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Insights from Complexity Theory for the Evaluation of Development Action: Recognising the Two Faces of Complexity

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- promoting investment in and use of Southern knowledge production of all types and origins;
- creating an environment for innovation, supported by research on existing and emergent practice, for people working in the development sector to raise and discuss means of addressing these issues; and
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Introduction

This paper reviews insights from complexity theory and how they have been applied in attempting to understand and evaluate the dynamics of social change and development. The paper also explores the convergence of recent critical social theory with complexity theory and considers some practical ways that both have been applied in the evaluation of social programming and understanding of social change and development. Development realities are subject to constant negotiation and relationships of power among multiple actors, in a variety of social, economic, geographical and political contexts. There is an urgent need to move beyond traditional approaches to planning and assessment which assume linear realities and pre-defined outcomes to address this complex character. This paper considers some general insights from complexity for evaluation practice, itself a microcosm of wider development dynamics. The paper complements IKM Emergent working papers 12 and 13 which look at the evaluation of knowledge management in a complex world of multiple knowledges.

The language and concepts from complexity theory appear to resonate with many development practitioners for how they help illuminate the character of development and social change as depending on the interactions of many different actors and stakeholders, with diverse understandings of what is at stake and how development and change happens. Notions such as 'emergence', and 'non-linearity' have been drawn on to make the case that complex and interdependent social processes underpinning development are not appropriately dealt with through traditional linear planning and 'command and control' approaches akin to attempting to technically engineer social outcomes (Rihani, 2006). Complexity concepts are attractive for the way they illustrate the "disjunction between the non-linearity and unpredictability of change processes and the protocols and procedures that govern development interventions that

assume otherwise" (Guijt et al., 2011: 17). At the same time, insights from complexity have led to a questioning of what are appropriate evaluation methods to deal with such unpredictability and complexity (Panos 2009, Patton 2011).

A number of authors have sought to highlight the relevance of insights from the complexity sciences to development and humanitarian aid programming (Ramalingham et al 2008) HIV programming (Vincent, 2009) social innovation (Westley et al 2006) and knowledge management (Powell, 1999). Participatory development practitioners have also recently highlighted the value of concepts from complexity (Guijt, 2007, 2008, Byrne 2008) and the evaluation of communication for social change programming (UNAIDS, 2011). In the field of evaluation, complexity theory has long be an interest of those working on 'systems' approaches to evaluation (Williams and Imam, 2007)1, and finds a long-standing champion in Michael Patton, recently culminating in his distinctive approach to 'Developmental Evaluation' (2011)

Complexity science is a relatively new and diverse field of enquiry – a range of concepts and theoretical frameworks rather than a unified 'complexity science' – and concepts from complexity have been interpreted and applied unevenly by different practitioners. A consistent question is the degree to which complexity concepts and frameworks can be extrapolated from the natural sciences to understanding social practice and change – does social reality actually work like a 'complex system' in the way this is understood in complexity theory, or is complexity science merely a useful set of metaphors through which to understand some of the aspects and dynamics of social development. Ramalingham and Jones, (2008) distinguish those responding to complexity science as being either 'champions', 'pragmatists' and 'critics' and they take a cautiously pragmatic approach, suggesting that concepts from complexity may provide useful

[1] Williams and Imam chart three decades and three 'waves' of systems thinking and evaluation which increasingly draw on notions of complexity as they move away from the earlier focus on systems approaches to engineering and 'cybernetics'

metaphors for the dynamics of social processes in development and humanitarian aid. Others argue that insights from complexity theory are often applied inconsistently by development practitioners and tend to try to 'domesticate' some of the radical contingency of social life into existing development planning frameworks (Stacey, Griffin and Shaw, 2000; Mowles et al., 2008).

This uneven grappling with aspects of complexity theory – perhaps inevitable given the many strands of its application - is evident in a number of recent workshops and conferences in the development sector. In the summer of 2009 Panos, supported by IKM Emergent, facilitated a one-day workshop exploring how complexity theory could contribute to more effective evaluation of development bringing together a range of development practitioners, academics, funders and evaluators to share insights and analyse a collection of seven case studies of practical applications of complexity concepts. This meeting was part of an emergent series of meetings organised in the Netherlands and the United Kingdom by a range of organisations exploring the relevance and application of complexity to development and humanitarian aid. Participants at the workshop drew on complexity concepts to support a more realistic and rigorous participatory evaluation which builds up from the complex multi-layered experiences of poverty in the lives of many people in developing countries (Panos, 2009). However, the inconsistent and loose use of concepts from complexity, and the need to translate them into clear more accessible language was an issue raised at the workshop. A subsequent three day conference in 2010 – 'Evaluation Revisited' – also highlighted that the concepts and understandings of complexity were still quite uneven and needed further discussion and clarification (Guijt et al., 2011).

Overview of paper

I explore some of this variation - and in some cases inconsistency – in the adoption of notions from complexity here, to become clearer about the assumptions behind particular applications of complexity theory and to be as specific as possible about how its insights are being applied in practice. In what follows, I briefly review some key theoretical insights from complexity theory and in particular where they converge with contemporary social theory. I review the way that the notion of 'emergence' in particular has been understood and applied to date by development practitioners. I then briefly review some useful evaluation approaches that build on learning from this field, including 'Realistic evaluation' (Pawson and Tilly, 2006), Whole Systems Action Research (Burns, 2007) and the recent synthesis of 'developmental evaluation' (Patton, 2011). Comparative cased-based methods, such as Qualitative Comparative Analysis (Byrne and Ragin, 2010) have proven valuable in addressing the complexities of development in North and South and are worth of further discussion, adaptation and development. Ultimately I argue that complexity theory, when combined with insights from recent critical social theory, may provide an overall analytical framework which has important implications for evaluative practice, as well as posing some important broad questions about the dynamics of social change and ultimately the character of development. I also highlight some parallels with work on the evaluation of knowledge management being developed under the auspices of the IKM-Emergent programme.

Understanding social change and development – insights from complexity and critical social theory

A brief review of some current work in critical social theory illustrates the convergence between understandings of social change in this field and insights

from complexity theory. Recent social theory provides us with some useful analytical tools to better understand what is at stake in social and developmental change, and hence to find more appropriate evaluation approaches consistent with this understanding. My attention to this convergence was first drawn in recent work trying to better understand the 'social drivers' of HIV - social factors such as stigma and discrimination, gender inequality and human rights abuses – and how they can be addressed in HIV prevention by attending to broader 'structural' factors (social, economic, political, cultural, environmental factors) that have a bearing on HIV outcomes (Vincent 2009, 2009a). The traditional focus in HIV programmes has been on individual behaviour and biomedical interventions, to the neglect of the wider social and contextual factors. There is an inconsistency and sometimes simple lack of explicit understanding of how social change happens in HIV programmes, which arguably could be addressed through the application of insights from critical social theory and complexity to better understand the social dynamics at stake (Vincent, 2009a).

