ODI

Managing complexity and uncertainty in development policy and practice

Hilton Root, Harry Jones, with Leni Wild

Key messages

- Development policy and practice has been challenged in recent years to take better account of uncertainty and complexity in policy reforms

- This paper draws together thinking on working with uncertainty, focusing on collective action mobilisation, networks and specific features of change

- A key insight is that complex systems are not capable of being isolated from their environment, which makes them subject to random influences beyond the control of individual project managers

- This highlights strategies for responding to this, and changes for dominant approaches in planning, programme design and monitoring.

- Implementing these also requires building a more cohesive evidence base on applying adaptive principles as well as better sharing of emerging experience in adaptive programming.

Acknowledgements

Table of contents

Executive summary

Development policy generally, and aid practice specifically, has been pushed to broaden its scope and embrace a number of ideas in recent years from beyond its traditional purview. These include the importance of developing a robust understanding of political contexts and using this understanding to inform programming (through a range of 'political economy' tools), and renewed calls for working more effectively within what are often complex, adaptive systems (i.e. 'complexity'). A number of schools of thought have fed into these ideas, which have often reflected a very broad and fluid body of evidence and analysis drawn from across the social sciences.

Yet they appear to be grappling with similar types of policy challenges. How to understand and potentially change people's motivations, incentives and behaviours? How to work in complex and uncertain environments, where informal rules and processes can be more powerful than formal ones? And how to operate where there are competing interests and no clear agreement on collective action?

Despite these important questions, there have recently been a number of criticisms of the dominant approaches to international support for institutional reform. The criticisms focus on the perception of a dominant, highly linear approach to reform, often assuming a single 'end point' that all countries are working towards, and a common assumption of 'rational choice' decision logics by the actors involved.

Recent critiques from a variety of perspectives and academic disciplines have sought to challenge this. They have highlighted that institutions themselves must be 'home-grown' and need to develop within their own local environments, rather than according to a particular blueprint. Moreover, there are growing calls to recognise the extent to which change processes are themselves often non-linear, unpredictable and uncertain for all involved. While this represents an important step forward, practice still lags behind and there are challenges in identifying practical ways to work with this 'uncertainty'.

This report draws together thinking around some of the main elements of working with uncertainty, focusing on the development of collective action, the role of networks and coalitions, and the specific features of change itself. Borrowing from elements of complexity thinking, political economy analysis and more, it elicits insights about how change happens. It also highlights some tools that can provide a more dynamic analysis of change processes. To embrace a more mature phase of working with adaptive, complex systems and changing incentives will require some very specific amendments to the dominant approaches in planning, programme design and monitoring, which include the following.

- Firmer evidence is needed to link the application of adaptive principles to successful institutional reform. This requires developing a shared community of practice that can move beyond arguments over different methods and disciplines to build a more cohesive evidence base to inform future programming that enables cross-case and cross-discipline learning.
- Emerging experience in adaptive programing is not being adequately documented, shared and disseminated. Special techniques are required when prevailing incentives seem to work against changing practice. And there will need to be better sharing of tools and approaches – for instance, for reporting frameworks.

We hope this paper helps the actors involved to take another step forward in their attempts to change how development policy and practice operates, enabling them to operationalise principles about how change really happens.

1 Introduction: the evolving development discourse

The role of institutional reform in supporting better development outcomes is well recognised, but there remains considerable debate on exactly how that reform comes about, what drives it, and what the end points might be. Critics of post-Cold War 'good governance' discourse, which was seen to promote a fixed, blueprint approach to institutional reform, have highlighted the extent to which informal arrangements and practices can undermine formal institutions (Grindle, 2007; Andrews, 2008; Kelsall, 2013; Levy, 2014). Where reform efforts have focused on formal institutions only, they often result in superficial 'signalling' of reform, rather than deep-seated change (Pritchett et al., 2010). Calls for a more sophisticated approach, recognise that countries are not modernising towards one single 'end point' or progressing towards a single ideal institutional form (Root, 2013).

Moreover, in analysing how individual stakeholders approach any reform process, many commentators continue to draw on narrow models of rational choice and game theory, which make some standard assumptions about how people behave and how information is used. Actors within these frameworks are regarded as 'utility maximisers' – that is, they try to improve their situation by calculating costs and benefits to maximise gains and minimise losses. They search for the optimal solution, assuming that advantage can always be derived from the best, most objective information.

These narrow 'rational choice' models have also been widely critiqued; institutional economics, for instance, highlights the role of institutions in shaping people's choices and behaviours, while many political economists emphasize the wide variety of factors that shape people's incentives and motivations (Harris, 2013). This is not a new critique. Since the 1950s, Herbert Simon has emphasised that human rationality is bounded and decision-making limited by the quantity of information that can be gathered, the finite information-processing capacity, and the amount of time available in which to make a decision (Simon, 1955, 1972). To avoid information overload, he argued, individuals 'satisfice' rather than optimise (Ibid.).

Growing recognition of complexity has added to these critiques. Alongside 'satisficing', other factors are also acknowledged to influence people's actions – the recognition that people are embedded in complex adaptive systems and that they make decisions simultaneously, generating and responding to changes in the behaviours of others around them and the larger environment (Rihani, 2005; Westley et al., 2006; Ramalingam and Jones, 2008; Barder 2009; Ramalingam, 2013).

There is, however, no single agreed definition of 'complexity'. Some commentators focus on the *characteristics of the system*, defined as: comprising autonomous, heterogeneous agents with networked structures and the ability to self-organise; exhibiting sensitivity to initial conditions and evolutionary dynamics where macro patterns of behaviour can emerge without centralised organisation; and, perhaps most significantly, which exhibit strong interdependence and interaction. Others characterise complexity with reference to the *nature of the problem faced*, where complex problems involve: distributed capacities (the knowledge and capacities required to tackle problems are spread across actors without strong, formalised institutional links); divergent goals (reflecting divergent interests, competing narratives or conflicting goals); and uncertain change pathways (where it is unclear how to achieve a given aim in a given context, or where change processes involve significant, unpredictable forces).[1]

---

1 Thus, a reform problem not presenting features of complexity might involve the following (Root, 2013): powers to shape a reform (in terms of both policy choices and their implementation) that are nearly fully concentrated within one body; that body operates according to unified, prioritised, non-conflicting goals (in reality as well as on paper); the ways to influence that body, and to implement the reform, are relatively fixed and well known.

