Systemic crises? Why strategic thinking needs critical systems practice

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ABSTRACT
The term systemic failure is one used with increasing frequency particularly by journalists and politicians to account for things going wrong in an increasingly complex and uncertain world. But what does it actually mean from a systems thinking perspective, and how might effective strategic thinking in management practice reduce incidences of systemic failure? From a systems thinking in practice perspective three interwoven traps contribute to systemic failure reductionism, dogmatism, and managerialism. Using the example of systemic failure of academic economics in averting the global financial crisis – as expressed by prominent economists themselves - each of the three traps is explored. Drawing on a framework for systems thinking in practice informed by the critical systems practice of systemic triangulation, some practical tools from systems approaches are introduced to counter traps of systemic failure.

Keywords: Critical systems practice, reductionism, dogmatism, managerialism, systemic triangulation, systemic failure

1. Systemic failure: two examples

> “"Enough is Enough," symbolises the mood of the nation. Its implications are far reaching: enough of politicians; enough of Pakistan-sponsored terrorism; enough of bureaucratic incompetence and enough of "turf wars". Conjointly, they constitute the most potent threat to the nation.
>
> Mrs Sonia Gandhi has highlighted the root cause as "systemic failure". The Prime Minister has been reiterating the need for coordination among police forces and security forces. Even the Naval Chief has talked about "systemic failure" as the root cause for the present state of national security.
>
> What does "systemic failure" imply? It implies that the complete machinery responsible for maintenance of internal security has failed to deliver: Ministers of home [affairs] at both Central and state levels; bureaucracy responsible to coordinate and monitor conduct of internal security operations, which includes both acquisition of strategic, tactical and actionable intelligence and rapid reaction operational response; agencies and security forces responsible for execution of field-level operations; the media for its over-enthusiasm to provide instantaneous live coverage to terrorists; and the people at large.
>
> The reasons for "systemic failure" are easy to identify: Systems overload, fatigue, lackadaisical processes and leadership failure at all levels. So all the components of the system need replacement by a more appropriate model. It implies radical departure, which as a nation we are unaccustomed to. Incompetent heads must roll if the nation is earnest to counter terrorism.”
>
> G.B. Reddy (2008)

Most people might associate systemic failure with some notion of a collapse in the way things are supposed to link up or interrelate. The breakdown might be manifest with different organisational entities not corresponding (for example, Ministerial departments and field-level operations), or with key factors (say, political or social or economic issues) being excluded from decision making, or with a recurring lesson not being taken in to consideration. In a world where we increasingly appreciate that everything connects, and failure is commonly regarded in terms of disabled connections, the antidote to systemic failure is often regarded in terms of ‘joined up thinking’ or ‘seeing the forest through the trees’. So having a wider holistic viewpoint on say, national security, involves looking beyond immediate threats of violence and exploring more the deeper sources of relationships that generate such threats.

Getting the ‘big picture’ is undoubtedly important. But the extract also hints towards failure in two other interlocking respects. One is the need for surfacing different perspectives. With India’s internal security, there are likely conflicts in perspective on several fronts including national perspectives of Pakistan and India as well as contrasting in-country perspectives between military and political players and, as the Indian Prime Minister states, a need for greater communication between police forces and security forces.

Both ideas – capturing interrelationships and engaging with different perspectives - can be associated with a more concise understanding of Systems. A definition of a system developed by Open University systems academics and referred to by Morris (2009, p.16) suggests that a system is simply:

- a collection of entities …
- that are seen by someone …
- as interacting together …
- to do something.

Using this definition shifts attention away from regarding systems as objective real world entities as commonly assumed in phrases like 'the' economic system or 'the' education system, towards systems as individual constructs embued with some sense of purpose. Sometimes the distinction is made more explicit by referring to a 'system of interest' as against a 'system'. So a system comprises of some *interrelationships among entities* (i.e. 'entities… interacting together') seen from a particular *perspective* ('seen by someone…to do something').

A third related aspect of systemic failure evident in the extract from Reddy (and hinted at through the underlined words in the preceding sentence) is in the perception of problem situations as relayed through the *models* that we as humans use to make sense of situations and to engage with different perspectives. With systems thinking, the term 'model' is often used synonymously with 'system'. As with the use of the term 'model', the idea of System refers to *conceptual* constructs (ideas as conceptual tools) rather than *physical* replications. Towards the end of the extract on systemic failure above, the author states "…all the components of the system need replacement by a more appropriate model." The statement suggests that the 'system' is a real world entity whereas the 'model' is more a conceptualisation of a real world entity. For the purposes of this paper we shall consider the 'system' as a model in itself – a conceptualisation or 'system of interest' relating to some real world entity. With this in mind, some questions arise:

(a) What is the purpose of the system/model that needs replacement?
(b) Who is responsible in the eyes of the author for the replacement of the system/model?
(c) Why does the author consider the existing system/model not 'fit' for purpose (and, incidentally, whose purpose)?

Whilst the purpose of the model might be simply expressed as 'to maintain internal security' or 'to counter terrorism', the author makes no explicit reference to who should take responsibility for the design of a new model. Perhaps there's an implicit suggestion that the task be a collaborative one amongst relevant departmental interest groups such as police forces and security forces. In response to the third question, the existing model appears unable to respond to the multitude of relevant factors or entities contributing to the threat towards national security ("System overload, fatigue…") and is possibly subject to different conflicting viewpoints ("lackadaisical processes and leadership failure").