Theorists of 'social practice' and 'embodiment' can help us understand the mutual influence and interdependence of personal and social change in development. They argue that social practice dynamically both reproduces and shifts social institutions, beliefs, norms and culture and these become embodied in people's habits, dispositions and capabilities, but are also subject to evolution and change (Bourdieu 1977, Crossley, 2001). The recent synthesis of 'Relational sociology' (Crossley, 2010) extends these insights to understand individuals as embedded in multiple and overlapping 'social worlds' and communication networks, in such a way that they are both shaped and shape the social worlds around them. Relational sociology recognises that social life is driven by a range of relational mechanisms that operate between people in their interactions which have effects in their own right – over and above what can be understood from the actions of individuals. In this sense social life displays a number of emergent properties, where the whole - of social practice - is greater than the sum of the parts – the actions and motivations of individuals. Language, knowledge, moral and legal systems are all examples of properties of social life which emerge in interactions

and in this way are strictly irreducible to individual actors. This is not to say that the agency of individual actors is negated, but that these sedimented conventions from the previous history of interactions tend to provide a set of opportunities and constraints within which action unfolds (Crossley, 2010).

From the relational perspective, neither the individualistic models of psychology or economics which reduce social processes to the action and motivations of atomised individuals, nor the holistic sociology that reduces all social action to laws of a 'system' provide adequate explanations. 'Structure' for relational sociology is always in process and is not a 'thing' but rather a state of play and emerging pattern within a vast web of ongoing interactions (Crossley, 2010: 13). "Social structure implies that these patterns, though emergent from social interaction, exert an influence upon it, generating both opportunities and constraints for further interaction. What we can do now is affected by the sedimented effect of all that has gone before us, both personal and public; the traces in the form of networks, conventions and (distribution of) resources." (2010: 141).

For Crossley, the best way to understand social life is to understand it as a set of overlapping 'social worlds' – each centred on specific shared interests or activities – and the networks, conventions and resources that make up the interactions of actors in them (2010: 1-4). He identifies a number of key dimensions of interactions: strategic, symbolic, affective, convention-improvisation and exchange-power, which help to explain the dynamic of interactions. At the same time, individuals may be part of several different networks, which involve them simultaneously in a number of separate social worlds, affording them a different of opportunities and constraints overall. The pattern and overall shape of networks that connect individuals are also important in themselves and he outlines a number of ways in which networks can be analysed, such as their density, degree of connectivity and overall structure. All these characteristics have implications for the positioning of individuals, their relative power and the flows of resources within networks (2010: 155).

Networks have been recognised as important and relevant to development by a range of other authors (Church et al., 2003, Davies, 2003). The value of taking a network perspective in understanding and evaluating development change has long been advocated by Rick Davies (Davies, 2003). The form of social networks has also been shown to influence the spread of HIV (Thornton, 2008). What Crossley adds is an encompassing framework to understand the role of networks in social life and a number of useful concepts and relational mechanisms that help to understand its overall dynamics. The analytical tools of theorists of practice and in particular Crossley's relational synthesis are potentially an important resource for strengthening the conceptual basis of development programming and its evaluation.

The parallels between the picture painted by relational sociology of social process and the way complexity theory has sought to understand 'emergence' and the nature of 'complex systems' are striking:

"In a complex system.... the interaction among constituents of the system, and the interaction between the system and its environment, are of such a nature that the system as a whole cannot be fully understood simply by analyzing its components. Moreover, these relationships are not fixed, but shift and change, often as a result of self-organisation. This can result in novel features, usually referred to in terms of emergent properties. The brain, natural language and social systems are complex" (Cilliers, 2008, vii-ix)

Such parallels are not lost on many of the contemporary social theorists outlined above who have explicitly made a link with the early concerns of social theory and the birth of social science (Byrne, 1998, Crossley, 2010). In the case of early sociologist Norbert Elias for example, the capabilities and dispositions of individuals take shape in particular social settings, which both provide the context for individual action and are also shaped by the balance of forces and interactions among individuals in what he called 'figurations' that are in constant flux and evolution (Elias, 2000).

David Byrne understands social change as displaying some of the characteristics of complexity and complex systems and argues that social outcomes may be non-linear and emergent – not being predictable from the various influences that may combine in processes of social change to produce properties that are qualitatively different from the character of the constituents of the system. For Byrne, social and structural change is 'complex and contingent' and social action is made up of a nested set of arenas of action, from the interpersonal, to institutional, to macro-social, all of which mutually influence each other to produce social outcomes (Byrne, 1998, 2002).

Management theorist Ralph Stacey has also drawn on early social theorists such as Elias and also G.H. Mead, to understand processes of organisational development strategy and management and what he calls 'complex responsive human process' (Stacey 2000, 2011). He distinguishes such a human process from the broader character of complex adaptive systems: "...in complex adaptive system, the agents follow rules, in effect, they directly enact generalisations. If humans simply applied generalisations, there would be no possibility of individual imagination and creativity – we would be determined by generalisations. It is essentially in the conflicting particularising of the generalisations, which have emerged over long periods of human interactions, that socially constructed, interdependent persons, display spontaneity, reflection, reflexivity, imagination, creativity and conflict." (2007, 314-315, cited in Patton 2011: 142))

Stacey here is underlining the need to distinguish between human social systems and what he sees as the more determined character of complex adaptive systems. Byrne makes a similar distinction between 'restricted' and 'general' complexity (following Morin, 2006) to differentiate between the agent-based models developed by computer programmers which derive apparently complex behaviour from a few simple rules of programming, and the more open-ended complexity of social interactions. 'Restricted' complexity is generated from the rule-based interactions among simple components of a system. 'General' complexity in contrast permits both whole system emergence which is not

reducible to the interactions of individual components, and also recognises the distinctive significance of human agency in the future of social systems and their intersections with natural ecosystems (Byrne, 2009: 2).

It is the notion of 'general' complexity that seems most relevant to understanding human social practice where power relations and ideology also come into play, and people can understand their world and act upon it on the basis of those understandings. The work of the social theorists outlined above highlights the need to be wary of making too easy generalisations from the 'restricted' more deterministic rule based systems and models that some discuss as examples of complexity to the human realm. It may be the conflation of restricted and general complexity that underpins some of the uneven understanding of complexity in development circles. At the same time, I argue, following Byrne and others, that understanding human social practice as an example of 'generalised' complexity can yield important insights.

Two faces of complexity

In this section I look at how some concepts from complexity have been unevenly applied in development contexts and outline what may be seen as the 'two faces' of complexity in the way it has been understood. Some have focused on the importance of local action, in some cases reduced to a notion of 'simple rules' of interaction that can generate the wider emergent system. Others suggest that retrospective analysis can reveal the role of certain macro level characteristics in social systems that are amenable to being addressed in policy and practice. First I dig a little deeper into some complexity concepts, using the notion of 'emergence' as a central thread in the discussion, then I return to these two faces of complexity to consider what they imply for approaches to development practice and modes of evaluation.