These insights combine to illustrate the diversity of incentives and motives that drive people's behaviours, reinforcing the limits of a narrow calculation based on rational choice. In recent years, a number of development agencies have looked to different tools and models to help them better understand and engage with these processes. One early approach in political economy analysis, aimed to explore options for 'good enough' or 'good fit' institutional reforms, rather than international models of best practice. This analysis drew on a wide range of concepts and theories from across the social sciences – including but not limited to rational choice models; the extent to which it remains overly influenced by such narrow models is still debated (Fisher and Marquette, 2014). Development agencies are also increasingly interested in complexity thinking too – perhaps partly prompted by a sense that too many political economy analyses lacked operational relevance or focused on highlighting political constraints rather than solutions. Despite these differences, there seems to be a growing convergence from a range of disciplines around the need to better understand how change happens (acknowledging its non-linear and uncertain nature) and the interactions between people, institutions and systems.

2 How to work with uncertain change processes?

It has long been recognised that within development, change processes are uncertain and interconnected (Hirschman, 1967; Simon, 1972; Brinkerhoff and Ingle, 1989). More recently, recognition of the role of complexity and of the need for 'good enough' approaches to institutional reform has gained ground. Explorations of what this means for development policy and practice, or of how to translate this recognition into practical changes for policy and programme design and implementation are underway.

For example, it is recognised that once a reform process begins to unfold, the direction may change markedly and rapidly from its inception phase. Rather than operating in a single environment in which a single process of reform unfolds, there are likely to be collections of seemingly independent processes among diverse environments – resulting in large interdependent networks in which people are constantly adapting to each other and, in turn, stimulating additional pressures on others. What does this mean for how to understand and respond to such processes?

One key element is to understand how collective action can be mobilised, even while there are diverging interests, and to recognise how networks operate. In addition, the nature of a change process itself (and the role of circumstance, critical junctures and more) can have a significant impact. We now look at each of these in turn.

2.1 Collective action and institutions

Collective action problems occur where actors may have quite different immediate interests, the pursuit of which is likely to harm their aggregate, longer-term interests; indeed, successful change initiatives require collaboration between these actors to overcome their divergent interests. For example, political parties might have the immediate incentive to capture funds from policy initiatives to fund their operations, but if they work together, the overall level of resources available to all parties might increase. An important stream of research within political economy analysis thus depicts collective action problems as one of the fundamental challenges in international development (Campos and Root, 1996; Booth and Cammack, 2013).

Fundamentally, resolving collective action problems requires agreed and enforced rules that ensure compliance and can sanction those who do not comply. Thus the solution to collective action problems often lies in institutional development, where a group of actors agree on certain rules that enable them to act collectively in their shared best interests (Ostrom, 1991). This may involve setting up new entities or creating new rules to guide the actions and interactions of existing bodies. Adherence to certain rules, whether strictly formalised or not, alters the likely pay-off of individual actions to help orient all actions towards the common welfare.

The relationship between strategic behaviour and institutional design is increasingly seen as of central importance to development progress (see Box 1 below).

Box 1: Collective action and development processes

North, Wallis and Weingast (2013) attribute major differences in the structure and performance of economies around the world and over time to political settlements among elite actors that use their influence to hammer out institutional arrangements designed to limit access to resources and opportunity. Bueno de Mesquita et al. (2003) explain that the quantity and quality of public vs private goods depends on whether collective action can be the work of either small or large winning coalitions.

Campos and Root's *The key to the Asian miracle* attributes the success of East Asia's high-performing economies to institutions that helped solve coordination problems that would have otherwise disrupted the implementation of growth-promoting policies. They chronicle how East Asian leaders designed institutions to address a general conundrum of development policy – the benefits accrue in later periods while the costs are incurred earlier. This time lag between costs and benefits makes the potential gains from a new policy largely promissory. In their study success hinged on building commitment mechanisms so that policies, once implemented, could be sustained and the benefits would be inclusively distributed. 'Making shared growth credible' solved the underlying coordination dilemma (Campos and Root, 1996).

Evidence suggests some common ways of supporting collective action and institutional reform:

- *Convening and brokering*: Convening actors and brokering agreement, including by external actors who can help to bear the transaction and transformation costs of agreeing on new rules.
- *Strengthening linkages*: With a variety of actors working on the same issue, there is likely to be a major challenge in ensuring adequate coordination and collaboration. Possible solutions may include promoting relationships between key actors or networks, improving channels for sharing information and negotiating action, or building common products or spaces for interaction (Ostrom, 2005).

In addition, one has to bear in mind that actors and networks are part of living systems, which continuously evolve and adapt. Rather than considering how to build collective action among groups with well-defined or fixed features, action has to take place within 'evolving systems' and processes of continual change and evolution. This has a number of important implications, including the need to understand how interdependencies affect the choices of each actor and how their relative opportunities and capabilities arise from within a set of relationships or interdependencies.

Moreover, research in social psychology, in particular, points to *tendencies to interact with those who are similar*, which can have a long-term impact on behaviour and particularly on the diffusion of norms, ideas and values, including for collective action. This is known as 'homophily' and means that the processes that lead people to become similar to each other locally can cause them to retain their differences from other groups. These differences can be further amplified if the environment changes faster than the responses of actors themselves. Another pattern of behaviour – and one that is often overlooked in considering how to mobilise collective action – is the tendency to *copy*.[2] Paul Ormerod (2012) uses the term 'copying' as shorthand to describe a variety of behaviours. He suggests that people may imitate the behaviour of others when they obtain a direct benefit from aligning with them, regardless of whether they are making the best decision.[3] He argues that, whenever 'social copying' shapes

---

[2] This tendency is also confirmed in the Axelrod model: 'The social influence model also suggests that functionalist explanations for common observations need not to be the only or even the simplest ones. For example, suppose there are two equally attractive variants of a cultural practice, and the less common one vanishes over time. A functionalist explanation would be that those practicing the less common variant switches to the more common variation because there was some advantage in doing things the way most other people do. This makes good sense for problems of coordination, such as which side of the esters to drive on or which technical standard to employ (Lewis 1967; Saloner and Farrell 1986; Axelrod 1994). But, as we have seen, the social influence model demonstrates that even if there is no advantage to adopting the majority practice, the majority practice may still tend to drive the minority proactive to extinction: if neighbors following different practices are equally likely to switch to the other practice, the practice with the fewest followers is the one most likely to the become extinct first. Thus the mere observation that a practice followed by few people was lost does not necessarily mean either that the practice had less intrinsic merit or that there was some advantage in following a more common practice.' (Axelrod, 1997b: 220)

[3] Alternatives that are substantially inferior are less likely to be selected, but only up to a point: beyond a certain quality threshold (which may be quite low), any alternative can become the most popular. Thus, over time, copying narrows the range of available options; as more individuals copy, they increase the likelihood that they will (1) select objectively inferior alternatives, and (2) increase the probability that bad choices will proliferate. It depends also on the choices made by other actors with whom one may interact.

individual behavior, inferior models – those least consistent with objective measures of performance – are increasingly likely to be copied (Ormerod, 2012).