The problem of modelling surfaces more in a second example of systemic failure expressed in an opinion paper authored by eight economists who gathered with other economists for a week of intense discussions in the wake of the 2007/8 global financial crises at the Kiel Institute for the World Economy in Germany in 2008 (Colander et. al., 2009). The paper describes the systemic failure of academic economists to model appropriately in order to avert or warn against the impending events:

"The global financial crisis has revealed the need to rethink fundamentally how financial

> systems are regulated. It has also made clear a *systemic failure of the economics profession*. Over the past three decades, economists have largely developed and come to rely on models that disregard key factors—including heterogeneity of decision rules, revisions of forecasting strategies, and changes in the social context—that drive outcomes in asset and other markets. It is obvious, even to the casual observer that these models fail to account for the actual evolution of the real-world economy. Moreover, the current academic agenda has largely crowded out research on the inherent causes of financial crises. There has also been little exploration of early indicators of system crisis and potential ways to prevent this malady from developing. In fact, if one browses through the academic macroeconomics and finance literature, "systemic crisis" appears like an otherworldly event that is absent from economic models. Most models, by design, offer no immediate handle on how to think about or deal with this recurring phenomenon. In our hour of greatest need, societies around the world are left to grope in the dark without a theory. That, to us, is a *systemic failure of the economics profession*." (ibid p.2 original italics)

The authors identify the failure of economic models in not taking account of the intricate relationships of entities in the 'real-world economy'. Prevailing models, they suggest, actually marginalise or disregard key factors in the real-world such as the different levels of decision making, forecasting strategies, and changes in social context. The following section explores the three aspects of systemic failure with three traps of modelling illustrated by some of the ideas expressed in the Kiel paper.

2 Systemic failure: three traps of modelling

A common feature of systems – whether used for exploring interrelationships or used more for negotiating among multiple perspectives – is their essential bounded nature. Of course all our thinking is bounded in some way. In strategic management this idea comes across strongly through the important principle of 'bounded rationality' (Simon, 1991). What makes systems thinking distinctive is the explicit manner in which boundaries are surfaced. Our mental constructs – the ways in which we think – are bounded in one way or another. In a sense we are trapped by our thinking. For systems thinking, where systems are regarded as essentially *conceptual* constructs to make sense of reality, as against actual real world entities, what is important is not just the potential usefulness of different constructs to improve situations but also the awareness and surfacing of such bounded constructs as potential traps through a more critical dimension of systems thinking (Reynolds, 2011a).

There are three essential traps associated with modelling that can lead to systemic failure: (i) the trap of *reductionism* in not dealing appropriately with interrelationships; (ii) the trap of *dogmatism* in not dealing with contrasting perspectives; and (iii) the trap of *managerialism* in naively assuming comprehensive and impartial use of management strategies. An example of this last trap is in fetishising management models as being completely 'holistic' (in dealing with *all* interrelationships) and/or completely 'pluralistic' (in dealing with *all* viewpoints). Each trap is described briefly below in the context of the Kiel opinion paper.

Capturing contexts of change: avoiding reductionism (Trap 1)

"Only Connect ..... " E. M. Forster (*Howards Way*)

The Kiel authors focus most of their critique on economic modelling based on what they call a prevailing 'conceptual reductionist paradigm'. This is expressed in the "representative agent approach in economics …[which] views the entire economy as an organism governed by a universal will…[It] blocks from the outset any understanding of the *interplay between micro and macro levels*" (Colander et. al., p.8).

Prevailing economic models, the paper suggests, tend to exclude *factors* that generate crises. Quite surprisingly, the authors claim that 'systemic risk factors' including different externalities and individual behaviours are simply not accounted for: "if one browses through the academic macroeconomics and finance literature, "systemic crisis" appears like an otherworldly event that is absent from economic models." (ibid p.1).

Likewise, prevailing models exclude particular *actors* such as non-rational stakeholders, and other networked stakeholders, that typically generate crises. Models omit important extra-disciplinary ideas including Network theory and 'self-organised criticality theory' amongst others. In short financial modellers generate an intra-disciplinary 'silo' mentality. Moreover, prevailing models exclude longer term temporal changes of boom and bust focusing rather on shorter term periods characterised by economic stability.

From a systems thinking as against a complexity science perspective the idea of complexity resides not in any one individual system but rather the perception of situations to which multiple systems speak. To use a well-worn though significant adage amongst systems practitioners, a system is merely a *map* of a situation or territory, not to be confused with the actual *territory*. In other words, systems are distinct from the complexity being represented. Arguably the prime purpose of systems thinking is to make simple the complex – that is, to bound the unbounded ontological complex realities variously referred to by systems thinkers as 'messes' (Russell Ackoff), 'the swamp' (Donald Schön), or 'wicked problems' (Horst Rittel). Similarly, drawing on the signal-to-noise ratio used in the language of communications engineering (cf. Richardson, 2010 p. 2), systems as conceptual constructs provide purposeful ways for generating meaningful 'signals' or patterns of abstracted data sets from the cacophonous 'noise' of reality. It is the multiplicity of different systems – each with different viewpoints regarding the situation - that generate complex situations.

Real world complexities represent something that exists outside of any one conceptualisation of context. Whereas complexity science has made valuable and intriguing strides in capturing real world complexity, particularly through computational modelling, systems thinking prompts a more cautionary note against achieving some ultimate understanding of reality.

Figure 1 illustrates some pitfalls with systems modelling in reducing the complexity of situations to make them manageable. Whilst modelling realities inevitably reduces the complexity of a situation, it can reinforce systemic failure through (i) generating further unforeseen effects on factors in the environment outside the purview of the model, as well as (ii) generating silo mentalities amongst practitioners (including, of course, professional economists) whose blinkedness is not helpful in

providing more purposeful support. The result of these two paths is an increase in perceived complexity and uncertainty.