Emergence Revisited

Ramalingham and Jones (2008) usefully review some of the core concepts from complexity theory that appear particularly suggestive for understanding the features of development and humanitarian aid as 'systems' and the dynamics of change.

They highlight that complexity concepts seem to be treated as metaphors by some, as a literal description of human social systems by others, or rejected by still others as inappropriately applied to human social practice. In addition to this variation, there is also often a slippage between all three when such concepts are taken up in practice, as people grapple with what is, and is not, useful in their work and the language of complexity is used to conceptually frame development work, or to inform particular planning, evaluation and organisational development practices in different settings. At the recent Evaluation Revisited conference exploring the evaluation and complexity, it was apparent that there was quite a range in people's understandings of complexity and some of its key characteristics. In the example of the concept of emergence, this could be seen to stretch from seeing something as 'difficult' to being literally 'unknowable' (Guijt et al., 2011).

Key concepts of complexity science
(Ramalingham and Jones 2008)

- Interconnected and interdependent elements and dimensions
- Feedback processes promote and inhibit change within systems
- Systems characteristics and behaviours emerge from simple rules of interaction
- Non-linearity
- Sensitivity to initial conditions
- Phase space – 'the space of the possible'
- Attractors, chaos and the edge of chaos
- Adaptive agents
- Self organisation
- Co-evolution

I focus here on the way the term 'emergence' has been understood and, in the process, touch on a number of other concepts such as the influence of 'initial conditions', the role of 'simple rules' and 'tipping points', and the conflation of chaos and complexity. In touching on some of the latter concepts I take for granted a certain acquaintance with the terminology of complexity building in previous discussions and useful summaries already available rather than repeating them here. Highlighting some of the differences in the way these concepts have been used is valuable for surfacing assumptions and clarifying concepts. Whether the current interest in complexity heralds a paradigm shift as some claim, or is just the latest development 'fad', such clarification can contribute to more consistent and transparent practice in future.

For complexity theorists a key aspect of emergence is that interactions between elements of a system can produce novel characteristics that cannot be predicted from, or reduced to, the characteristics of those individual elements: "complex systems...have emergent properties, that is to say the character of the system cannot be determined by an analytical specification of the properties of the components of the system, and second, that significant change in such systems is qualitative rather than incremental" (Byrne, 2009).

In the case of human social systems this is captured in the example of language or legal systems – which arise from human social interactions, become sedimented into conventions and institutions to varying degrees, and then become part of the ground on which new interactions take place. In this way emerging regularities in the system can then act back on the ongoing interactions and actually provide a changed set of opportunities and constraints for action. This means that interactions are not determined by fixed rules or structures, but nonetheless structure in the system does influence the way it can unfold in the future. In this sense structure is a process or 'state of play' in the system. To quote Crossley again:

> "...social structure implies that these patterns, though emergent from social interaction, exert an influence upon it, generating both opportunities and constraints for further interaction. What we can do now is affected by the sedimented effect of all that has gone before us, both personal and public; the traces in the form of networks, conventions and (distribution of) resources." (Crossley, 2010: 141)"

This does not mean that 'anything goes', however. Complexity does not mean randomness or complete unpredictability or chaos. Cilliers (1998) notes that the popular metaphor of the 'butterfly affect' may be overused and misunderstood since it applies to deterministic 'chaos' resulting from the non-linear interactions of a relatively small number of equations (and in this sense chaos is an example of 'restricted' complexity in that it is more deterministic). In complex systems there are always a huge number of interacting elements and it is rare to get chaos (in the technical sense) in nature. In fact complex systems are often relatively robust and able to perform in the same way under different conditions (or undergo structural changes to adapt to more extreme changes in conditions) to ensure their continuity - something which is a key characteristic of living systems. This also means that complex systems are less sensitive to the influence of 'initial conditions', which can lead to widely divergent outcomes in chaotic systems. The notion of 'path dependence' usefully highlights the key role of history for all complex systems for the way it always influences the way they respond in the present, but this does not always have such dramatic consequences as in the specific example of chaotic systems (1998: ix). Mowles similarly argues that there is no 'free for all' where emergence is concerned, since interacting agents are both constraining and enabling one another and emerging global patterns constrain what it is possible for agents to do in their local interactions (Mowles, forthcoming: 10). In this way emergence is always influenced and patterned by the history and current state of the system and the relationships within it, so emergence is not the opposite of planned or structured.

David Byrne takes the discussion of how emergence may be 'patterned' a step further with the notion of 'control parameters' to highlight the way emergent systems may be influenced by key parameters, even while this influence is not a traditional linear causal one. In the example of Tuberculosis, for example, he shows how changing levels of wealth inequalities can lead to a qualitative shift from smaller pockets of infection to a state of epidemic TB (Byrne, 1998). More recent work on social exclusion in the United Kingdom charts a 'phase shift' in social conditions over the last three decades to what he calls 'post-industrial capitalism'. Using longitudinal data to track the trajectory of individuals, households and regions over time, he shows that a number of key social process and policies over the period have produced three distinct social positions - 'attractors' in the language of complexity – that of the excluded, the insecure and the affluent. The last three decades have seen a substantial transfer of wealth to the top 1% of the population, and the rise of 'poor work', which sees individuals cycle between social security benefits and very low-paid work (often still supplemented by benefits in some form). The undermining of workers' organisations and trade unions has been part of moves to 'flexibilised' labour and increases in insecurity mean that even for the middle classes, the threat of sliding back into financial difficulties is much greater. At the same time, public and political participation has been marginalised by a shift to unelected quangos, bodies of experts and consultants, and the increased influence of the public relations industry in 'managing' public opinion. In this way, all of these emerging social factors combine to produce 'social exclusion' as a particular social trajectory for a substantial number of people in post-industrial capitalism (Byrne, 2005: 81). Byrne's analysis illustrates the way that quantitative and qualitative analysis can be combined to understand how qualitative shifts in social life can emerge from the combination of a range of different incremental changes. Similar multi-methods work, combining qualitative and quantitative analysis, looks at housing and health and looks at the interrelationships among neighbourhood change, policy interventions and the emergence of states of health in the United Kingdom (Blackman 2006).

The examples of social exclusion and health highlight how the trajectory of a particular social system overall emerges from the interplay between numerous local negotiations and the influence of more enduring regularities at 'higher' levels in the system. Here we have the characteristics of emergence – of mutual influence of local and higher level interactions. Of course in human social systems there is also scope for understanding and reflexive action on the social arrangements that are emerging as noted above. It is possible to see that certain emerging social arrangements may be associated with particular social outcomes – in the case of Byrne's work in the United Kingdom, social exclusion and insecurity for many may be the fruits of particular social arrangements in post-industrial capitalism. In this case, restoration of local democratic input into decisions about social policy and health, and policies to control financial speculation and extreme differentials of wealth through progressive taxation, may all push the social system in a direction that does not settle into one with social exclusions as a major 'attractor' state.