2.2 Networks and distributed capacities

As highlighted by recognition of the role of copying and social interactions, efforts to support institutional responses to collective action problems can also miss the potential of individual actors or groups to change outcomes. In other words, they can overlook system-level variables rather than the intrinsic properties of an individual regime.

Network analysis can be used to supplement this understanding. It can help to locate possible reform entrepreneurs so that reformers can help them to gain resources and recognition. Alternatively, it can identify instances where barriers to reform caused by group homogeneity and peer pressure may reinforce incumbent institutions. Indeed, while it might sometimes appear that a few individual 'champions' drive policy change, even these 'champions' often grow out of and derive their influence, capacities, maneuverability, and the resources they can mobilize from the networks in which they are embedded (Mcloughlin and Batley, 2012). So-called 'champions' may be unable to sufficiently escape the prevailing rules of the game, may struggle to act beyond the networks that have supported them to obtain a position of power in the first place, or may find their efforts stymied without sufficient buy-in from broader networks and existing institutions that can contribute capacities, power or legitimacy to an issue.

Networks may be built on informal relationships and may be difficult to access through formal institutional identities. In such cases, the channels for influencing policy must include knowledge about the relationship of the formal and informal network structure (Keck and Sikkink, 1998).

Indeed, networks can constitute powerful filters standing between decision-makers and the 'market for ideas'. Even choices made by leaders are not independent of the choices made by others, especially networks of others; and leaders are unlikely to make choices divorced from the cognitive frameworks used to create value locally. A key lesson of networks for policy-makers is to move beyond a narrow focus on the cost-benefit calculus of individual incentives. Rather, network analysis can help to target the interactive network of social relationships, including the role of community sanctions that support, sustain, conceal or even validate the behaviour they seek to modify.

Network analysis reinforces the idea of interdependence and interactions at various levels such as the national, regional, local, and international (Gaventa, 2006). These interactions can be strong or weak but hierarchical relationships are rarely so strictly enforced that no space is left for discretion at lower levels; influence is often multidirectional. Often, the reality is a 'polycentric' institutional landscape shaped by a number of overlapping institutions, with power shared between formal and informal institutions (including where traditional modes of governance hold considerable legitimacy) and between many nested and quasi-autonomous decision-making units operating at many different levels (Folke et al., 2005).[4]

Understanding the extent to which patronage (the ability to control the rights to certain privileges or benefits such as funds or appointments to office), for example, is embedded within the network dynamics of a society provides a highly relevant example of what this means for development policy and programming.

Where patronage operates as part of a network, this reinforces the notion that directly targeting existing patronage structures can be counterproductive. A direct approach, removing the most highly connected entities or individuals in the social network, could result in a collapse of the network, or could trigger a battle for leadership among the remaining patronage chains.

Instead, reformers might explore how to change the decision to invest in maintaining patronage networks, including expectations of reward. This way the perceived 'risk' of losing a patronage network might be minimized, hence increasing the 'risk appetite' for alternative investments or approaches. Making the cost of maintaining patronage networks outweigh the returns is the goal.

---

[4] It should be noted that this 'distribution' condition does not hold for all problems. In some cases, the relevant powers for a particular change or reform are relatively concentrated in one single, functional body, or the change itself may be relatively self-implementing.

One way to reduce the benefits of patronage is through policies that strengthen the so-called 'intermediary nodes' of the system. Operations and organisations focused on the 'social middle' should be assisted to become more sustainable, and network analysis can help in identifying those who occupy that 'middle'. A longer-term response would be to replace the personalised dependence on a 'boss' or 'big man' with state-provided sources of welfare (see Box 2). Following the Great Depression in the United States, the New Deal, which offered state-based protection to dependent workers, curtailed patronage systems that had sustained the corruption nexus between business, politicians and dependent workers in large cities. The state thus played an essential role as 'public risk manager' (Root, 2005: 231-234). Examples from South Asia illustrate how these patronage networks currently operate and why a different approach is needed (see Box 2).

<div style="background-color:#cfdedd; padding:1em;">

Box 2: Patronage networks in South Asia

Some of South Asia's developmental failures can be seen as exemplifying the persistence of patronage systems. Despite the region's long-lived democratic traditions, openly contested elections, and strong political parties, patterns of social coordination that predate democracy persist. At the same time, new social loyalties continually arise in the context of the region's democratic policies. To balance greater democratic pluralism with existing patterns of social interaction, mechanisms to resolve conflicting practical, moral, and political interests of the population remain patronage-based. In other words, the livelihood of many depends on the success of 'big men' in accessing state-controlled resources.

For example, in Nepal's energy sector, entrenched networks of individuals and institutions are organised to extract rent. Changing this situation requires coming to grips with how the workings of these networks shape programme performance, as well as a context of ingrained nepotism and patronage that cannot be dislodged in the short term. Forms of network analysis, for instance, can serve as a diagnostic tool to identify interventions that are most conducive to achieving the goals of the new economic reform programme in Nepal.

</div>

Some implications for working with networks seem to be emerging, as follows.

- *Working with or through existing institutions*: When the resilience of existing institutions is difficult to circumvent existing networks can at the least be utilised as resources for change in helping to understand and solve problems.
- *Strengthening linkages and engaging more broadly*: With a variety of actors working on the same issue, there is a major challenge in ensuring sufficient coordination and collaboration. This may involve promoting relationships between key actors or networks, improving channels for sharing information and negotiating action, or building common products or spaces for interaction. Change efforts may need buy-in from a broad number of individuals and organisations.

