Complexity thinking and social development

Connecting the dots

How are societies 'developed'? For years, international aid has failed to provide a convincing answer. This article offers a potential path to improving both aid performance and development in a broader sense.

By **Alan Fowler**

The function of international development work is to accelerate and guide change in societies. But despite its long history of attaining shifts in rhetoric, thinking and practice, international aid has fallen short of achieving sustainable improvements. Why doesn't aid seem to work? Development specialist Roger Riddell provides a thorough assessment of the results, strengths and weaknesses of aid. He concludes that we cannot count on foreign assistance as currently provided to accomplish its intended results. Factors in the system as a whole – for example, the geopolitics influencing distribution of aid funds – continue to hamper the effectiveness of aid. Consequently, systemic responses are called for that would tackle deep structural issues of aid, such as donor self-interest.

Other development analysts have assessed inadequate aid performance and have reached contrary conclusions, some of which I summarize in this article. Incorporating these seemingly contradictory conclusions, rather than choosing one on which to base a solution, can improve efforts to change society. This synthesis is the basis of complexity thinking.

'Complexity thinking' in this discussion refers to a coherently connected body of ideas about and evidence for change in social systems. These ideas do not rely on fixed, linear cause-and-effect relationships or the premise of top-down control that underpins much official aid. My aim here is to make a case for complexity thinking as a compelling path to more effective and enduring societal improvement – not just to increased development assistance.

Examples of how this can work in terms of thinking, analysis and strategy are already found in other fields. For example, Robert Axelrod and Michael Cohen of the University of Michigan explore ways in which organizations can 'harness' complexity, and Margaret Wheatley, president emerita of the Berkana Institute in Boston, has applied complexity analysis to leadership. Applications of complexity

thinking also appear in politics and terrorism analysis. 👆

In the broad canvas of social change, an approach drawing on complexity is potentially powerful. It would entail incorporating different views about what is and is not effective. Combining these ideas would offer more robust grounds for action, and provide more realistic insights about processes and measures. It would also provide clearer assessments of how long different types of change in societies need in order to be realized, and a refined understanding of the relational power shifts involved in the process.

Reasons and remedies

Jeffrey Sachs of the Earth Institute at Columbia University is convinced that 'aid works'. Sachs is a leading supporter of increased aid, more efficient locally owned planning and clearer performance targets, with greater coherence and predictability through harmonization of donor efforts. His view, basically, is that nothing is wrong with the fundamental premise of aid. An economic growth-dependent, poverty-reducing future is knowable and predictable and can be planned and reached in the long term through cumulative increments. Implicit is the idea of a world system that is stable enough to make pre-determined, long-term social goals reachable. For the economist Sachs, the aid performance challenge is to do more of the same, only more efficiently. This approach requires an expert ability to control change in incremental, aggregated ways.

Paul Collier of the University of Oxford believes that what aid can accomplish with regard to deep and enduring poverty reduction is overestimated and oversold. Worse, aid is not allocated where it is most needed: landlocked countries that are home to the bottom billion of the world's poor. In areas where states and markets do not function well, aid acts as a welfare safety net, preventing regression into poverty and collapse within societies. To Collier, aid is most valuable in stressed conditions, such as post-conflict situations or areas where conflict is anticipated. Aid works in such settings by increasing domestic consumption, injecting expert technical assistance to help implement institutional reforms and providing substantial budget support for governments to spend beyond what the tax base would allow. Aid can deliver as an instrument of change,

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though not in all circumstances.

William Easterly of New York University disputes such a positive relationship between development assistance and economic growth, even 'where conditions are right', such as in areas with sound institutions and policies. Easterly argues that aid, operating in the service of a postmodern Western imperialism, remains a technocratic, supply-driven, paternalistic enterprise in which experts assume they know what's best for the poor. Aid-compliant, planned societal change spurs inefficiency, induces relational dysfunctions and mistrust, fosters corruption and bureaucratization and weakens domestic political authority and accountability to the populace. Easterly opposes grand, prescriptive, condition-based designs for improving societies. More effective would be recognizing and valuing the innovation and problem-solving skills of the people living in those societies. One example would be establishing a 'project marketplace' where those people seeking assistance can post information about their needs and proposed initiatives and negotiate with those who can provide necessary resources. It is not the task of development to transform government and society. Such transformation must arise from within aid-seeking societies.

Reframing perspectives

Many differing conclusions about aid performance have been reached, but most rely on linear cause-and-effect relationships. Hence, they contain similarities in what they tend to contest or ignore.

Although Collier, Sachs and Easterly express seemingly contrary opinions, their conclusions have common themes. They all address the impact of uncertainty on effectiveness. Sachs describes the need for adequate knowledge and government control over processes and relationships. Collier suggests investing 'only in situations where aid can work well', while Easterly proposes that aid is ineffective in situations where too much top-down control stifles the drive and initiative of those in need. These are all empirically based interpretations that should be connected.