It is important to be clear that Byrne is not arguing that such changes can be enacted in a simple way by a process of top-down planning that will have clear cause-effect impact. Instead he is highlighting the kinds of social policies which empirically, in combination and in particular contexts, tend to produce social exclusion, and in the process highlighting them as areas that need to be addressed in negotiations over social arrangements if 'social exclusion' is not to be reproduced as a key part of the system. I have argued elsewhere that in this way, such an application of complexity can point to broad policy recommendations, which may provide an enabling environment for inclusive development (Vincen, 2009). This does not imply planning in detail, or any illusion that outcomes can be controlled in advance, just that certain broad social factors may be attended to – such as reducing extreme levels of wealth inequality – if certain exclusionary social outcomes are to be avoided. In this way, grounded empirical analysis can highlight policy relevant conclusions, even if they do not point to simple 'solutions' that can be put in place without attention to context and the unfolding social negotiations in any setting. Mowles put what is at stake in

such negotiations succinctly: "Even if the social outcomes cannot be predicted in advance, it does not mean that people are not able to collaboratively enquire into the emerging constraints on and consequences of their actions." (Mowles, forthcoming).

This is one 'face' of complexity, where retrospective empirical analysis can reveal the way that when combinations of factors interact in particular contexts, they tend to produce certain patterns of social outcomes. But again, this is not a simple causal process, the human social process involved is always negotiated. At the same time, people can understand the emerging patterns they are part of this and attempt to influence them.

The studies of Byrne, Blackman and others draw on methods informed by complexity and, in particular, case-comparison methods such as Qualitative Comparative Analysis. We look at this approach below as being potentially fruitful for social analysis and evaluation in development contexts, where it has been more extensively applied to understand social development in the North to date. The boxed example of understanding economic changes gives us another example to think about the interplay of local and more macro processes in the emergence in complex systems.

Misreading the 'hidden hand' of economics

Discussions of complexity in development circles often use illustrations from economics to make a case for 'how the real world works'. The well known maxim of the 'hidden hand' of the market attributed to Adam Smith is seen as a primary example of how certain basic mechanisms are seen to unfold in a way that produces macro-level characteristics – in this case the argument is that the self-interest at the level of individuals in markets will lead to beneficial outcomes at the level of society. In fact Adam Smith argued that social policies tend to serve particular interests: since merchants and manufacturers of England were the 'principal architects' of state policy, they made sure that their own interests were 'peculiarly attended to' (Chomsky, 2010:15). Smith worried that

if English manufacturers and merchants were free to import, export and invest abroad, they would profit while English society would be harmed. But because English capitalists preferred to invest and purchase at home, as if by an 'invisible hand', England would be spared the ravages of economic liberalism (Chomsky, 2010). So in fact for Adam Smith this is just as much an example of certain basic local market mechanisms operating within broader influences or constraints. The generalisation from this single use of the 'invisible hand' maxim in Smith's Wealth of Nations to such an often used 'common sense', raises interesting questions of its own about how ideas come to take on an importance and life of their own in social discourse. But the invocation of a local market mechanism on its own generating macro-level economic effects can be seen to ignore wider social constraints, interests and power, which are all components of the 'system' of which local exchanges are part.

Examples from economics can also be seen in Patton's recent discussion of 'developmental evaluation' (2011), where he often returns to the recent global financial crisis of 2008 as an illustration of how the future is completely unpredictable and 'unknowable' - and as such a real world example of emergence. Analysis shows however that there were some consistent trends and social practices underpinning the crisis, as many observers and some members of the financial services industry pointed out at the time. Recent statistical and economic analysis suggests that the financial crisis can be seen in the context of a steady redistribution of wealth to the top 1% over recent decades, financial deregulation that unhinges profits from being re-invested in the places that generated them, and the declining share of the general working population in the proceeds of rising prosperity represented by 'wage shares' (Lansley 2010:4-5).There may be limits to the degree of economic inequality in the global economic system, since if it is too great, the amount of wealth that a small minority are able to feed into global flows of financial speculation rather than productive investment makes the whole system unstable (Lansley, 2010: 10).

This brief digression into the way economic examples are often used to illustrate complexity highlights the danger that by drawing complexity metaphors from the physical sciences, the political and ideological interests driving certain social arrange-ments – in this dramatic inequalities in the global economic system - is naturalised. I made a similar point in a plenary discussion on complexity at the conference on 'Evaluation Revisited':

"Aren't there structural things that you can know in advance – the factors that create the environment in which things emerge one way or another? There are bottom up emergent details but there are also social trends that will tend to certain kinds of outcomes. For example David Byrne's tuberculosis research where he shows that there are certain consistent social arrangements that show up in TB (Pulmonary tuberculosis) epidemics. If we don't acknowledge these then our complexity approach will end up being an apology for neo-liberalism, where 'anything goes'.." (Guijt et al 2011: 20).

In this exchange, the example was read as being one of 'complicated' analysis, rather than a comment about complexity and the way emergence may be 'patterned' in some ways. Again as noted above, it seems that if we apply concepts from complexity to understand social systems, we have to recognise that the emergent higher order levels in social systems are also shaped by the reflexive capacities of humans – where power, meaning and differential interests may play a greater role than in some examples of complex systems where the basic elements are in themselves more simple and determined. The work of Byrne and Crossley, among

others, convincingly illustrate how social structures can emerge dynamically and historically and in contingent ways, and yet be no less concrete, with real social implications, which include serving the interests of some groups above others. As noted above the notion of 'generalised' complexity usefully distinguishes the additional layer of reflexive agency and the many more 'degrees of freedom' in human social systems.

Qualitative Change – 'self-organised criticality'

Another important aspect of emergence is the way it can be seen to lead to qualitative change and how, at critical points, the interactions in a system can drive it to change from one state to another. Looked at another way, it can be seen that an accumulation of incremental quantitative changes can at some point lead to qualitative change. This has particular significance in development practice where it is often qualitative changes that are the most important. The notion of the 'tipping point' popularised by Gladwell (2001), also draws attention to the way that small actions can sometimes lead to disproportionately large changes in complex systems. It is important to acknowledge, however, that it is only because the overall system of interrelationships has reached a critical point, that the next small change can trigger a 'tipping point' where the system shifts from one state to another (different 'attractors' in the language of complexity). So it would be a misunderstanding to see this as random or unknowable, even if it is not possible to predict precisely (Smith and Jenks, 2006).