These approaches also raise some challenges and questions:

- In many instances, existing networks and informal institutions may be part of what sustains a problem, meaning that the recommendation to simply 'work with them' is challenging. The approach to and timing of engagement may need to be carefully considered for some actors, and some may need to be excluded from key spaces/decisions. Documenting experiences of how to work effectively in these settings is likely to be a key area in which political analysis can contribute.
- Broad but poorly targeted engagement can be ineffective, and in some cases it may be that direct engagement may not be helpful at every stage – e.g. it may be better to exclude key opponents from certain spaces.

Efforts to mobilise collective action and to understand how networks operate both require forms of stakeholder mapping. These have a long history in the social sciences, and are part of a range of programme management tools. Often, however, they can present a static or fixed picture of stakeholder interests that inadequately specify the relationships and linkages between different stakeholders and how they change over time. Two forms of modelling have the potential to support more sophisticated stakeholder analysis and are described below.

- **Agent-based modelling (ABM)** employs computer simulation to understand how different combinations of 'micro-level' incentives and interactions produce 'macro-level' phenomena. Explanatory insight into the collective behaviour of agents is facilitated. It can also illustrate how macro-level phenomena influence, and are influenced by, micro-level interactions. When combined with empirical data, ABM can allow for deeper analysis of how actors respond to available information, according to various rules (formal or informal) and their response to others and their environment too. It can generate insights such as how the choices of one actor will shape the choices and behaviour of others, and how the structure of individual incentives can obstruct or contribute to collective action for common, long-term interests.

  For example, an agent-based stakeholder model analysing processes of institutional reform in developing countries helped policy-makers outline a new development strategy for Korea and coordinate appropriate trade-offs among politically significant stakeholders (Root et al., 1999). Identifying structural reforms that were politically feasible, it enabled a trade-off in which labour conceded management's demand for a more open labour market in exchange for management's support to open the financial system, advocated by big labour. ABM has also assisted the World Bank's East Asia and Pacific regions to operationalise administrative reform packages by identifying politically feasible trade-offs among key stakeholders (Green et al., 2010). Other examples involve an analysis of the hydropower sector in Nepal (Root et al., 2014) which tested different logics (such as identity politics, patronage, politicised decision-making and rent-seeking) and scenarios to see how they would play out under different conditions, and to identify the interaction of contextual trends and programme design elements.

- **Multi-agent social simulations:** These can be used when it is not possible to assess the potential responses from the introduction of a new policy (as is the case for ABM). They are distinct but from but related to ABMs Instead, a 'social simulation' can be developed to try to understand how different stakeholders might respond, and can depict what kinds of coordinated actions will emerge. These simulations can help in identifying who should be involved or avoided in a coordinated strategy, which phases will be most critical, and a range of options for what kinds of incentives might work best. They are useful for designing agents or solving practical reform problems by providing a system-level view of the reform process. The interactions between agent behaviours and institutions can be targeted to help actors find compromises and predict when cooperation might emerge. For example a way to build alliances among new actors that can break a current logjam can be chartered; experimentation can indicate novel solutions that can be invented locally based on the interactions among agents; and identify feasible compromises or trade-offs among conflicting constraints.

  Root et al. (2014) map how social networks are distributed and the links between informal ties and formal affiliations in Nepal's energy sector as a first step towards conducting social simulations to identify opportunities and risks of a given policy option. After obtaining and organising network data on the relevant stakeholders, they find that social simulations can provide guidance relevant for policy interventions. In this example, various data sources were used to construct the networks of ties that shape the interaction of key players in the sector; after this, a simulation was used to examine how behaviour and decision-making affected outcomes such as the progress of key projects and the distribution of rents and other resources.

2.3 How change happens

While patterns of mobilising collective action and network dynamics are key to understanding what can enable or constrain reform processes, there are also specific issues posed by the nature of how change itself happens.

For example, it has long been highlighted that crises can play a large role in change processes. These are often driven by unforeseen events or forces, and frequently lead to decisions that mark 'turning points' with far-reaching consequences. They can provide the catalyst for fundamental reforms, opening possibilities for wholesale institutional change previously unthinkable or seemingly impossible (March and Olsen, 1998; Klein, 2007). For

example, Mcloughlin and Batley (2012) argued that crises have been important in shaping the reform of public services by throwing the normal rules of the game into flux, weakening or destroying interest groups, empowering new ones, or persuading the public of the need for major reform.

Even without major crises, opportunities to influence reform or constraints to such reform can come and go unpredictably. Grindle (2004) demonstrated how reforms that would have seemed highly unlikely given prevailing interests and institutions were able to succeed 'against the odds' due to 'room for manoeuvre' that can arise from the dynamic and fluid nature of reform processes. Kingdon (1984) highlighted the role of chance and 'luck' in driving reform agendas: due to the disconnect between actors and fora involved in prioritising key problems and their potential solutions, the impetus and direction for action will often rely on the uncoordinated confluence of different streams of thought and decision-making.

Rather than viewing change processes as linear (with step-by-step processes that build on and reinforce each other), these examples support the view that change is often far less 'planned'. It can occur in a wide range of ways, including the following.

- *Combinatorial explosions*: Where a combination of objects can form new outcomes, both through bottom-up aggregation or top-down disaggregation, leading to an unlimited number of possible structures.
- *Information cascades*: These can be analogous to contagion in an epidemic that spreads from one individual to another. When change happens over a network, it can come about in a highly non-linear and discontinuous manner; when individuals have incentives to adapt their own behaviour to that of their neighbours, cascading effects can result from the actions of a small group of initial adaptors.
- *Diversity begets diversity via 'niche construction' and can trigger transitions*: When an actor defends its 'niche', it creates space for others to find new strategies. As adaptations multiply, the new 'niche' created can foster the possibility of still more sets of interactions and exchanges, which encourage new specialisations and refinement of existing strategies.[5]

---

[5] Computer scientist John Holland explains: 'The multiplier effect that accompanies the re-use of resources in a cascade typically drives the occupants of a niche to increasing specialization. Darwin's comet orchid illustrates the extremes of specialization that can result. Similar changes over time can be observed in most niches: transportation niches in an economy, dialects and slangs in languages, special trading procedures in markets (e.g. "derivatives") and so on. When a new variation arises in a niche, it usually makes possible new paths in the network of interactions. If a new path provides an increase in the multiplier effect (often through increased recirculation) it persists. The long-term effect is increasing diversity that breaks initial uniformity' (Holland, 2014: 68-69).