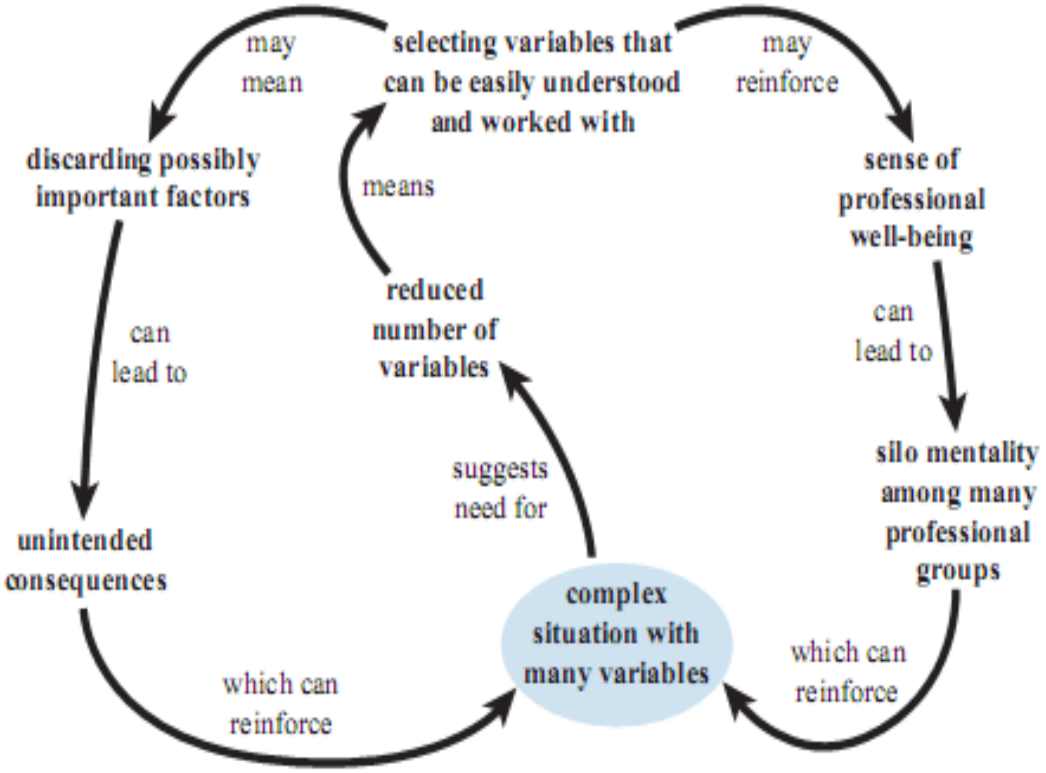

Figure 1 Causal loop of reductionism in conventional thinking

As a general rule, any context of use is best regarded as being complex from the outset. From a systems perspective this means a context with variable perspectives on what needs to be done. Systemic failure in intervention can often be attributed to the sidelining of relevant perspectives.

Engaging with multiple perspectives: avoiding dogmatism (Trap 2)

> *"A systems approach begins when first you see the world through the eyes of another"* (Churchman, 1968 p.231)

There are different perspectives associated with modelling. From a banker's perspective economic modelling might be described as a system for enabling efficient use of monetary resources to promote profit and growth. But from, say, an environmental activist's perspective, economic

modelling may be described as a system for challenging (or justifying) the depletion of natural resources.

The Kiel authors make clear that contemporary financial models are focused solely on the rather narrow perception that economics is concerned only with the allocation of scarce resources. The ideas used at the micro level of financial modelling are based upon the unquestioned appropriateness of the 'dynamic general equilibrium model'. Models are built on unspoken assumptions; for instance: "asset-pricing and risk management tools are developed from an individualistic perspective…taken as given the behaviour of all other market participants" (Colander et.al., 2009 p.5). This is not to suggest that all economists have worked on these assumptions or that all economists have systematically ignored, for example, the longer term boom and bust trajectories of economic activity. But the opinion paper does suggest a pervasive ignoring of key works associated with crises phenomena dating back from works of Walter Bagehot in 1873 to more contemporary economists such as Hyman Minsky since the 1980s.

Perhaps the most significant charge of dogmatism implicitly made by the Kiel economists is in suggestion that models are retained in the light of considerable external evidence that would question their validity:
"The corner stones of many models in finance and macroeconomics are rather maintained *despite* all the contradictory evidence discovered in empirical research. Much of this literature shows that human subjects act in a way that bears no resemblance to the rational expectations paradigm and also have problems discovering 'rational expectations equilibria' in repeated experimental settings." (ibid, pp.7-8).

For West Churchman (1968), quoted above, systems thinking not only requires 'building a bigger picture' of the situation – for which he described a process of unfolding increasingly more variables from the context of use – but also appreciating other conceptual constructs or perspectives on the situation. The transition speaks of two worlds; one, the holistic ontological real-world 'universe' of interdependent elements, encapsulating complex interrelationships; another, an epistemological socially constructed world of 'multiverse' (cf. Maturana and Poerksen, 2004, p.38), encapsulating differing constructs on reality.

Figure 2 illustrates a dogmatism as a reinforcing causal loop. Situations are complex because of contrasting perspectives. Strategy making requires negotiating between different perspectives. The systemic consequences are twofold: (i) relevant perspectives can be marginalised and alienated, and (ii) there can be a reinforcement of professional self-righteousness amongst practitioners. The result is often an increased effect of complexity (not appreciating others' perspectives) and conflict of values in the wider situation.