Where there are sharp qualitative transitions between different states of the system, the notion of 'self-organised criticality' may be more useful (Cilliers, 2008: 96-8). Self-organisation is another commonly recognised property of complex systems which "enables them to develop or change internal structure spontaneously and adaptively in order to cope with, or manipulate their

environment" (1998: 90). But this is not a voluntaristic process taking place at the level of individual decisions; change comes from the interaction of large numbers of elements, it as an emergent property of the system as a whole. At the same time, many complex systems naturally evolve to a 'critical' state where a small event can start a chain reaction that affects many other elements of the system, sometimes at several different levels. The system does not reach equilibrium but evolves from one 'meta-stable' state to the next. At this stage, with 'self-organised criticality', there is a tendency for the system to "organise itself toward the critical point where single events have the widest possible range of effects... the system tunes itself toward maximum sensitivity to external inputs" (Cillers, 1998: 96). Further, "With self-organised criticality, the system will try to balance itself at a critical point between rigid order and chaos. It will try to optimise the number of attractors without becoming unstable... and with [the] number of stable states optimised... the system will be able to change its state with the least amount of effort." (1998: 97). Kauffman goes as far as to suggest that, in this way, complex systems display a creativity that is inherent in evolutionary processes, as systems tend to evolve into the 'adjacent possible' and reach into contexts of interaction beyond their immediate operation (Kauffman, 2010).

As noted above, self-organised criticality is an emergent property of the interactions in a system, rather than a process directed from some centre in an instrumental way. In this way, diversity and interaction within the system drives its changing dynamic and evolution into new states. Mowles makes a similar point, when he notes that "...novelty arises in CAS simulation because of difference and diversity between the interacting agents, not because all the agents link up together to 'share their values' in some idealised sense of unity." (Forthcoming: 11)

Rather than focusing on the small change that seems to come out of the blue to produce a 'tipping point', the notion of self-organised criticality draws attention to the properties of the system and its interactions. Further, they highlight processes through which complex systems appear to maximise adaptiveness and flexibility,

as well as sensitivity to their environment. This has striking implications for the potential for systems to foster learning and innovation and may hold important insights for the attempts of development organisations to promote the same as they seek to apply insights from complexity theory. But it highlights the importance of systemic properties and the interaction of diverse perspectives, rather than the 'heroic' action of particular individuals which are often foregrounded in accounts of tipping points.

'Simple rules'

One other notion linked to emergence is that of 'simple rules' in complex systems. Some scholars have suggested that there may be emergent 'simple rules' which may be seen to characterise one particular complex adaptive system (Eoyang, 1998, 2008), in that they appear at a range of levels and scales, and may be distinctive to that particular system. But while these rules are seen as emergent by some, such as Eoyang, there is sometimes a slippage into suggesting that these rules can be manipulated to move the system one way or another. Patton (2011) implies that such 'simple rules', once ascertained for a particular system, may be employed as a way to manage complexity, by encouraging their use at a range of levels in the system, as a kind of sympathetic reinforcement or resonance with the tendencies already present in the system. He gives an example of such an approach to work on strengthening families in the United States by working according to the same simple rules across a range of different stakeholders, from families to social workers and other social services agencies (Patton, 2011). At other times, Patton appears to imply that 'simple rules' are more like principles or 'rules of thumb' which can be applied in particular situations of complexity. In this way, it is not always clear how the notion of simple rules is being applied. And in the work on families, it is not clear how these rules are applied differentially within what are quite different settings with differing institutional constraints, and among very different groups of stakeholders.

Mowles suggests that the way the notion of 'simple rules' has been understood by scholars such as Patton and Rogers tends to domesticate the more radical implications of understanding social practice through models of complexity. By suggesting that managers may be able to 'encourage' emergence by setting a few simple organisational rules, or by following a few simple rules, some authors subsume insights from complexity within traditional logic models and managerialist assumptions about the ability to guide or control emergence (Stacey, 2000, Mowles forthcoming: 5). There seems to be a subtle slippage here from the notion of simple rules observed as emerging patterns in complex systems, to a more instrumental application of those 'rules' as noted above.

The notion of 'simple rules' often appears in discussion of computer simulations and work in game theory, where models of the behaviour or large numbers of agents seem to generate larger scale patterns of behaviour from a small number of equations or rules. The 'boids' simulation of X is a key example, often cited (Ramalingham and Jones, 2008, Johnson, 2001, Patton, 2011), where agents following three basic rules simulate the flocking behaviour of birds. Mowles draws on Stacey (2011) to point out that the boids simulation is not an example of a complex system, since the agents all follow the same fixed deterministic set of rules, and that beyond the initial flocking behaviour, the system does not evolve further so does not really display emergence. As noted above, such computer simulations are really examples of 'restricted' complexity, rather than the 'general' complexity of social settings.

Complexity and participation

We have focused above largely on one 'face' of complexity – namely, the way that, despite the uncertainty and unpredictable detail of emergence in social systems, certain macro patterns or regularities do seem to be recognisable in complex systems when looked at retrospectively. Another 'face' of complexity can be seen emerging from work applying insights and concepts from complexity to give a new impetus to participatory approaches and action research which stress

the importance of local knowledge, local action and the negotiated nature of social change among multiple stakeholders (UNAIDS, 2011). These approaches build on the observation that a complex system can only really be experienced and 'known' locally in particular interactions at particular times. Here we have the 'face' of complexity that puts more emphasis on local negotiation and action in the emergence of social change.

Some argue that, in a very real sense, the only way a system can be 'known' is by engaging it and seeing how it responds and changes (Byrne, 2002). This is not an argument against planning, or the importance of evidence, but recognition that what can be planned in detail in advance is limited, and that evidence has to be seen within a particular context and not over-extended. Such a conclusion drives recent work in 'whole systems action research' (WSAR) which we look at in more detail below. This approach, rather than starting from pre-determined plans, involves a wide group of stakeholders in generating a range of different pictures of an issue from a variety of perspectives. These accounts are then brought together to find 'resonance' across the 'system', to give a more nuanced overall picture of the problem and related questions to be answered, and to lead to specific lines of further enquiry and action by local stakeholders. Broadly similar conclusions have driven participatory evaluation approaches that foreground learning. Guijt (2007) highlights the value and potential of a number of contemporary approaches: action research and appreciative enquiry; organisational learning; popular education; feminist evaluation; participatory and empowerment evaluation; democratic evaluation and dialogue; and utilisation-focused evaluation.

What all these approaches have in common is that they start from the recognition that social change processes are complex, emergent and context-dependent, with an emphasis on gaining enough understanding to be able to act in context, rather than expecting to build a complete and irrefutable 'objective' picture. Again, this does not imply that meaningful action is not possible, just that planning is limited, and each new setting requires understanding and the engagement and

judgement of people acting in context. We return to two approaches emphasising action based on ongoing reflection in context with Whole Systems Action Research and Developmental Evaluation below.