3 Implications for policy and practice: adaptive and iterative programming

One could argue that viewing change processes in development as unpredictable, non-linear and involving multiple actors with different interests is simply common sense. Yet in many countries, this has often not been evident in approaches to support institutional reform or in the design of development policy and practice. The table below presents a stylised comparison of more conventional development thinking on how change happens, and what non-traditional models suggest.

Table 1: Conventional and non-conventional views of how change happens

	Conventional understanding of change processes	Non-traditional models (combining complexity and political economy)
System structure and agents' behaviour	Systems are comprised of individual actors that respond independently to externally generated incentives. These actors develop future strategies with full understanding of costs and look for optimal solutions. A static vertical structure enables goals and rules to be generated and implemented from the top down. One element of the system can be reformed, without triggering a counter-response among other parts. Distinctions between local and non-local actors are underplayed.	Systems are comprised of many interdependent diverse actors, they interact, self-organise and co-evolve in complex networks, according to shared evolving rules: if one part is removed, the remaining components will be affected, but the system will adapt. Systems have a dynamic structure, which arises from interaction of the parts without a central authority; overall, aggregate behaviour of the system emerges from the interactions among the parts, or actors. Each actor re-evaluates its position through continuous feedback loops and adjusts its behaviour to the actions of others, recreating the system. Familiar solutions are more likely to be selected over optimal ones.
Change processes (dynamics)	Change is the direct and proportional result of deliberate actions and accumulation of inputs. Actors' interactions are mediated by autonomous mechanisms such as the market and not by reference to other actors. The behaviour and the properties of the whole system can be quantified, computed, explained and predicted by	The behaviour of the system cannot be understood from the sum of the behaviours of the parts. The interaction among actors contributes to a more complex behaviour of the whole that its individual components did not possess. Systems are comprised of many subsystems with multiple levels of interaction. A network (market,

	calculating the sum of characteristics of its individual components. Transitions are from fixed end points or one static equilibrium to another. Systemic change is usually a consequence of external shocks or the accumulation of small changes.	institution, identity) is not just an aggregate; it is a component, a building block of a larger system. Relationships are dynamic. Actions at one scale impact behaviour at another. The dynamics at micro levels produce emergent outcomes at higher levels. History matters. Change is discontinuous and irreversible. A small change within the system can have a radical qualitative effect. Sensitivity to initial conditions (path dependence) reinforces divergence and variation.
Problem-solving methods	All societies (social systems) can achieve global institutional standards and convergence toward optimal policies or institutions. Problem-solving starts with assessing where a country is on the developmental continuum and means searching for a single solution that is better than alternatives.	A single optimal solution cannot be identified and may not even exist. Suboptimal solutions, once selected, may persist for long periods of time. Divergences can be self-reinforcing as prior conditions shape the outcome. Filling the gaps of missing information may not suffice. To understand the behaviour of a system, one must focus on the network of relationships of its constituent parts.
Policy response	To identify the optimal solution (best policy option) it is necessary to fill the gaps of missing information and knowledge about the correlation of causes and outcomes. Parts of the system can be disregarded with no damage to the analysis. Malfunctioning parts are addressed independently to avoid unwanted side effects or feedback elsewhere. Success, once attained, can be infinitely replicated. External interventions can alter the direction of change in a reversible manner.	Therefore, influencing behaviour depends not just on demonstrating the most effective of several solutions in terms of outcome. It depends also on the choices made by other actors with whom the components of the system may interact. Nothing can be taken away without altering the outcome. To attain desired outcomes, a strategy should be sufficiently adaptive to constantly changing environment conditions.

The principles of more adaptive, iterative and non-linear approaches to supporting reform have long been recognised. For example, Brinkerhoff and Ingle called for 'structured flexibility' (1989) and Mosse et al., for 'process' approaches (1998), which aim for more flexible and responsive support, drawing on action research-style approaches. Easterly (2006) critiques the role of technocratic 'planners' in development agencies, highlighting the need for people and organisations to play the role of 'searchers' instead, who look for more piecemeal, practical solutions to specific needs, which can then be scaled up.

Ellerman (2006) advocates an 'evolutionary' approach to programming. This starts by facilitating a wide variation of small-scale interventions, allowing a 'breadth first' approach to exploring solutions; next, the effectiveness of different approaches is assessed, synthesising lessons learnt across projects and using them as benchmarks for the

following round of intervention. A 'problem-driven iterative adaptation' model (Andrews, 2013) has highlighted the importance of experimentation and positive deviance, the need for active learning mechanisms and iterative feedback loops, as well as providing some detail on the enabling 'authorising environment' required to achieve this. Similarly, recent research by the Overseas Development Institute (ODI) points to the need for support that is locally led, politically smart and adaptive (Wild et al., 2015). This has documented examples like those in the Philippines, where support from The Asia Foundation enables 'development entrepreneurs' to broker some significant reforms, resulting in concrete and measurable improvements in development outcomes (Booth, 2014a).

All these approaches share principles based on the premise that people learn over time and acquire information not previously available. Adaptive strategies are therefore needed to evolve in response to new inputs, to prepare for the multiplicity of possible futures, and to allow for strategies to change over time.

Robust planning uses scenarios to explore multiple views of the future and to facilitate the exchange of information about uncertainty to those who are part of a decision-making process. Once the widest range of possible contingency is specified, appropriate policies can be specified against each scenario, and potential pathways selected.

