternative, Loode suggests a focus on understanding existing feedback loops and seeking to affect their interaction, as well as identifying and investing in strengthening peace-promoting actors (2011: 77).

This view of state weakness as produced and held by systems dynamics has been explored by others interested in the relationship between intractability and weak institutions. In looking at state-sanctioned organised crime, Dewey reflects: 'The "fragile" quality cannot be explained but by the "strength" of highly stable structures, which actually perpetuate the aforementioned weakness' (2011: 5). Dewey argues that state weakness is *perpetuated or promoted* by state actors as a strategy (2011:6), creating a mechanism for on-going instability. In this manner, the fragility of the context reflects the *strength* of political or institutional structures. International actors may find it particularly difficult to work in these spaces, needing to weigh the pros and cons of Creating of parallel institutions or driving bottom-up governance.

This perspective is echoed by Osaghae who argues that some state weakness is by design: 'Rather than a pathology or aberration, disorder (in the form of weak institutions, informalisation of political processes, legitimacy crisis, civil strife, armed conflict) may very well be a deliberate

strategy of politics in fragile states' (2007: 693). These perspectives emphasise instability as created by actors, by design, rather than as the product of structural deficiencies or voids as in some work on fragility.

Intractability has also been the subject of work in systems dynamics, which specifically uses the language of an 'attractor' to discuss how systems evolve towards creating a set of outcomes. Vallacher et al., drawing on work from political psychology, emphasise the role of mental models and social structures in entrenching conflicts. The authors write:

An intractable conflict is one that has become entrenched in cognitive, affective, and social-structural mechanisms, a transformation that effectively distances the conflict from the perceived incompatibilities that launched it. (2010: 262)

Over time, systems become more stable, which makes them more difficult to change.

One example is political polarisation. As polarisation sets in, more and more of the world is divided in polarised terms (e.g., media diets, geographies), accelerating the polarisation and increasingly involving moral judgements of the 'other side', and reducing opportunities for building connections and empathy. These systems become resistant to change. As Vallacher et al. argue:

When a system's dynamics are governed by an attractor, however, the system is resistant to perturbing influences that would otherwise move it to a different state or pattern of changes. An external factor might promote a temporary change in the state of a system, but over time the system will return to its attractor. (Vallacher et al. 2010: 265)

The authors outline a few examples of how these systems can be disrupted, particularly focussing on political identity. For example, a disturbing event may encourage actors to reconsider their positions, or a different attractor becomes salient. In other cases, controlling a parameter around a feedback loop — for example, providing security when a sense of insecurity reinforces distrust and segregation — may be effective.

7.   The challenges of working in post-conflict systems

It is easy enough to call for international actors to become more adept at working with uncertainty and to become powerful systems thinkers, tuned into the dynamics that make post-conflict transformation so difficult. Yet it is also important to understand some of the barriers to the greater adoption of these approaches. Indeed, the rationale for using systems approaches — complexity, uncertainty, incomplete information — also pose challenges to their application. Concerns with participation and accountability, and silos and bounded rationality, are considered below. In addition, as will be reviewed further in the discussion section, these challenges also ask organisations to work in new ways. As such, an open question remains regarding what type of organisational design is appropriate for supporting work that embraces uncertainty, and more fully embraces experimentation and participation.

7.1 Participation and accountability

A first key concern with systems approaches is issues around data and bias: who is drawing the system map? Who is defining the problem and system boundaries? As discussed at length in section 4.2, critical systems theory and methodologies address some of these issues and foreground concerns over bias, marginalisation, and incomplete knowledge. This stance puts strong emphasis on participation and joint knowledge production; in other words, the data on the conflict should be co-created with local input. This resonates strongly with work on systemic action research, which responds to the need for systems approaches as well as the idea that bottom-up approaches to post-conflict transitions are more robust.