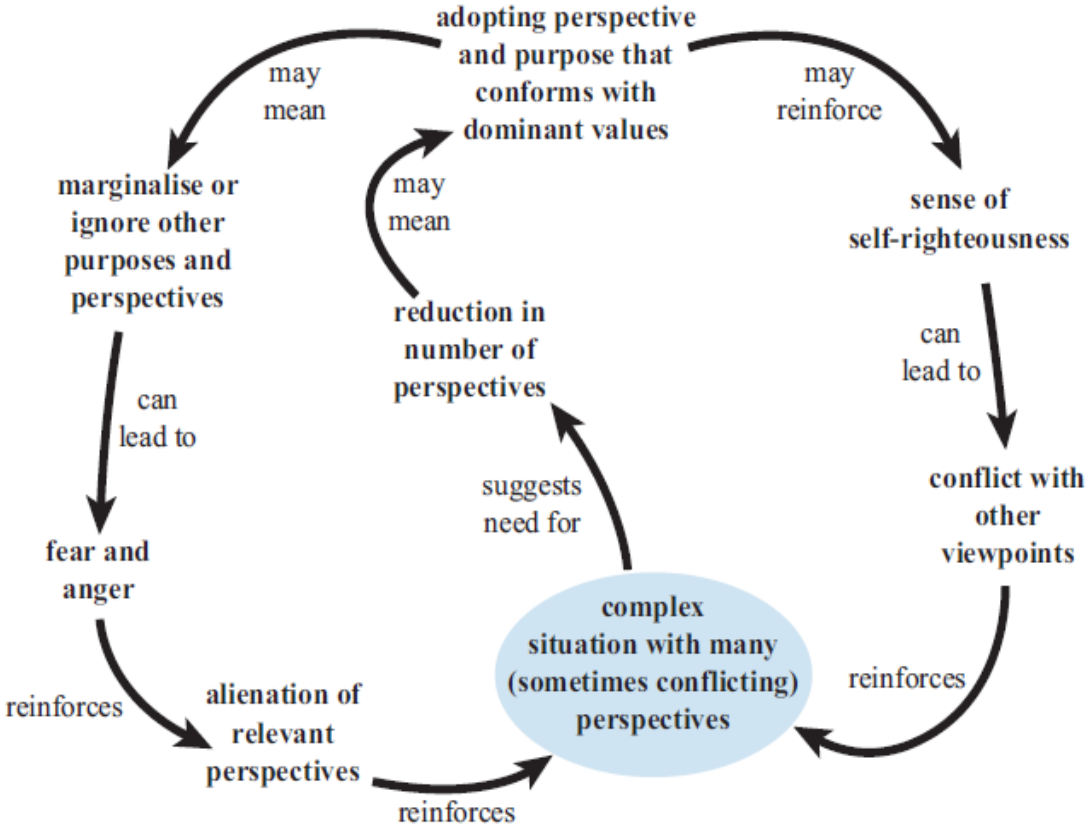

Figure 2 Causal loop of dogmatism in conventional thinking

All systems are partial. They are necessarily partial – or selective – in the dual sense of (i) representing only a section rather than the whole of the total universe of interrelationships, and (ii) serving some stakeholder parties including practitioners - and their interests - better than others (cf. Ulrich, 2002, p.41). In short, no proposal, no decision, no action, no methodology, no approach, no tool, no model, no system, can get a total grip on the situation nor get it right for everyone (Reynolds, 2008). In using and (re)designing models we need to keep an eye on changing contexts of interrelationships and change and variety of different practitioner perspectives.

Reflecting on model limitations: avoiding managerialism (Trap 3)

> "To a man with a hammer, everything looks like a nail" (Mark Twain)
>
> "No problem can be solved from the same consciousness that created it. We have to learn to see the world anew." (Albert Einstein)

The Kiel authors provide some alternative ideas for improved modelling. Their critique of reductionism calls for a more holistic approach to economic modelling involving for example attention to risk analysis, Network theory, and actor coordination, amongst other ideas. Similarly their implicit critique of dogmatism advocates a more pluralistic approach including, for example, wider engagement with other economic viewpoints such as behavioural economics, or indeed other disciplines. Moreover, the authors call for a wider engagement amongst financial modellers with the wider public sphere.

But how holistic are the Kiel authors themselves? Are there effects of leaving out the political domain of economic activity? Similarly, how engaging with other perspectives are they? Behavioural economics can be important but what about ecological economics? Also, what about engaging with other related disciplines – political sciences, anthropology, philosophy, for example. And despite the open-access internet availability of the opinion paper, to what extent are the authors merely talking to each other rather than engaging wider publics on a transdisciplinary dimension?

In short, is there a risk of fetishising new improved models? Figure 3 illustrates two loops of traps associated with systems thinking. When these traps are enacted, there is a risk of (i) holism – assuming comprehensiveness, and (ii) pluralism – assuming impartiality.