In the face of uncertainty, these approaches suggest that policy and programming responses must foster innovation and variation, monitoring and learning throughout, and must be flexible enough to adapt to emerging signals:

- *Appropriate planning:* In the face of high levels or multiple sources of uncertainty, initial plans for an intervention should not be very detailed, but framed in ways that encourage ongoing learning. Interventions should be based around explicit and testable theories and assumptions about how change will happen, which are continuously revised in response to new information and changing conditions.[6]
- *Multiple intervention points:* It may be better to work across various entry points rather than attempting to pick one single preferred option in advance. An intervention may work best as a portfolio of smaller projects, underneath a broad set of goals. In the Philippines case, this was described as a strategy of 'small bets' and in the case of one of the reform efforts there, it meant initially trying out multiple interventions to identify which was most likely to work and, over time, phasing out those which were less successful (Booth, 2014).
- *Monitoring and learning:* There should be ongoing monitoring and evaluation to understand the effects of an intervention (intended and unintended), and learning goals should be set. These should feed back into initial plans and assumptions. These feedback loops should be as fast as possible. Moreover, placing too much pressure on committing to specific targets in short or medium timeframes could be inappropriate, and could incentivise risk-averse behaviour and a focus on 'low-hanging fruit' at the expense of more ambitious, transformational targets. Instead, planners should consider large numbers of different scenarios to generate *robust* (rather than optimal) strategies.
- *Flexibility:* Interventions should be adaptive and flexible. This might require broad budget categories or outputs- and results-based funding methods (as an alternative to, rather than in addition to, strict rules on how outputs are achieved). It will be crucial to retain the option to continue, scale up, or shut down different aspects of the intervention depending on future prospects for progress.
- *The right teams and people:* There is a need for strategies to identify what is politically feasible and to develop political coalitions to support reform. Often, this requires people and teams with necessary skills (in networking, relationship building, strategy) and contacts.

Future avenues for policy and practice can build on the growing number of tools designed to help plan and manage interventions in the face of uncertainty. Some thinkers and practitioners have focused on developing tools and approaches for dealing with complexity in the public and private sectors, such as Kurtz and Snowden's Cynefin framework (2003). Related tools have been built on things like safe-fail experiments (Snowden, 2010) in which small interventions are designed to set the course for programming by first testing ideas with a series of low-risk failures.

---

[6] For more on planning in the face of complexity, see Hummelbrunner and Jones (2013a)

A relatively well-known private sector approach to promote variation in product development is via rapid cycles of testing and refinement (Barder 2009). Models of 'development entrepreneurship' also draw on private sector approaches and politically savvy programming, and have set out creative uses of theories of change, timelines and other methods for reporting against impacts and activities (see Faustino and Booth, 2014).

The policy implications and programming approaches developed thus far are still built on fairly broad and basic principles of uncertainty, rather than more nuanced analyses of system dynamics. This is partly because the analytical tools are themselves at a relatively early stage of application to policy and programming (more broadly, but particularly in relation to development). As the application of these tools proceeds, more sophisticated, nuanced or specialised tools and approaches should emerge. Further research, learning and institutional development is needed too, not only on the tools themselves but also on how they can fit into large, bureaucratic organisations.

4 Conclusions: future directions for research, policy and practice

The evidence and arguments put forward in this paper aim to support efforts to move development policy and practice towards a more mature phase of working with adaptive, complex systems and incentives. Harnessing elements of political economy, complexity and a range of other thinking and learning could all help to further shared interests in contributing to different ways of supporting development practice.

One of the barriers to harnessing a shared agenda has been the lack of clear examples and of practical, actionable recommendations for how to do development differently. Some examples are now emerging, however that can guide future research and practical agendas. A key insight is that complex systems are not capable of being isolated from their environment, which makes them subject to random influences beyond the control of individual project managers. Their dynamics are not stationary; working effectively within complex systems requires flexible, iterative and adaptive programming.

Until now, when policy-makers have confronted a complicated problem, they have often asked, 'What do we do first?' or 'What is the best solution?' But for very complex problems, where there are diverging interests and incentives and significant power imbalances, those are the wrong questions. In practice, one cannot isolate a first step from a second, or identify a single optimal solution. Calls for more adaptive programming therefore challenge the emphasis in development policy on 'best practices' and benchmarking based on the idea of a fixed end point.

More adaptive programming calls for policies that stress the role of experimentation, adaptability, resilience, collective learning and collective problem-solving. Instead of controlling a reform process from a central position of command, we argue that a more sustainable solution is to foster the capacity of individuals and groups to self-organise, learn and adapt. The long-term goal is to *create self-reliant systems* with the capacity to organise complex social tasks and ensure more inclusive outcomes. Fundamentally, this means seeing development not as the sum of successful projects, but as the process that enables a society to produce its own varied adaptive solutions.

4.1 Key lessons and principles

This brief review reveals that across different schools of thought, there is a relatively similar set of basic principles for action to help development policy and practice become more effective in the face of often uncertain and politically challenging contexts. Most recently, complexity adds further weight to calls from political economy and other disciplines for a focus on institutional reform that takes a flexible, iterative and adaptive approach – and there is relatively broad agreement now on the key principles of such an approach.

Indications are that there is still limited uptake, however, and that these approaches remain far from mainstream practice. Slow uptake has been put down to the lack of an operational evidence base, and the political economy of agencies themselves.

For these reasons, future directions for the policy and practice agenda need to focus on: (1) establishing more robust proof of impact; (2) applying the approach within existing spaces; (3) improving how the approach is applied as a result; and (4) changing the rules within development organisations, to enable wider application too.

Future research agendas
Real potential exists for bringing together different schools of thought and to support further theory-building and the development of knowledge (e.g. Root, 2013), as well as documenting examples where analytical tools have been successfully applied to policy and programming problems. Overall, however, this work is still at an early

stage. Some efforts have been undertaken to proactively test tools and disseminate lessons on their utility (Ramalingam et al., 2014). However, further testing, experimentation and learning is needed before the full potential of these tools can be realised in development policy and practice.

More robust proof of impact
Donor agencies, governments and others need firmer evidence about the links between applying adaptive principles to institutional reforms. How can this evidence be gathered?

- *Overall approach*: Building an effective evidence base evaluating institutional development and the role of adaptive programming will require a theory-based approach to evaluation that respects complex causality and the importance of context, and draws on a broad range of different types of evidence. This can be done by combining realist evaluation, qualitative comparative analysis, and evaluation rubrics.
- *Elements of a framework*: At present, the emerging evidence base remains highly fragmented, with a growing set of case studies but little cross-case learning. A shared framework of evaluation/analysis could help build greater comparability and facilitate opportunities for cross-case learning.
- *Process*: In order to develop a shared evidence base, those interested in building this agenda need to come together in a shared network or community of practice. At present, there is a set of disparate communities (from complexity, political economy, design thinking and elsewhere), although there are some attempts to link them, as seen in the recent Doing Development Differently network (see Box 3). This network has developed an initial set of shared principles set out in a 'manifesto' that could help create a network to facilitate opportunities for sharing learning and experience.