There is also recognition in such participatory approaches that different people may bring differing perspectives and interests to the table in any development intervention and that, in a sense, they co-create the intervention as they negotiate its meanings and practice. This diversity of perspectives and interests has long been explicitly recognised in some 'systems' approaches to evaluation as something to be acknowledged and worked with rather than avoided or reduced (Williams and Imam, 2007) and is acknowledged by many applying concepts from complexity. The implications for evaluation include the need to understand these different perspectives and how they change over time. The work of Gill Callaghan highlights this 'negotiated order' in any evaluation setting, emphasising the need to understand how a particular project or social order has been negotiated by a range of different stakeholders involved. Importantly, she also draws attention to the structural conditions, power relations and communication processes in any setting – and how the particular local interaction is affected by a range of wider social processes, since these all have an influence on social outcomes (Callaghan 2008). There are parallels here with the outline approach to evaluation of knowledge management developed in IKM-Emergent Working Paper 13 which sees the importance of bringing together a range of different perspectives and knowledges and developing a process of collective reflection, something we return to below.

Callaghan brings us back to the two faces of complexity – the importance of ongoing negotiation in local contexts but also the wider influences of certain macro level social factors, which although emergent and dynamically changing over time, are relatively enduring and concrete enough to have a constraining influence on the action unfolding locally. Critiques of participatory approaches have highlighted the danger of only focusing on the local (Mose, 2001) and not recognising the influence of wider social structures. Complexity-informed

approaches to participation can help to illuminate how local action and wider emergent social structures are interrelated and mutually affect one another and, when allied with some of insights from relational sociology outlined on pages 3-7, provide ways of better understanding some of the mechanisms involved in social change.

Applying complexity in evaluation

Having explored the two faces of complexity we can see that is both important to attend to local context, diverse perspectives, and negotiations driving emergent social processes, but also to the wider previously emergent social factors that frame and influence current negotiations. In this section I consider a number of recent approaches to evaluation which attempt to acknowledge and work with complexity in different ways. The recognition of the complexity of social interactions has implications for the way social change can be understood, for the nature of causality in social processes, and for research and evaluation frameworks which attempt to address social change. A number of authors note the irony of the fact that there is a general recognition that reality, and social reality in particular, are complex and unpredictable in the detail in advance, and yet this is ignored when it comes to understandings of development and when considering appropriate evaluation methods (Lacayo et al, 2008, Patton, 2011). I begin then, with a brief review of the questions that have been raised over the adequacy of traditional experimental approaches to research and evaluation when addressing the complexity of social development. I then look at a number of evaluation approaches that have been informed by complexity theory for their promise in application to contexts of development and social change.

Complexity and causality – appropriate methods of evaluation

Contemporary theorists who have drawn on complexity theory are resolute that experimental methods that rely on simple cause-effect relationships are rarely able to account for the many interrelationships and feedback loops in social processes (Byrne 2002, Pawson 2006, Patton 2008, 2011). The way that

dominant scientific analytical methods break what they are studying into analytical pieces is particularly inappropriate when addressing complexity, since they actually destroy what they attempt to understand, given that it is relationships between components of a system and their interactions which are central (Cilliers, 1998: 7). For Cilliers, this means that complex systems cannot be reduced to simpler models or a collection of basic constituents since too much relational information gets lost in the process: "To describe a complex system you have, in a certain sense to repeat the system" (Cilliers, 1998: 10 emphasis added). This suggests that the traditional approaches of statistical analysis based on linear causality are of limited use when approaching complex systems.

A related issue is the way that traditional methods of research and statistical analysis mistakenly focus on 'variables' – such as 'class' or 'gender' - abstracted from the real unfolding of the social world. Byrne argues instead, that it is the complex case, made up of a wide range of interacting factors and feedback mechanisms which is the reality of any particular social formation – what he calls the 'co-varying real' (2002). So research and evaluation approaches that attempt to isolate particular 'variables' and track their interrelationships miss the complex dynamics of social life in important ways. For this reason, the randomised control trial of before and after comparison, and related methods of multi-variate analysis are simply not valid approaches to use when addressing complex systems, since many of the assumptions of the statistical tests used for data analysis – based on discrete variables that act independently and continuously - are violated in the complex interactions and feedback of real life. Instead, Byrne outlines the value of complex case comparative methods (Byrne and Ragin, 2010) which we return to below.

In a similar vein[2],Crossley highlights the problem of the 'variable' analysis; since it: "obscures the workings of the social world because it shifts the focus of analysis away from interaction between actors, where the work really gets done and outcomes are genuinely decided, onto labels which we treat as properties of individuals." Variables do not do anything, he argues, it is actors who interactively 'do' the social world and collectively determine the fate of their peers (2011:21).

Debates over the dominance of experimental approaches in development evaluation have ebbed and flowed and are mirrored by similar debates in academic and research circles, where there has been concern at a narrowing of research and inquiry to what is considered 'legitimate' scientific method, with experimental or quasi-experimental approaches seen as the gold standard and finding other methods wanting (Hammersley, 2005)). As far back as 1996, the Gulbenkain Commission on Restructuring the Social Science defined science as the construction of useful empirical knowledge about reality, rather than in terms of a specific set of research practices constituting 'the' scientific method. Discussions at the Evaluation Revisited conference suggest that there is a need to challenge the contemporary narrowing of the conception of 'rigour' in evaluation to experimental methods, and underlined that they are not appropriate for assessment of complex development interventions aimed at social transformation. Rigorous evaluative practice means starting with the evaluation question first, then applying appropriate methods, rather than privileging one approach or method as is increasingly evident in a hierarchy of methods applied

[2] *Interestingly, Crossley and Byrne's critique of the abstraction of variable based analysis both separately draw on E.P. Thompson's critique of reducing social class to a variable.*

by many influential institutions (Guijt et al 2011)[3]. Such discussions are particularly pertinent in the context of trends towards a narrow version of 'results based management' being favoured by some bilateral donors.

A range of authors writing about social change and development programmes have stressed the importance of recognising the complementarity of different approaches, and clarity about where different methods are best applied. Following Stacey, they distinguish between simple, complicated and complex situations and argue that different approaches and responses are needed for each, with experimental designs particularly unsuited to dealing with the complex (Westerly et al., 2007, UNAIDS, 2011, Patton, 2011). Without rehearsing these debates here, we can recognise that when we are considering social development processes, we are predominantly within the realm of the complex. Even if aspects of development may appear relatively simple and linear, such as the delivery of some commodities, they are usually part of a larger whole of complex social, economic and political forces and flows of information knowledge and resources. In this way, approaching the planning and assessment of development as linear is a wilful denial of reality. I now turn to a number of research and evaluation approaches which have attempted to take complexity seriously. I first look at two approaches which look retrospectively at the patterns emerging from social processes – the more macro 'face' of complexity – Qualitative Comparative Analysis and Realistic Evaluation. I then consider two quite different approaches informed by complexity – which focus more on responsive local action in context – complexity's other 'face' – with Developmental Evaluation and Whole Systems Action Research. I also draw out

[3] *Such as in the guidance of '3ie' the International Initiative for Impact evaluation. http://www.3ieimpact.org/*

parallels with recent work by the IKM-Emergent programme to find evaluation approaches appropriate for knowledge management in development contexts.