However, despite the widespread embrace (at least in principle) of participatory approaches, these are fiendishly hard in practice. As has been well documented, international actors encounter practical challenges when entering an unfamiliar context, ranging from language barriers to travel restrictions (see Chambers 2006 on the 'capital city trap'). The challenges also extend to concerns with the reproduction of power dynamics within participatory processes (Mosse 2004), as well as more fundamental questions about who 'local actors' are, particularly if certain levels of education and political engagement are preferred by the international actors (Wilén et al. 2011: 534-5). Even Midgley, who advocates critical system theory, recognises the inescapability of power relations and exclusion in his own interventions. This raises concern over whether bottom-up or participatory processes can ever truly be realised.

These issues of power and participation are particularly acute in post-conflict settings. Jackson argues that due to these dynamics, soft systems methodologies can be particularly problematic:

> *The kind of open, participative debate which is essential for the success of the soft systems approach, and is the only justification for the results obtained, is impossible to obtain in problem situations where there is fundamental conflict between interest groups which have access to unequal power resources. Soft systems thinking either has to walk away from these problem situations or has to fly in the face of its own philosophical principles and acquiesce in proposed changes emerging from limited debates characterized by distorted communication. (Jackson 1991: 134)*

As the author argues, the presence of participative debate is foundational to the value of soft systems tools; without this basis in open practice, serious concerns may be raised, with the analysis both from the perspective of capturing reality and in terms of a useful or productive sense-making.

Bächtold raises a parallel concern with accountability — the failure not of involving participants in problem definition, but of making the work of intervenors legible to communities so that they can be assessed. Bächtold (2021) argues that systems thinking tools, language and the focus on complexity make processes more exclusionary. Due to new interest in systems expertise, which is not widely held, Bächtold argues:

> *Rather than 'de-colonizing' or making peacebuilding more inclusive, the way complexity concepts have emerged in peacebuilding discourse reproduces—rather than questions—the power structures of international interventions. (Bächtold 2021: 504)*

This critique suggests that systems thinking methodologies may serve as a new tool of mystification, separation and self-justification for international actors intervening in civil conflicts and post-conflict state building.

In particular, Bächtold raises concerns that the ways in which systems work is evaluated. He posits that those involved in peacebuilding work have successfully argued that post-conflict contexts are typified by 'exceptional conditions of complexity'; as a result, they 'warrant an approach drawing on flexibility, adaptation, and learning… and are not amenable to the more direct reports, audits, and measures of accountability demanded by donors' (2021: 506). This paradoxically makes interventions more exclusionary, he argues, by recasting 'peacebuilding interventions as non-objectionable and by denying the people targeted by peacebuilding to be considered subjects that interventions ought to be accountable to' (2021: 517). While post-conflict contexts may well be highly complex and unamenable to conventional approaches, Bächtold raises the question of whether the emphasis on emergence and organisational learning effectively lets international actors off the hook.

7.2   Silos and bounded rationality

A second set of concern emerge around the silos and, relatedly, the bounded rationality of analysts tasked with understanding a system holistically. Work by conflict scholars has drawn attention to confluence of social, economic, and political factors that lead to persistent security issues in post-conflict states — a perspective concordant with a systems view. As Muggah and Krause argue, 'dealing with the most widespread forms of organized violence and insecurity in post-conflict contexts will require responding to the wider dynamics of armed violence rather than focusing exclusively on insecurity directly connected to what are traditionally defined as armed conflict and post-conflict dynamics' (2009: 137). Yet, the authors suggest that '[t]he international development and peace and security architecture is structured according to specific sectors that deal with such things as the rule of law, health, education, governance, gender and the environment, treating issues of insecurity and armed violence in an isolated and not a holistic fashion' (Muggah and Krause 2009: 146). Silos, they argue, are a barrier to cross-cutting approaches.

Institutional silos may create particular issues for systems analysis and building a more multi-faceted view of conflict. Systems thinking and systems innovation are not neutral, and the usability and desirability of systems thinking depends on the constraints facing analysts. An analyst's perception of the problem and problem framing depends on where the actor sits (What data do they see? What tools are available?). It also depends on their beliefs about the nature of the problem, and their certainty regarding both the problem description and their own analysis. An analyst who has months of preparation time and ample resources for including multiple stakeholders will not pursue the same analysis nor use the same systems tools as a field operator, where the relevant stakeholders are highly time constrained.