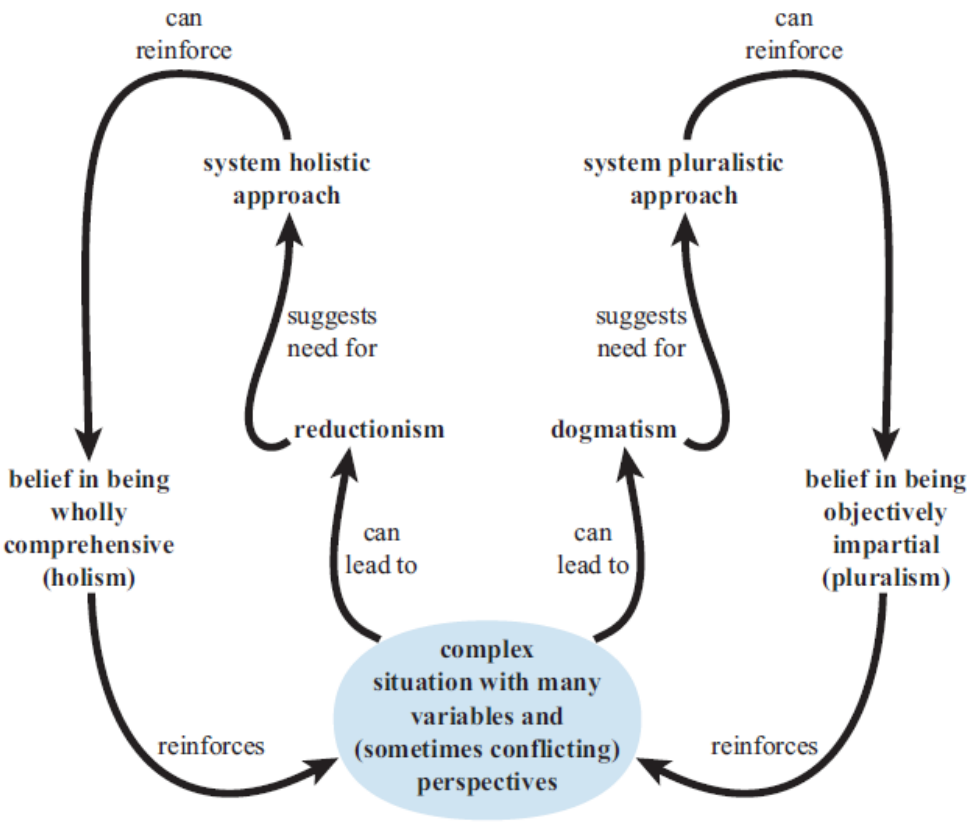

Figure 3 Causal loop diagram of the traps of holism and pluralism in systems thinking

Given the impossibility of being comprehensive and impartial, it may seem churlish to surface the weaknesses in any claims implicitly made around being holistic and pluralistic. The Kiel authors have hinted at the potential traps of holism and pluralism. As the authors point out, holistic models are to be encouraged *but* there is a need also to be transparent about the fragility of any improved models: "… while such models better capture the intrinsic volatility of markets, their improved performance, taken at face value, might again contribute to enhancing the *control illusion* of the naïve user. The increased sophistication … *should not absolve the modellers* from explaining their limitations to the users in the financial industry" (ibid. p.6 my italics).

Similarly, pluralistic models that invite different contrasting perspectives should be encouraged but there is from the authors' collective viewpoint a need also to reveal biases: "Researchers who develop such models can claim they are *neutral academics* –developing tools that people are free to use or not. We do not find that view credible... It is the responsibility of the researcher to make clear from the outset the limitations and *underlying assumptions* of his models and warn of the dangers of their mechanic application." (ibid p.6 my italics).

These acknowledgements suggest a political as well as an ethical dimension to modelling. What is important here is a critical assessment on the boundaries of modelling; what's in and what's out, and who decides what's left out. Politics of modelling requires critical systems practice – boundary critique – based upon *systemic triangulation*. In the next section I will introduce the notion of systemic triangulation which can be used as a basis for understanding how systemic failure works, but moreover provides the basis for a simple generic framing device which can be used for applying systems thinking to support professional practice.

3 Systemic triangulation

The purposes behind models represent important judgements of boundary. The 'models' referred to by the Kiel authors can be regarded as bounded conceptual systems. They are ideas or tools used for making sense of situations (for example, national security or global finance) and with the ultimate purpose of supporting improvement in such situations. As with all forms of systems thinking, the models comprise of three factors which, in their mutual influences on each other, can generate either failure or success. The Kiel paper on systemic failure signal these through highlighting:

1. the importance of *interrelationships* in situations of interest;
2. as viewed from peoples' contrasting *perspectives*;
3. expressed through ideas or *models* used to make sense of interrelationships and perspectives.

Figure 4 illustrates the influences between these three entities in the form of a triadic relationship.

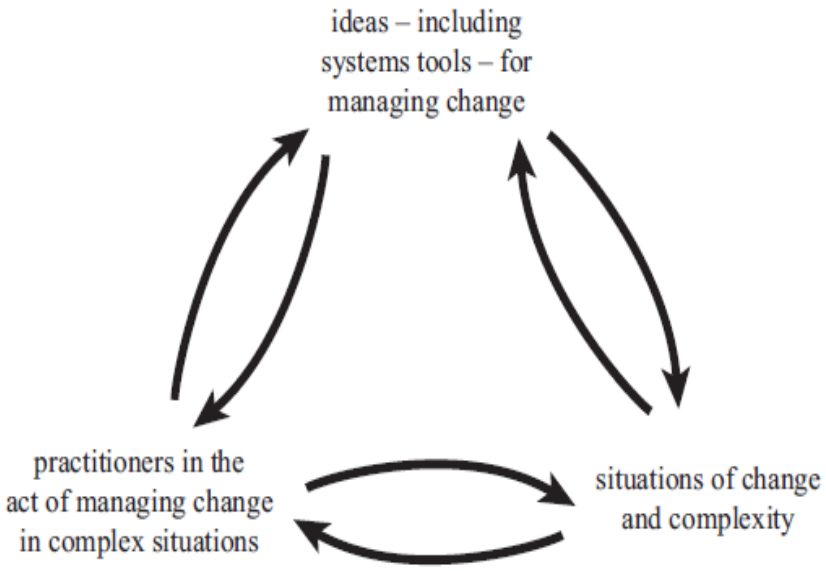

Figure 4 Triadic relationship between situations of change, practitioners managing change, and tools for managing change.

The triadic relationship in Fig. 4 draws on synthesising two ideas; one is the popular notion of the 'Iron Triangle' within social sciences; the second is Werner Ulrich's notion of boundary critique associated with critical systems thinking. The idea of the iron triangle was first expressed by Ralph Pulitzer a political journalist reporting critically on the Paris Peace Conference amongst the allied governments following World War 1 in 1919. Pulitzer was frustrated with the vicious cycle of vested interests at play in the conference deliberations. He suggested that the resultant accord is not likely to be successful given the insipid self-contained interests amongst three sets of actors – the wider industrial concerns represented by bureaucratic bodies, military interests, and politicians making the decisions. One rendition of the Iron Triangle is given in Figure 5. It relates specifically to American politics and based on the American President Dwight Eisenhower in his 1961 Presidential resignation address in which he describes the military-industrial complex. Figure 5 is an expansion of the triad relating to systemic crises arising from prevailing economic activities. The 'hammer' is used as a generic reference point for models – whether they be financial models, or wider economic models – both of which support and underpin policy design.