Complexity and case-based methods – Qualitative Comparative Analysis

Given the weakness of experimental approaches when it comes to complexity, a number of authors have instead developed a set of alternative methods which are better able to deal with the complex causality at stake in social processes. A range of complex case comparative methods (Byrne and Ragin, 2010), were developed explicitly to try to build on the best of both qualitative and quantitative methods; "... to gather in-depth insights into different cases and to capture the complexity, while still attempting to produce some form of generalisation" (Rihoux and Ragin, 2009: xviii).

One particular method, Qualitative Comparative Analysis (QCA), facilitates the analysis of empirical social data to explore how in different cases social factors combine in different configurations in different contexts to produce different patterns of outcomes. QCA combines both quantitative and qualitative analysis and "moves from detailed qualitative understanding of cases, through the specification of measured attributes of those cases, into the establishment of multiple and complex causes for the present state of those cases" (Byrne, 2009: 3). As I noted above in the discussion of David Byrnes work on social exclusion in the United Kingdom, QCA can help to examine trends over time and identify key social 'control parameters' which have a bearing on the broad character of social outcomes. Due to complex interactions and emergence, such factors do not have a simple causal relationship to social outcomes, but may have a disproportionate influence 'tipping' a social formation into one or another common 'attractor' state for that society. In this way, it may be possible to identify broad policy actions aimed at producing enabling environments for inclusive change, even while the detail of particular changes is contingent and beyond control. Byrne notes that acknowledging complexity does not mean that constructive purposeful action is

not possible, but raises questions about the ability and wisdom of attempting to control social outcomes in detail.

A strength of such case-based methods is that they are able to focus on the qualitative social changes that are really important and really make a difference - such as the transition from low levels to epidemic levels of infection in public health contexts. Again, there is not a simple causal relationship here, but QCA aids analysis of empirical data helps to understand what factors appear to work in combination to produce particular outcomes and give a sense of necessary and sufficient causes for different outcomes. In the study of health inequalities across socially deprived boroughs in the United Kingdom, application of QCA to a combination of surveys and existing secondary data helped to understand how social programmes interacted with the existing context and resources in different boroughs to produce a variety of different outcomes for cancer, cardio-vascular disease and teenage pregnancy (Blackman et al., 2010). A number of factors which were part of successful interventions in some boroughs interacted quite differently with the context in other instances. Application of QCA helped to identify a number of different "pathways for narrowing health inequalities" to guide responsive strategic programming at the local level (2010: 02).

What works for whom and in what circumstances? – Realist evaluation

Another promising approach to understanding complex social change and the role of social programmes and interventions in such change is Realistic Evaluation and Systematic Review (Pawson and Tilly, 2004, Pawson, 2006). The mantra of Realistic Evaluation is to understand 'what works, for whom, and in what circumstances' (Pawson, 2006). Realist Evaluation also has roots in complexity theory (and critical realism) and considers social interventions always to be "complex systems thrust amidst complex systems" (Pawson, 2006: 25). In a similar fashion to QCA, Realist Evaluation is interested in how the resources of a social programme interact with the existing resources and people's capabilities in any particular setting to produce patterns of outcomes. It aims to deepen

understandings of these interactions to guide the decisions of policy-makers as they attend closely to the contexts within which they act. There is no expectation that any particular intervention will be the 'same' as it plays out in different contexts, since the ideas and resources and agency of people in each case will be different. At the same time however, Realist Evaluation hopes to build a cumulative understanding of how similar programme mechanisms fare across a range of different contexts. Rather than providing one-off verdicts on the success or failure of projects and programmes, Realistic Evaluation aims to build a cumulative picture of what works in what circumstances in a way that can usefully inform judgement on subsequent action and programming, by providing a measure of generalisable principles which need to be applied intelligently in any new context.

Realist Evaluation methods have yet to be applied more widely in relation to programming in the international development context, having been more extensively employed in developed country settings to date. But the recognition of the need to learn from accumulated experience, but pay attention to context and exercise judgement about what is relevant in any new context resonates with others seeking to apply insights from complexity (Patton, 2011, Jones, 2011) A number of recent initiatives have sought to apply Realist Evaluation in the context of health systems research in Africa and Latin America and a community of practice is building around the application of realist evaluation methods, building on work carried out by the Royal Tropical Institute in Belgium and the Royal Tropical Institute (KIT) in the Netherlands[4].

DFID Uganda, in planning its next 4-year HIV strategy in early 2011, sought to better address the social drivers of HIV in Uganda, and to this end explored the use of Realist synthesis and QCA to identify key social factors that have a bearing on trends in HIV infection in the country. A key concern was to see greater use of data and more extensive analysis of existing data sets from

[4] http://www.itg.be/itg/generalsite/Default.aspx?WPID=704&L=E

surveys, and the evaluation research and data of a number of ongoing programmes to better monitor and understand the social trends affecting the evolution of HIV in Uganda. To this end, a knowledge management and research centre is proposed to facilitate data sharing and analysis and the identification of broader social trends which may influence the implementation of programmes in different districts[5]. Panos London, in partnership with a number of international communication programmes, is currently exploring how to adapt and apply Realist Evaluation methods and QCA to produce an appropriate evaluation framework and related approaches and tools suitable for multi-levelled communication programming development programming on HIV and gender.

Navigating complexity as it unfolds – developmental evaluation and Whole Systems Action Research

Whilst QCA and Realist Evaluation outlined above focus mainly on drawing out the way combinations of contexts, interventions, and patterns of outcomes retrospectively form social research and evaluation data, some approaches have been developed which add a concern for real-time navigation of change in complex social settings of unfolding social change and work with multiple stakeholders. Two promising approaches are Developmental Evaluation (Patton, 2011) and Whole Systems Action Research (Burns, 2007) which we now briefly turn to.

Developmental Evaluation

Michael Quinn Patton brings many years of experience and insight in evaluation together in the approach he calls 'developmental evaluation'. In keeping with his emphasis on evaluation being 'utilisation focused' and paying appropriate attention to how evaluation findings will be used, he suggests that developmental

[5] *The strategy was designed by Alastair Robb, Fred Wabiru-Mangen and the author*

evaluation is particularly useful in situations where goals are emergent and changing rather than pre-determined and fixed, and where the focus is on innovation and change rather than external accountability to pre-conceived plans or testing of a model (2011: viii). In this way, developmental evaluation is well-suited to situations of complexity. Patton looks in turn at several concepts – non-linearity, emergence, adaptation, uncertainty, dynamical systems change, co-evolution – stressing their value as 'sensitising concepts' rather than concepts that are operationaliseable (2011: 148). Rather than advocating any particular method, Patton stresses the importance of evaluative thinking and questions, and ongoing and systematic data-based reflection and attending to what is emerging, its significance and meaning for people and what are the implications for subsequent action: "...*tracking emergent and changing realities, illuminating perspectives about reality and feeding back meaningful findings in real-time so that reality testing facilitates and supports the dynamics of innovation"* (2011: 6).