Behavioural science can help address biases within the data-creating process of initial exploratory and survey research, as well as participatory systems thinking exercises, such as facilitated workshops. However, the intersection between bounded rationality and systems dynamics, and the

larger intersection between behavioural science and systems thinking, extends beyond contextualising the rationality of actions in a systemic perspective. Morecroft argus that 'systems dynamics models implicitly assume bounded rationality in decision making and that recognition of this assumption would aid systems dynamicists in model construction and in communication to other social sciences disciplines' (1982: 2). An improved alignment between behavioural science, and systems thinking language and programmes in operational contexts, could potentially improve the insights and communication approaches of both teams.

On the flip side of the concern with silos are the challenges around creating boundaries to analysis and avoiding 'analysis paralysis'. Boundary extension issues tend to create analytic conflicts between members of the analytic team, as well as the analytic team and operations or management. Where the scope of analysis for the expected problem can always be expanded outwards — for instance, in understanding a given violent episode in a post-conflict country, analysis can both expand historically backward for that region as well as extending to the conditions of global economic systems impacting the state of socio-economic problems in that area. Heuristics for identifying limits to agency and assessment are needed, which are often learned through practice and not immediately intuitive.

8.   Discussion and implications

The preceding sections have discussed the potential for systems approaches as a way of thinking, a form of analysis and an approach to intervention, as well as a reflection on the nature of post-conflict systems and the challenges they pose. As discussed, a new wave of scholars argues that a lack of appreciation of systems and complexity explains intervention failures. In this section we discuss the implications of adopting different aspects of systems thinking by an organisation involved in peacebuilding work and post-conflict transitions. Turning these tools inward, a starting place for any organisation may be to ask itself 'systems' questions (Foster-Fishman 2007). What is the problem that the introduction of systems thinking seeks to solve? What are the drivers of this problem (norms, resources, regulations, operations, etc.)? How do key parts of the system interact? And what levers for change exist?

A first set of considerations may be about the extent to which an organisation wants to engage with systems thinking. An organisation could embrace systems thinking as a mindset or way of seeing the world. This would require training people to think from a 'systems point of view', without being tied to any specific analytic strategy or set of intervention practices. Such an approach would engage questions about how people within the organisation see the world and conceptualise change. How do we view the nature and scope of problems? How do we understand complexity? What assumptions do we carry about how interventions affect outcomes?

Or it could adopt systems analysis methodologies and systems innovation practices. This could mean increased engagement with participatory methods, portfolio approaches and experimentation, and adaptive peacebuilding. A related set of questions may concern whether soft or hard systems methods are pragmatic in context or desirable for the analytic questions at hand.

In addition to organisational, skills-based and budgetary constraints, hard systems thinking requires large amounts of data and clarity over features and variables. Early systems questions help with 'humbling' the analyst by forcing reflection over whether the description of the system is complete enough to model and test hypotheses, or whether further hypothesis-generating and investigation activities are needed.

Yet, perhaps of more interest, is to consider the systems effects of introducing these changes and points of resistance within the organisation as well as the broader system (funders, government and NGO partners, media) within which it works. The adoption of systems approaches would have implications for timeframes, budgeting, and monitoring and evaluation methods.[12] New forms of evaluation could introduce conflict, particularly if being introduced to a context where evidence-based policy is dominant (Taylor 2013). Here the concerns raised by Bächtold are again relevant: if systems approaches shift organisations towards an emphasis on measuring learning rather than outcomes, does this erode accountability to both donors and local communities? How can learning and accountability be reconciled?

The adoption of systems thinking also may demand more reflexivity from the organisation itself. Creating a map of the problem for an intended intervention without understanding how the organisation exists as an actor within that problem can create a skewed view of both the intervention and the analysis. A starting principle of critical systems analysis is that the intervenor is part of the system. The stakes here can be put directly. How do information flows or who holds power affect how the organisation prioritises interventions? Does the organisational model itself inhibit the pursuit of higher orders of systems innovation models from a Meadows perspective? What are the bigger systems in which the organisation is embedded and implicated?