Another common theme among these conclusions is the relative reliance on governments or competitive markets as sources of positive change. States bring about change via decisions about the public good enforced through legal compliance with public policy. Markets bring change through competition and technological innovation. Easterly stresses that people themselves bring about social change, but not in terms of the significance of civic agency and cooperation – that is, he emphasizes the actions of citizens in determining and controlling their futures.

Finally, the three conclusions all either ignore or underestimate the degree to which political power is a factor in development performance in both state-instigated and market-driven change. Although geopolitics is recognized to varying degrees, the local politics determining who gains and loses from change in society is not central in these examples of performance analysis. Yet, if economic growth is the basis for development, politics is vital for distributing its costs and benefits.

Complex systems

Fortunately, it is possible to include all three of these perspectives within a more powerful and comprehensive analytic view. Progress in theorizing social science over the past 20 years has produced an inclusive, overarching approach to understanding societies as ➤

complex systems. These systems are made up of many components and sub-systems that function at interconnected levels of social organization, from the entirely local to the most global. Sub-systems, such as those involving patriarchy, religion, the environment, family, community, citizens, states and markets, all interact with each other. At the largest extreme of the scale are the global interactions among some six and a half billion people.

A common label for such integrative analysis is 'complexity'. Complexity involves combining and organizing observations and knowledge to bring together various disciplines and their contributions into a wider framework for understanding societal processes. In a coherent, grounded way, complexity theory aims to connect disparate branches of knowledge, all of which are relevant for social change, but which are otherwise scattered over different areas of study and practice. ☝

Even complex systems have basic characteristics that provide a way of 'reading' what is going on in a society and estimating what could be done to bring desired change. One defining characteristic is complexity's overarching concern with social *processes* rather than social *structures*. Continual interactions between people create patterns that reflect a human desire for order and stability. Societies routinely experience unexpected disruptions that generate responses which eventually bring back order and stability. Looked at through this lens, planning for aided development is one of these disruptions to existing conditions. In a complex view, this disruption should guide and reinforce the direction of change from stability to instability, with the aim of arriving at new stability that benefits the poor as required.

Resonating with Easterly's arguments against excessive determinism, but in a broader and more positive way, complexity theory is precisely about understanding the tricky dynamics of achieving intended change. For example, the introduction of new farming methods would by definition disrupt existing methods, with the aim of returning to stability with higher yields. But experiencing the risks involved and reacting to changing conditions over time – such as farm gate prices dropping due to higher production – may lead farmers to refine their farming system in other, unforeseen ways. Complexity does not assume that what is planned will necessarily occur. An alternative outcome would not be treated as a failure, but as a step toward more refined processes that could help determine a farmer's decisions.

In this sense, complexity pays particular attention to what *emerges* from interactions. In the case of agricultural innovation, the eventual pattern of surviving and earning a living arises because poor farmers adopt behaviours that have been influenced by many factors, not all of which could have been anticipated. Nor can all the causes involved be simply 'added up'. Instead, their interaction causes new ways of 'being a farmer' to emerge.

A similar situation occurs when diverse processes in society join such that the whole is revealed as more than the sum of its parts. For example, the decline of bartering and the advent of using money as a basis for economic transactions eventually gave rise to the banking industry. When allied with technology, this familiar fixture of the institutional landscape can no longer be seen as merely handling the sum total of all the money presently in circulation. Today, the role of banking in society goes far beyond the management of physical money.

Scale and time

Scale is another important factor. Changing the behaviour of an individual farmer is one thing. Changing a segment of the farming industry based on wide-scale adoption of new farming methods is quite another. Issues and dynamics of producer power, environmental repercussions and vulnerability to and dependency on inputs all enter the equation, again in interactive ways that cannot be firmly predicted. In society, scale is not simply an issue of accumulating bigger numbers. As shown in the banking example, the process of monetary growth introduces unanticipated effects and outcomes, such as the emergence of specialized regulatory bodies and, more recently, counter-terrorism measures that influence how banks behave and evolve. Today, banks must strictly monitor and notify the authorities of suspicious transfers from people who have left developing countries to people back home – totalling some $300 billion in small amounts. This example illustrates a direct, vertical link between security on a global scale and local family life. This type of scaled connectivity occurs in supply chains and many other processes, and makes up an important part of the social system.