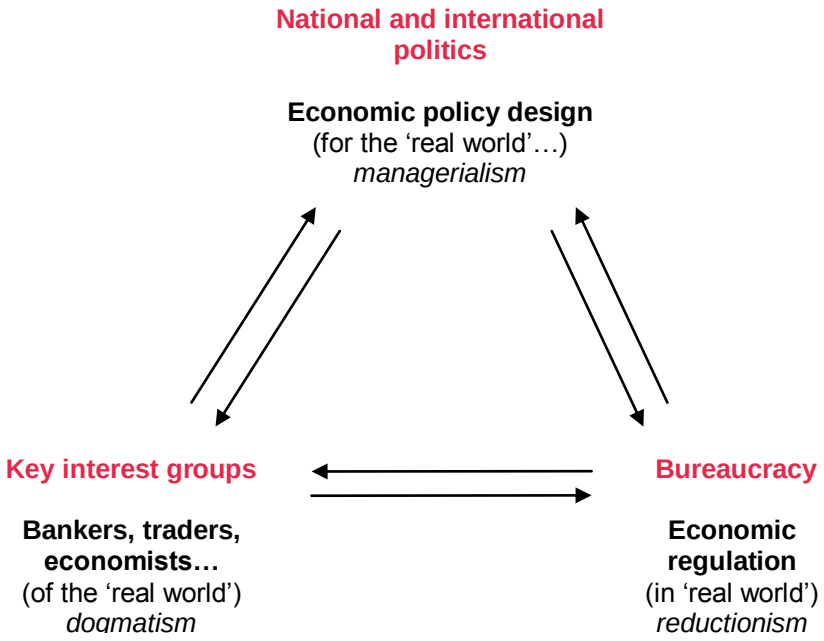

Figure 5 The Iron Triangle of economic modelling and traps of thinking.

The idea of the iron triangle is sometimes used explicitly in political science, as for example in reference to European politics (cf. Hix and Hoyland, 2005), as well as amongst political activists, as for example with Arundhati Roy in relation to her opposition to large-scale dam constructions in India (Roy, 1999). Used as a generic metaphor, the iron triangle has acquired pervasive currency in depicting the systemic failure of political institutions.

But how might the triangulation of the iron triangle be translated from the rather purposive fixed relationships in 'traps of thinking' towards a more purposeful notion of systems design? In the systems literature Werner Ulrich expresses a similar notion of triangulation in his description of boundary critique (Ulrich, 2003) - an eternal triangle of interplay between judgements of 'fact', value judgements, and boundary judgements:

> "Thinking through the triangle means to consider each of its corners in the light of the other two. For example, what new facts become relevant if we expand the boundaries of the reference system or modify our value judgments? How do our valuations look if we consider new facts that refer to a modified reference system? In what way may our reference system fail to do justice to the perspective of different stakeholder groups? Any claim that does not reflect on the underpinning 'triangle' of boundary judgments, judgments of facts, and value judgments, risks claiming too much, by not disclosing its built-in selectivity" (Ulrich 2003 p.334)

Figure 6 aligns Ulrich's systemic triangulation with the traps of thinking described earlier.

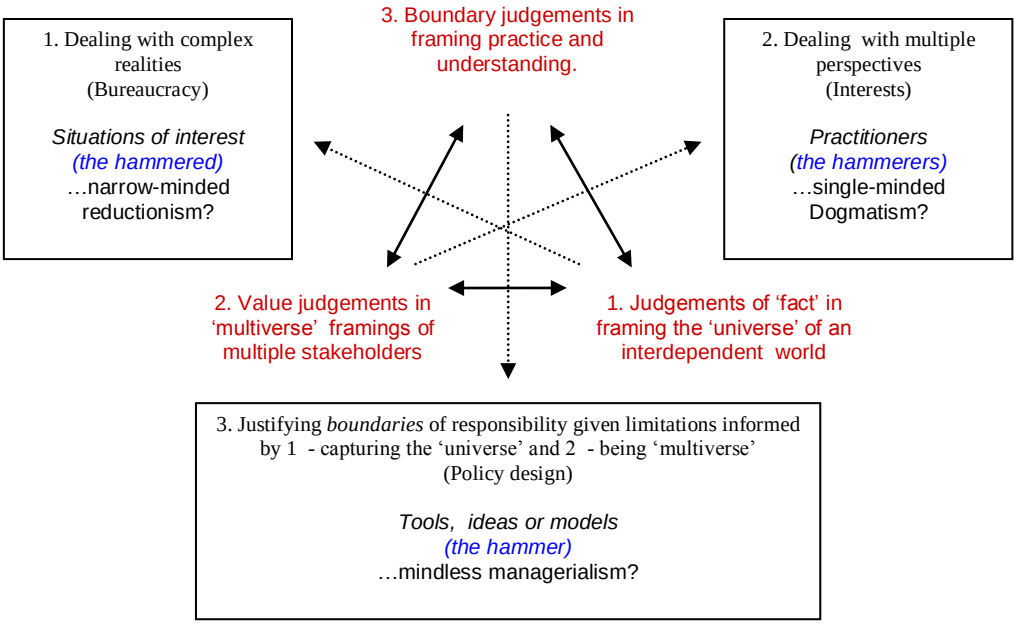

Figure 6 Critical systems triangulation
(adapted from Reynolds, 2008a)

The three corners of the triangle represent the three aspects of systemic failure signalled in the Kiel paper: firstly, the problem in formulating judgements of 'fact' regarding the universe of *interrelationships* in situations of interest; secondly, engaging with the multiverse of value judgements associated with peoples' contrasting *perspectives*; and thirdly, making effective boundary judgements expressed through ideas or *models* used to make sense of interrelationships and perspectives.