> **Box 3: The Doing Development Differently manifesto**
>
> At a workshop in late 2014, a small group of funders, practitioners and researchers examined some recent development successes and identified six emerging principles for doing development differently:
>
> - Focus on solving local problems that are debated, defined and refined by local people in an ongoing process.
> - Legitimise reform at all levels (political, managerial and social), building ownership and momentum throughout the process.
> - Work through conveners who mobilise all those with a stake in progress (in both formal and informal coalitions and teams) to tackle common problems and introduce relevant change.
> - Blend design and implementation through rapid cycles of planning, action, reflection and revision (drawing on local knowledge, feedback and energy) to foster learning from both success and failure.
> - Manage risks by making 'small bets': pursuing activities with promise and dropping others.
> - Foster real results – real solutions to real problems that have real impact: they build trust, empower people and promote sustainability.
>
> These principles form the basis of a 'manifesto' signed up to by more than 400 people from 60 countries. See www.doingdevelopmentdifferently.com

Widen practice – apply the approach more widely within existing policy spaces
There is enough evidence to warrant wider application of adaptive approaches than currently appears to happen. There are a number of ways in which space to apply them has been found within existing agency constraints, and these need to be shared and built on. How can this be achieved?

- *Communication*: Greater appreciation is needed of when these approaches are relevant. While they may appear to be 'common sense' for dealing with politics and policy, agency staff do not always see how adaptive programming applies to the cases they are familiar with. Greater efforts are needed to move beyond the governance sector, through linkages across sectors including service delivery

and also economic growth and across modalities (policy dialogue, technical assistance, Sector-Wide Approaches (SWAps), etc). Learning to be 'problem focused', 'adaptive' or 'politically smart' calls for a learning community-type approach along with collaborative development of 'practice notes' on key tasks and elements.

- *Techniques and tactics for programme design and management*: Emerging practice suggests that better use of existing space in agencies is possible, but there is a need to share the methods for more adaptive, innovative working. These might include: the use of output-based contracts; the use of log frames arranging outputs along 'process' rather than thematic categories; the use of flexible modalities; and more adaptive management techniques.
- *Better monitoring and evaluation of institutional change*: Reporting tools for more adaptive programme, including through use of theories of change and strategy testing need to be more widely documented and shared, so that others can learn from them (e.g. see Faustino and Booth, 2014).

Change rules to expand space

As has been noted in recent work on 'problem-driven iterative adaptation' (Andrews, 2013) and on 'politically smart, locally led' approaches (Booth and Unsworth, 2014), there are key constraints to uptake among large development organisations and funders. While more research will elaborate the nature and significance of different obstacles, we already have some insights into the main barriers and how they might be overcome. These include:

- *Approval and planning processes*: Lengthy approval and planning processes reduce the space for analytical engagement and reflection during implementation. A focus on pre-planned and fixed activities up front can also pose challenges.
- *Career and staff incentives*: Staff turnover and limited length of postings in-country reduce capacity for local knowledge, networks and experience. At a minimum, this suggests that knowledge and experience of a country need to be given more significant weightings (to allow for an informal cadre of country specialists). Current incentives may encourage greater focus on getting spending approved or meeting spending targets, with less attention on types of impacts achieved. This also inhibits productive and open engagement between donors and those implementing their programmes.
- *Development communications:* The way development is presented and communicated (in developing and developed countries alike) tends to focus on more simplistic models of how change happens and the role of aid, overlooking much of the complexity and uncertainty that exists.

This paper has briefly reviewed current thinking on how to work with uncertain reform processes, looking at the implications for mobilising collective action, understanding networks and their effects, and looking at specific elements of change processes themselves. It suggests the need for alternative approaches to understanding how systems operate, and how change happens, to achieve better development outcomes.

In this context, efforts involving more adaptive programming are gaining ground. Yet more attention needs to be given to how to operationalise these efforts and what it means for changing practice. This will require more robust proof of impact, greater application and uptake of adaptive programming within existing constraints, and longer-term efforts to address some of those constraints.

References

Anderson, P.W. (1972) 'More is different', *Science* 177 (4047): 393-396.

Andrews, M. (2013) *The limits of institutional reform in development: changing rules for realistic solutions*. Cambridge: Cambridge University Press.

Andrews, M. (2008) 'The good governance agenda: beyond indicators without theory', *Oxford Development Studies* 36(4): 379-407.

Axelrod, R. (1997a) *The complexity of cooperation: agent-based models of competition and collaboration*. Princeton: Princeton University Press.

Axelrod, R. (1997b) 'The dissemination of culture – a model with local convergence and global polarization', *Journal of Conflict Resolution* 41(2): 203-226.

Axtell, R. (2000) *Why Agents? On the Varied Motivations for Agent Computing in the Social Sciences*. Working Paper 17. Washington DC: Center on Social and Economic Dynamics.

Barder, O. (2009) *Beyond Planning: Markets and Networks for Better Aid*. Working Paper 185. Washington DC: Center for Global Development.

Booth, D. (2014a) *Aiding Institutional Reform in Developing Countries: Lessons from the Philippines on What Works, What Doesn't and Why*. London: Overseas Development Institute and The Asia Foundation.

Booth, D. (2014b) *The SAVI Programme in Nigeria: Towards Politically Smart, Locally Led Development*. London: Overseas Development Institute.

Booth, D. and Cammack, D. (2013) *Governance for development in Africa: solving collective action problems*. London: Zed Books.

Booth, D. and Unsworth, S. (2014) 'Politically smart, locally led development'. Discussion Paper. London: Overseas Development Institute.

Brinkerhoff, D. and Ingle, M. (1989) 'Integrating blueprint and process: a structured flexibility approach to development management', *Public Administration and Development* 9(5): 487-503.

Bueno de Mesquita, B., Smith, A., Siverson, R.M. and Marrow, J.D. (2003) *The logic of political survival*. Cambridge: MIT Press.

Campos, J. E. and Root, H.L. (1996) *The key to the Asian miracle: making shared growth credible*. Washington DC: Brookings Institution Press.

Easterly, W. (2006) *The white man's burden: why the West's efforts to aid the rest have done so much ill and so little good*. Oxford: Oxford University Press.

Ellerman, D. (2006) 'Rethinking development assistance: networks for decentralized social learning' (www.ideas-int.org/documents/Document.cfm?docID=14).

Faustino, J. and Booth, D. (2014) *Development Entrepreneurship: How Donors and Leaders can Foster Institutional Change*. London: Overseas Development Institute.