Another facet of complex systems is that time frames matter. The longer something takes, the less predictable the outcome becomes. Longer time frames – such as those involved in political and budget

connected clusters that reflect the goals and distribution of functions that societies find beneficial. Though their borders are not always fixed or clear, nation-states form clusters of rules that co-evolve to support major social institutions or domains: government, business, civic society and family. In other words, people's daily interactions 'attract' into patterns that gain value and settle into a worthwhile functional order. Governments regulate societies, businesses create wealth, citizens exercise control over human activity and families handle reproduction. But conflict and innovation continually challenge the ability of these and other attractors to maintain 'developmental stability' – the condition needed for orderly progress. How these challenges are met, at what cost and to whom depends on how power in the society is acquired, held and applied.

Enduring patterns of processes and relations in society are perceived as structures which embody the distribution of *power* – that is, the relative individual or collective ability to get one's way. Power is the active glue that binds the whole together and is typically asymmetric – some groups have more power than others. Altering this condition is a major focus of people's energy, exemplified in social movements that push the processes of change from the margins of society to effect structural reform. Identifying types of power and where they are located is an essential factor in understanding complex social systems. The insights gained can be used for deep, enduring development that can begin to tackle causes rather than symptoms.

Overall, complexity thinking incorporates various conclusions about social change that can provide firmer grounds for successful action.

cycles, shifts in social institutions and intergenerational changes – require a move from relying on certainties in defining desired change to estimating probabilities. Scale and time combine to make complex systems sensitive to the *speed* of change, which may or may not have significant and surprising effects on stability. Even small disruptions can generate disproportionate effects, or 'tipping points', where starting circumstances are critically significant. ☞ For Collier, a keen awareness of the *context* and *preconditions* is vital for development efforts to be effective.

The role of rules

Another characteristic of complex social systems is the need to identify basic *rules*. Often unwritten, rules guide interactions among people and the organizations and institutions they create. One common relational principle is that of reciprocity, meaning norms of behaviour involved when people help one another over time. Rules co-determine what is expected and what happens in cases of non-conformity – for example, causing a person's exclusion or tainted reputation. These so-called 'relational rules' are continually tested in daily interactions. Rules are reinforced if they prove to work. When rules prove ineffective, negative feedback leads to their amendment or attrition. Generally, rules that are time-efficient and that reduce required investment between two people while producing adequate benefits for both are naturally reinforced. Eventually, proven rules are often codified in laws and become part of society's formal arrangements.

Complex social systems show properties of *attraction* and *co-evolution*. The combination of rules that develop and stabilize societies – rules that both generate and cope with change – is not accidental. Over many years, rules evolve and separate into

Complexity in practice

Applying complexity theory to development issues would bring a number of potential benefits. One benefit would be to move above and beyond the current theory and analysis that is dominated by economists – but not by replacing one monotheism with another. There is an urgent need to connect knowledge about the many facets of social change. Otherwise, progress is limited to variations on existing narrow themes with their proven limitations. By its nature and premises, complexity thinking offers more comprehensive insights about development in a non-moralistic, scientific way. In doing so, it also avoids privileging states and markets over citizens.

Another critical and practical benefit of complexity theory is that it naturally would bring neglected issues of politics and power into the framework of purposeful social change. For example, what is the purpose of promoting democratic politics to expand citizen control and public accountability in a country where the government relies more on aid than taxes in order to function? And how can external calls for poor people in a given society to claim their rights be justified, and the (physical) risks of such popular assertion assessed, without a thorough understanding of how power is distributed and sustained?

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Features of complex systems

By Willemijn Verkoren

Apart from development intervention, many other factors contribute to changes in societies. A recent Overseas Development Institute (ODI) paper explored the value of complexity theory in improving performance in the development field. 👆

In the report, the authors identify and describe ten features of complex systems. Each feature is outlined, explained in detail, illustrated with examples and explored in terms of its implications for development and humanitarian action. One such feature, with which many people may be familiar from chaos theory (an element of complexity theory), is the 'butterfly effect.' The butterfly effect refers to the ability of a tiny event, such as a butterfly flapping its wings, to cause a big event, such as a tornado, through an unpredictable chain of interrelated events. The butterfly effect illustrates two complexity characteristics: *sensitivity to initial conditions* and *unpredictability*. It is important to understand the broader contexts of development interventions and continually look for what was not anticipated.

The paper offers concrete ideas about what complexity theory could mean for development planning and analysis. It describes how the monitoring method called 'outcome mapping' would fit particularly well with the ideas of complexity theory. The authors argue for a shift in overall thinking that would lead to more tolerance of uncertainty, greater reliance on continuous learning (rather than using fixed planning models) and better connection to wider processes of change. As a systematic attempt to apply complexity thinking to the realities of aided development, the paper is a welcome step forward.

Also, because the rules of a society emerge from context-specific social processes – whether they are formal laws or conventions people choose to follow – they contain implicit information about standards and norms that are valued or avoided in that society. Understanding which rules work for whom in practice – as opposed to on paper – would illuminate the basis of judgement that people use, for example, in evaluating the behaviour of public officials. This understanding could offer more practical ways to strengthen accountability of these officials.