The underpinning ideas of the iron triangle and systemic triangulation are not particularly simple but they are not new either – such ideas can at least be traced back to early American pragmatism spearheaded by Charles Peirce (cf. Peirce1878). The challenge is to translate such critical insight into a more purposeful framework; a challenge that can serve the wider endeavour of continually reframing expert support for policy design (Reynolds, 2008b).

4 Systemic failure: a systems thinking in practice framework

A systems thinking *in practice* framework builds on the three entities associated with systemic failure described above: (1) real-world *contexts* of change and uncertainty, (2) people or *practitioners* involved with making change, and (3) the ideas and concepts – including systems - as *tools* for effecting change. These can be complemented with three interrelated activities: (i) stepping back from messy situations of complexity, change, and uncertainty, and *understanding* key interrelationships and perspectives on the situation; (ii) *practically* engaging with multiple often contrasting perspectives amongst stakeholders involved with and affected by the situation, and (iii) *responsibly* directing joined-up thinking with action to bring about morally justifiable improvements. These activities are supported by three (sub)frameworks respectively – framework

for understanding (fwU), framework for practice (fwP), and a framework for responsibility (fwR) - constituting what might be called an overall critical systems framework (Reynolds 2008a). The framework provides a learning tool or heuristic for developing a systems literacy. The name given to the heuristic - systems thinking in practice - is the namesake of the UK-based Open University postgraduate programme to which the author has with colleagues contributed development and authorship in one of the key modules (Open University, 2012).

Figure 7 illustrates the constituent activities and entities of the heuristic framework for systems thinking in practice.

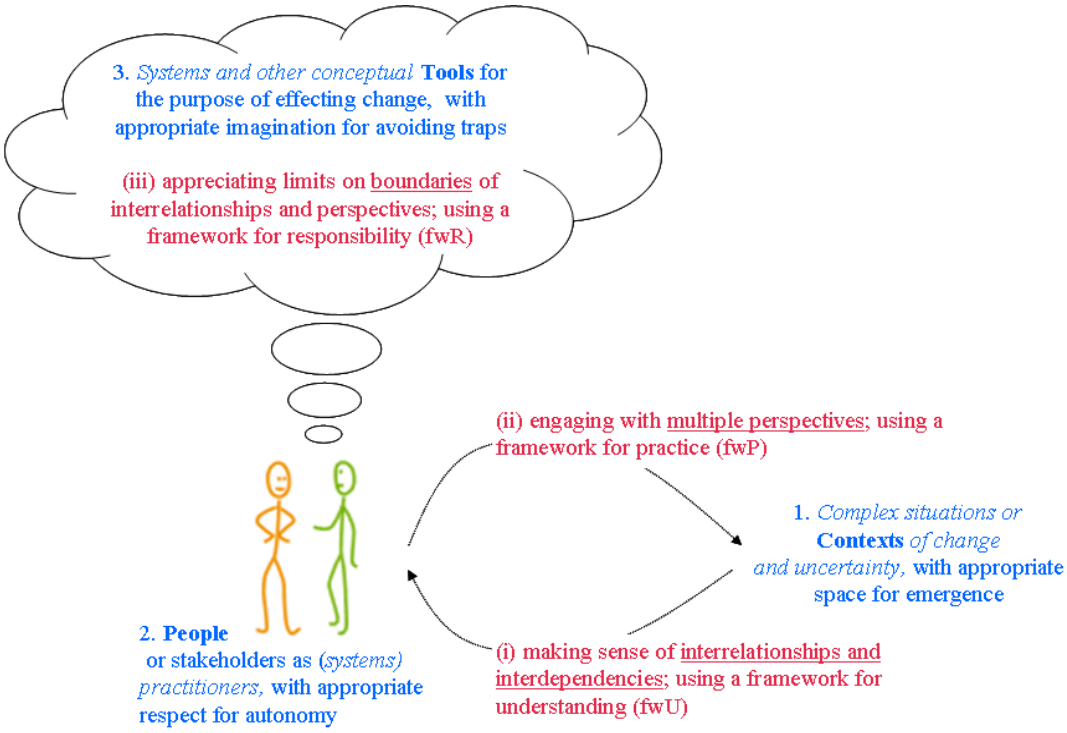

Figure 7 Heuristic framework of systems thinking in practice
(adapted from Reynolds, 2011b)

The heuristic provides a benchmark for mitigating against systemic failure in managing change. The systems tradition has developed a variety of tools for dealing with each of the three entities associated with the three traps of thinking.

First, the need for 'joined-up-thinking' to alleviate reductionism. Systems ideas in this tradition include expressions of first order cybernetics such as the viable systems model underpinning *The Brain of the Firm* (Beer 1972), and system dynamics underpinning *Limits to Growth* (Meadows *et al.* 1972), and 'systems thinking' in *The Fifth Discipline* (Senge 1990). The holistic principle is ontological; a statement about real world interconnectedness and feedback.

Second, the development of constructivist tools for addressing problems of dogmatism. Systems are here based on the epistemological notion of conceptual constructs used for developing knowledge about reality as well as guiding our activities in reshaping reality – serving the need for making new realities. Systems ideas in this tradition include second-order cybernetics such as *autopoeisis* (Maturana and Varela 1980) and a range of *problem-structuring methods* including soft systems methodology, cognitive mapping and others (Rosenhead and Mingers 2001). Such works

raise important questions regarding how to respond to multiple stakeholder perspectives or, as Maturana puts it, how to practice being epistemologically 'multiverse', as distinct from assuming access to some ontological 'universe' (Maturana and Poerksen 2004 p.38).