A final set of considerations links back to the question of why adopt systems approaches? One response may be that the systems thinking approaches and the embrace of complexity are an appropriate response to, and improvement upon, post-Cold War models of liberal peacebuilding. However, those attuned to current work may recognise that ideas of systems, complexity and co-creation are already alive and well in the field. Peace research may already be a systems discipline, with attention to root causes, structural conditions, intractability, irreducibility, and complexity. Community building and network building are a core practice within the building linkages approach. If this is indeed the case, and systems thinking is just *old wine in new bottles*, its adoption would have much less of an effect on an organisation than perhaps would be anticipated. Indeed, an important area of future study may be to trace the organisational implications of adopting systems approaches, with attention to areas of stability and continuity of mindset and practice.

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[12] see Hargreaves 2010; Kreger 2007

9.   Reflections and conclusion

The idea of holism — that the sum is greater than its parts — sits at the centre of work on complexity, deep ecology and systems thinking. It pushes back against the analysis of problems in isolation and processes as linear, and it brings into view issues of interconnection and unintended consequences. Systems thinking is increasingly informing new ways of analysing and approaching post-conflict transitions. This has resulted in new attention to experimentation, portfolios or policy bundles, and multi-layered approaches (see Backer and Scheye 2007 on security sector reform; also, UNDP 2022), as well as a reaffirmation of work around sense-making and participation.

We opened this paper by exploring three key avenues for using systems: first, a means of seeing the world; second, a set of analytical tools; and third, a strategic approach to intervention. Across each of these approaches, analysts and organisations can consider three broad reflexive points: what is off the table?; what is or should be always on your mind?; and how do you see yourself? Perhaps the most basic and robust use of systems thinking remains as a way to identify and define what options can be filtered and removed immediately. These three points can be further adjusted with classic questions within a systems practice: what maintains the complexity? What are the boundaries? Who are the key actors? How are their actions related? Where am I acting? Where are the leverage points? What unintended consequences can emerge and how can they impact future complexity?

The next part of the paper looked, in particular, at post-conflict transitions. While there is growing interest in systems analysis and systems innovation toolkits for use in post-conflict transitions, we found that less work has been devoted to analysing the structural features of post-conflict contexts. While some work on resilience and fragility engages with ideas of linkage, redundancies and feedback, this structural analysis appears to not be well integrated with the practice-based literature. This is an interesting area for further analysis. Similarly, toolkits often do not fully acknowledge the features of post-conflict contexts and the constraints on intervening organisations that make the application of systems approaches particularly challenging. This includes issues around information, participation, and the siloed organisation of many international organisations. Power dynamics matter, particularly if the success of the methodology depends on including a range of perspectives.

The penultimate section looked to this organisational question: what does it take to adopt systems thinking? While a starting place may be capacity building and the introduction of new tools, more interesting questions arise around both what problem this organisational change is intended to resolve, as well as what conflicts this would create. If these approaches are taken seriously — from experimentation to greater participation — an organisation would need to consider the knock-on effects for how interventions are planned, justified, funded, timed, and evaluated. Adopting a systems thinking approach asks nothing less than doing away with linear models.

Systems mindsets, tools and practices are ultimately focused on working with uncertainty and complexity and avoiding the errors that come with assumptions about linearity. Thus, systems thinking can be a continuous and necessary reminder to peek below the waterline and consider the drivers of conflict that are often not visible. As Gray and Burns argue, systems thinking:

[P]rovides analytical tools to 'see in systems', enabling the delineation of complex causal relationships, the revelation of various stakeholders' roles in regards to diverse themes and geographies, and the latent and manifest capacities available to the system for peacebuilding. (2020: 19)

The authors raise the promise of systems tools to better understand actors' roles, elucidate causal relationships and highlight capabilities. Systems thinking may also help organisations involved in post-conflict conflicts consider what changes they could bring and what making those changes would actually entail.

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