Further, we could estimate more realistically the probability of whether the ongoing processes determining change could be directed in a particular way. This direction could in turn help avoid the credibility problem of exaggerated promises and unfulfilled hopes faced by both aid recipients and politicians.

Application of complexity ideas and principles is possible across a range of scales and time lines that would anticipate the unexpected as the norm. In addition, complexity theory offers categories for a more nuanced, deeper and conceptually connected context analysis.

Finally, a common misconception about complexity is that it replaces prediction and planning with reliance on people's random initiatives directed at improving their own well-being. On the contrary, complexity theory recognizes that planning can work to some degree. What it cautions, among other things, is that social changes driven by planned, incremental efforts cannot be simply added up to larger scales, because the efforts themselves alter the initial conditions. Nor can intended outcomes be guaranteed. In a complex worldview, contingency and indeterminism matter, but they do not necessarily preclude dedicated efforts to effect change that endures over time.

In practical terms, far more needs to be done to make complexity-based ideas clear and compelling for the aid system. Approaches,

strategies and methods must become attractive and available to development policy makers and practitioners. Tentative steps in this direction are underway in which altering linear thinking about change is a necessary starting point. (see 'Where to next?' below.) One major difficulty is to develop terms and language that are more consistent with complexity dialogue (see table at right). Another difficulty is to establish meaningful topics of discussion, such as what 'capital' includes or excludes, what 'rules' are, what 'scale' entails and what the helpful boundaries around development problems are and how they can be found.

Where to next?

Applying complexity thinking to social change is fast evolving, but so far uneven. For some time the Global Business Network has been deploying complexity thinking in its promotion of scenario planning. More recently, economist Erik Beinhocker used complexity analysis to re-assess the history and functioning of economic systems in creating wealth. His book is an important example of applying complexity to economics, an essential step with regard to development studies.
Some years ago Norman Uphoff provided a practical case showing how complexity can help analyze the introduction of participatory management into small-scale irrigation. Among other insights, his reflections showed how, after a difficult period of fostering farmer-based irrigation control, a shift in attitude of a senior official resulted in a substantial and rapid expansion of the principles and practices involved. It was a small, power-related change that had disproportionate effects. Michael Warner has been applying complexity theory to negotiation in the context of natural resource management, and a recent publication (see box at left) is another step forward in both explaining complexity and applying the concept to development and humanitarian efforts.

Today, we understand more and more about complex social systems. However, much still needs to be done to realize the potential of such a rich and profound way of understanding the workings of not just aid, but of the processes of social change everywhere. There are overdue signs of this evolution on the aid landscape. I urge for more concerted efforts in this exciting direction. ■

Traditional perspectives on aided development	Complexity perspectives on civic-driven development
Prediction: Assumption that the future is both knowable and reachable through the actions of humans.	**Estimation** Informed guess about how things work and interact and what change might result from human effort.
Centralized: Hierarchy-based transaction and rule framework.	**Devolved:** Margin-driven rules and networked connectivity.
Mainstream development capital: That which is valued economically and socially.	**Complex development capital:** That which is valued economically, culturally, socially and symbolically.
Cause-effect relationships: Logical, non-contingent relationships that can be relied on to achieve desired change.	**Transactional rules:** Interaction patterns that show actual relationships and their effects in contingent interaction.
Plan: Reliance on different scales of resources and scheduled actions with predetermined goals and outcomes which justify allocations.	**Forecast:** Investments set against a range of possible scenarios with associated degrees of attainment probability.
Public policies: Top-down approach of transmission of rule preferences that is based on the existing power arrangements.	**Local discourses:** Periphery-originated transmission and amplification of marginalized power assertion over recognized interests and rule selection.
Time: Budget, policy and project cycles.	**Time:** Socio-political stages of change.
Impact: Predetermined, expected changes resulting from development efforts.	**Emergence:** Range of changes due to development initiatives, both anticipated and unexpected.
Institutional analysis: Assessment of roles and competencies of stakeholders.	**Power analysis:** Identification of types and locations of power across all stakeholders.
Apolitical governance: Obscuring or ignoring political issues, respecting the sovereignty of boundaries.	**Political governance:** Direct concern with citizenship and the civic-political interface in governance.

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☐ K. Cetina (2005) Complex global microstructures: The new terrorist societies, *Theory, Culture and Society*, 22(5): 213-234.

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☐ W. Easterly (2006) *The White Man's Burden: Why the West's Efforts to Aid the Rest Have Done So Much Ill and So Little Good*. Penguin Press.

☐ B. Ramalingam and H. Jones (2008) *Exploring the science of complexity*, Working Paper, 285, ODI.

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