A third critical systems tradition deals with the methodological limitations and inevitable problems of selectivity in thinking holistically and interconnectedly, and being pluralistically multiverse whilst avoiding tendencies of managerialism. Critical systems thinking (CST) is an umbrella term used in association with this third tradition (Ulrich 2003; Jackson 2003). The framework in Fig.7 provides an expression of critical systems practice derived particularly from Ulrich's CST work on boundary critique.

Whilst some tools may have a particular focus on one of the three activities and associated entities, the effectiveness of use in supporting decision making can be gauged according to how well all three entities are dealt with. The rich history and current variety of systems tools prompt questions as to how they may relate to each other and what emphasis is given to the context of use, the users or practitioners, or the actual tools being used (Reynolds and Howell, 2010). The tools used in systems thinking in practice need not be exclusively recognised as being derived from what some recognise as the Systems tradition. They may derive from traditions ranging from Complexity science to Performance arts such as puppetry. Any tools that attempt to (i) make sense of a context of complex realities whilst (ii) enabling amongst practitioners different perspectives on such realities to flourish in order to (iii) enable systemic improvement in the real world, qualify to be exemplars of systems thinking in practice. What matters in systems thinking in practice are not just the expression of these three entities, but also the interplay amongst all three entities and associated activities, and the resultant dynamics of change that emerge.

5 Summary

> "Systems literacy is not just about measurement. The learning journey up the ladder of complexity—from quarks, to atoms, to molecules, to organisms, to ecosystems—will be made using judgment as much as instruments. Simulations about key scientific ideas and visualizations of complex knowledge can attract attention—but the best learning takes place when groups of people interact physically and perceptually with scientific knowledge, and with each other, in a critical spirit. The point of systems literacy is to enable collaborative action, to develop a shared vision of where we want to be." (Thackara, 2005)

Thackara alludes to three dimensions of systems thinking: (i) measurement and representation of complex situations, (ii) interaction amongst practitioners and ideas, and (iii) critical reflection on such representation and interaction. The question addressed in this paper is how we might use such ideas to avoid the traps of systemic failure.

Systemic failure occurs when emergent properties of a complex web of relationships associated with different systems are manifestly dysfunctional . Whereas *systems failure* represents an inability of a system to perform an ascribed purpose, *systemic failure* represents an inability of different 'systems of interest' to effect purposeful collaborative improvement in response to changing environments. This paper has examined systemic failure in terms of three interrelated traps.

For Trap 1 – reductionism – the Kiel paper and the example of the collapse of internal security in India suggests something about there being a collapse in the way things are supposed to link up or

interrelate. In a world where we increasingly appreciate that everything connects, and failure is commonly regarded in terms of disabled connections, the antidote to systemic failure is holistic thinking; often regarded in terms of 'joined up thinking' or 'seeing the forest through the trees'. So having a wider holistic viewpoint involves looking beyond, say, the 'rational representative agent', and embracing more the interplay between micro and macro levels of economic activity. Systems thinking is here characterised in terms of modelling wholes rather than parts. But crucially, wholes or systems are not pre-given. The example hints towards a second failure in not appreciating particular perspectives on modelling.

Trap 2 – dogmatism - prompts a reminder that wholes are selected by someone for a purpose. Someone usually selects the whole with the purpose of making an intervention that they think will improve matters. Hence there are always different perspectives to appreciate. Other stakeholders may have different purposes associated with modelling financial realities, and hence produce different financial 'systems'. Such systems may be complementary and helpful, or they may be disruptive. In either case, the underpinning systems models need to be appreciated to avoid systemic failure. Traps 1 and 2 signal the importance of Systems thinking for dealing with the bigger picture and multiple perspectives respectively. The example of systemic failure of academic economics signals an overriding third flaw often underpinning the modelling process in any discipline. This signals the need for a critical systems practice.

Trap 3 – managerialism – prompts the reminder that all systems are partial – or selective – in the dual sense of (i) representing only a section rather than the whole of the total universe of considerations, and (ii) serving some parties - or interests - better than others. The two dimensions of partiality respond to being more holistic, and being more pluralistic respectively. However, given the partiality of any systems thinking a third critical dimension is required where systems boundaries need to be made and questioned on the inevitable limitations of being holistic and pluralistic. In short, economists need to practice modesty in claims of inclusiveness, humility in levels of certitude, and responsibility to wider stakeholders. Where limitations are not acknowledged, the unquestioned boundary judgements on being holistic or pluralistic might be regarded as constituting holism and pluralism respectively- 'here is the definitive big picture!' or 'here is my unbiased compilation of viewpoints'! – both constituents of managerialism.

The final paragraph of the Kiel opinion paper states:

> "We believe that economics has been trapped in a sub-optimal equilibrium in which much of its research efforts are not directed towards the most prevalent needs of society… Defining away the most prevalent economic problems of modern economies and failing to communicate the limitations and assumptions of its popular models, the economics profession bears some responsibility for the current crisis. It has failed in its duty to society to provide as much insight as possible into the workings of the economy and in providing warnings about the tools it created. It has also been reluctant to emphasize the limitations of its analysis. We believe that the failure to even envisage the current problems of the worldwide financial system and the inability of standard macro and finance models to provide any insight into ongoing events make a strong case for a major reorientation in these areas and a reconsideration of their basic premises." (Colander et. al., 2009, p.14)

From a systems thinking in practice perspective, systemic failure results from three interwoven factors - (i) disconnects amongst essential contextual entities, (ii) disengagements amongst relevant perspectives associated with different stakeholders, and (iii) dysfunctional application of boundary judgements in the models used to support decision making. A particularly helpful place to start any

reorientation and reconsideration whether its in relation to international terrorism or international finance is through critically exploring such premises using the literacy of systems thinking in practice.

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