Fisher, J. and Marquette, H. (2014) *Donors doing Political Economy Analysis^TM: From Process to Product (and Back Again?)*. Working Paper, Developmental Leadership Program. Birmingham: University of Birmingham, International Development Department.

Folke, C., Hahn, T., Olsson, P. and Norberg, J. (2005) 'Adaptive governance of social-ecological systems', *Annual Review of Environment and Resources* 30: 441-473.

Gaventa, J. (2006) 'Finding the spaces for change: a power analysis', *IDS Bulletin* 37(6): November. Brighton: Institute of Development Studies.

Green, A., Barma, N., Abdollahian, M., Nunberg, B. and Perlman, D. (2010) *At the Frontier of Practical Political Economy: Operationalizing an Agent-Based Stakeholder Model in the World Bank's East Asia and Pacific Region*. Washington DC: World Bank.

Grindle, M. (2007) 'Good enough governance revisited', *Development Policy Review* 25(5): 553-574.

Grindle, M. (2004) *Despite the odds: the contentious politics of education reform*. Princeton, NJ: Princeton University Press.

Harris, D. (2013) *Applied Political Economy Analysis: A Problem-Driven Framework.* London: Overseas Development Institute.

Holland, J. (2014) *Complexity: a very short introduction*. New York: Oxford University Press.

Hirschman, A. (1967) 'The principle of the hiding hand', *National Affairs*, Issue 6.

Hummelbrunner, R. and Jones, H. (2013a) *A Guide for Planning and Strategy Development in the Face of Complexity*. London: Overseas Development Institute.

Hummelbrunner, R. and Jones, H. (2013b) *A Guide for Managing Projects and Programmes in the Face of Complexity*. London: Overseas Development Institute.

Keck, M. and Sikkink, K. (1998) *Activists beyond borders: advocacy networks in international politics*. New York: Cornell University Press.

Kelsall, T. (2013) *Business, politics, and the state in Africa: challenging the orthodoxies on growth and transformation*. London: Zed Books.

Kingdon, J. (1984) *Agendas, alternatives, and public policies*. Boston: Little, Brown & Company.

Klein, N. (2007) *The shock doctrine: the rise of disaster capitalism*. London: Penguin Books Ltd.

Kurtz, C.F. and Snowden, D. (2003) 'The new dynamics of strategy: sense-making in a complex and complicated world', *IBM Systems Journal* 42(3): 462-483.

Levy, B. (2014) *Working with the grain: integrating governance and growth in development strategies*. Oxford: Oxford University Press.

March, J.G. and Olsen, J.P (1998) 'The institutional dynamics of international political orders', *International Organization*, 52(4): 943-969.

Mcloughlin, C. and Batley, R. (2012) *The Politics of What Works in Service Delivery: An Evidence-Based Review*. Working Paper 06. Effective States and Inclusive Development Research Centre (ESID). Manchester: School of Environment and Development, University of Manchester.

Mosse, D., Farrington, J. and Rew, A. (1998) *Development as Process: Concepts and Methods for Working with Complexity*. London: Routledge and Overseas Development Institute.

North, D., Wallis, J. and Weingast, B. (2013) *Violence and social orders: a conceptual framework for interpreting recorded human history*. Cambridge: Cambridge University Press.

Ormerod, P. (2012) *Positive linking: how networks can revolutionise the world*. London: Faber and Faber Limited.

Ostrom, E. (2005) *Understanding institutional diversity*. Princeton, NJ: Princeton University Press.

Ostrom, E. (1991) *Governing the commons: the evolution of institutions for collective action*. Cambridge: Cambridge University Press.

Pritchett, L., Woolcock, M. and Andrews, M. (2010) *Capability Traps? The Mechanisms of Persistent Implementation Failure*. Working Paper 234. Washington DC: Center for Global Development.

Ramalingam, B. (2013) *Aid on the edge of chaos*. Oxford: Oxford University Press.

Ramalingam, B. and Jones, H., with Reba, T. and Young, J. (2008) *Exploring the Science of Complexity: Ideas and Implications for Development and Humanitarian Work*. Working Paper 285. London: Overseas Development Institute.

Ramalingam, B., Laric, M. and Primrose, J. (2014) *From Best Practice to Best Fit: Understanding and Navigating Wicked Problems in International Development.* Working Paper. London: Overseas Development Institute.

Rihani, S. (2005) 'Complexity theory: a new framework for development is in the offing', *Progress in Development Studies* 5(1): 54-61.

Root, H.L. (2013) *Dynamics among nations: the evolution of legitimacy and development in modern states*. Cambridge: MIT Press.

Root, H.L. (2005) *Capital and collusion: the political logic of global economic development*. Princeton, NJ: Princeton University Press.

Root, H.L. Geller A., Ramalingam B., (2014) '*The Dynamics of Economic Policy Reform in Nepal: Modelling the Energy Sector'* London: DFID, Unpublished

Root, H.L., Abdollahian, M., Beier, G. and Kugler, J. (1999) *The New Korea: Crisis Brings Opportunity*. Policy Brief, Milken Institute. Washington DC: Milken Institute.

Simon, H.A. (1972) 'Theories of bounded rationality' in C.B. McGuire and R. Radner (eds) *Decision and organization*. Amsterdam: North-Holland Publishing Company.

Simon, H.A. (1955) 'A behavioral model of rational choice', *The Quarterly Journal of Economics* 69(1): 99-118.

Snowden, D. (2010) 'Safe-fail probes' (www.cognitive-edge.com/method.php?mid=47).

Westley, F., Zimmerman, B. and Quinn Patton, M. (2006) *Getting to maybe: how the world is changed*. Toronto: Random House.

Wild, L., Booth, D., Cummings, C., Foresti, M. and Wales, J. (2015) *Adapting Development: Improving Services to the Poor*. London: Overseas Development Institute.

ODI is the UK's leading independent think tank on international development and humanitarian issues.

Our mission is to inspire and inform policy and practice which lead to the reduction of poverty, the alleviation of suffering and the achievement of sustainable livelihoods.

We do this by locking together high-quality applied research, practical policy advice and policy-focused dissemination and debate.

We work with partners in the public and private sectors, in both developing and developed countries.

Overseas Development Institute
203 Blackfriars Road
London SE1 8NJ
Tel +44 (0)20 7922 0300
Fax +44 (0)20 7922 0399