For Patton, neither the top-down implementation of validated best practice should be privileged, nor the bottom-up grass-roots innovation grounded in local context and knowledge. Instead it is more useful to look at where the two meet in the 'muddled middle' of the real world and navigate this by adapting effective principles drawn from experience to particular local contexts (2011: 168, 177). Rather than the blue-prints of best practice, principles drawn from accumulated experience provide guidance for action in the face of real world complexity, and they need to be interpreted, applied and adapted to suit each new context, something which resonates with the insights from Realistic Evaluation. Patton draws on a wide range of scholars and evaluators, and uses practical examples, to illustrate the emerging practice of developmental evaluation. Recognising the relatively eclectic mix of concepts, frameworks and approaches he distinguishes a range of different situations characterised by complexity and sets out a number of inquiry frameworks that may be useful for evaluation in these circumstances and a related mix of tools and methods which appear to best match the demands of evaluating the different situations. A simplified version of his summary table gives an impression of the types of situation and methods he brings together

Methods for addressing evaluation of complex development challenges
Adapted from Patton (2011: 334)

Complex system development challenge	**Appropriate engagement, design and methods**
New programme – how will participants react?	Reflective practice with staff and or participants – track developments and changes
Ongoing adaptation and development to changing conditions	Direct observation, follow with participants
Generalising success to new initiatives	Tracking results, then tracking dissemination and adaptation
Many agencies working together on same problem	Outcome mapping – emergent pattern in collaboration and reflective practice
Community generating its response	Participatory evaluation involving community in all aspects
Humanitarian crisis	Direct independent observation, listening and tracking posts. Rapid reconnaissance, networked reporting
Network taking innovation to scale	Social network analysis tacking interactions. Cross site and scale synthesis of local level evaluations
Major systems change aiming to tip	System mapping (visual displays of baseline system from diff perspectives) Indicators of system change over time
Advocacy initiative to influence public policy/law	Bell-weather surveys of knowledgeable thought leaders – tracking media and trends

An important aspect of complexity is the fact that it involves multiple stakeholders with different and sometimes conflicting perspectives, and this demands a range of evaluation approaches that are able to deal with this variety, and to track different perspectives and put them into dialogue with each other. Patton's developmental evaluation brings together a wealth of insights from his own extensive experience and from a range of scholars and practitioners, with many illuminating practical examples that illustrate the resonance of concepts from complexity to evaluation. He also weaves together a range of different approaches – appreciative enquiry, action research, outcome mapping and most significant change among many others, which take on a new affinity in the context of the overarching challenge of understanding and learning from complex, emergent social processes. In this way, developmental evaluation gives important visibility to, and recognition of, the distinctive challenges of understanding and

evaluation of complex social processes. Equally, it provides important guidance and a sense of legitimacy to a range of evaluation approaches that have often been considered less rigorous. Further, it usefully situates these approaches in the context of where they can be most usefully applied, playing to their particular strengths, in what can often seem a bewildering landscape of evaluation tools and techniques.

At the same time, there are inconsistencies in the way Patton applies concepts from complexity. He appears to over-extend the characteristics of natural ecosystems to human practice with little acknowledgement of issues of differences of power and interest. His comparison of the adaptive cycle in ecosystems with the changing political administrations in the United States (2011: 211) seems to repeat the mistake of conflating more deterministic natural systems with the 'generalised' complexity of human social systems, naturalising some very historically specific political arrangements in the process[6]. Complexity is sometimes a metaphor, sometimes real, and sometimes a mystery to be solved by the evaluator or 'social innovator' as detective or hero. This is not to deny the insight and wide-ranging practical relevance of many of the examples that Patton brings forward, but it does perhaps point to the need to foreground the system or the process that is, or is not, 'ripe' for change, rather than the agency of the particular evaluator or expert, when dealing with the two faces of complexity in evaluation, and the need to deepen power analysis in any applications of concepts from complexity.

Whole Systems Action Research (WSAR)

In the case of whole systems action research (Burns, 2007) and its applications in evaluation, there is a similar concern to acknowledge complexity in social change

[6] *His example of the global financial crisis outlined above is another example of this tendency*

process and to aim to respond in real time, but the participation, understandings and 'sense making' of multiple stakeholders is relatively to the fore of the process, with strong facilitation central and less emphasis on the objective figure of the evaluator. Exploration of the issues in WSAR involves multiple lines of enquiry carried out by different groups of stakeholders who periodically come together to share and review their research and findings and look for issues with 'resonance' between them. When an issue is found to be important, it is addressed through further exploratory action by groups of stakeholders directly involved in the issue – probing and testing the 'system' to see how it responds, in iterative cycles of action and reflection. In the example of the Welsh Government's 'Communities First' initiative across 143 communities in Wales in the United Kingdom, the action research process became a hub through which learning about the complex multi-stakeholder and multi-community intervention was analysed and acted upon, so insights emerging from the ground were linked to core decision-making processes about the programme" (Burns, 2007: 71 cited in UNAIDS, 2011).

Whole Systems Action Research (WSAR) tends to collapse distinctions between action research, evaluation and capacity development and in this sense is not conceived of explicitly as an evaluation approach. By supporting participation in reflection and action on social practice and using this in the process of bottom-up policy change, however, the approach has many affinities with the utilisation-focused evaluation and developmental evaluation of Patton (UNAIDS, 2011). Whole Systems Action Research (WSAR) has been used to improve HIV treatment outcomes in Kenya and has shown success in a range of different settings with sensitive issues such as domestic violence, health care, and community regeneration (see Burns, 2007). The method is currently being used to better evaluate capacity development processes in international development in the 'capacity collective' initiative at the Institute of Development Studies in the United Kingdom.

Working with multiple perspectives and knowledge

Running through the above approaches is a concern to recognise and bring together diverse perspectives and experiences of multiple stakeholders rather than privileging one universal standpoint or one particular way of generating evidence. The same concern is central to the evaluation approach being developed by some in the IKM-Emergent programme (Leborgne et al., 2011)[7], which recognises the need to work with a variety of different stakeholders and distinct cultures of knowledge that have influence with development practice, and all form part of its knowledge ecology. A process of collective inquiry and iterative learning and construction of knowledge among different development stakeholders is proposed which shows many parallels with Whole Systems Action Research (WSAR). As with WSAR, however, there is a similar neglect of how power gets negotiated in the process of bringing together and facilitating dialogue among diverse stakeholders. As noted above, focusing on local interactions and participation can sometimes miss the wider structuring of social interactions by difference and power, something which the notion of 'two faces' of complexity helps to remind us of.

Conclusions – working with the complexity of social change

In this paper I have reviewed some of the uneven understandings of concepts adopted from complexity theory by development practitioners. Looking at the notion of emergence and a number of related concepts, I compare the emerging uses in development discourse and practice, with some of the understandings provided by complexity theorists and critical social theorists. In an evolving field, this is as much to clarify assumptions and promote critical reflection and dialogue among development practitioners on the ways concepts from complexity are being applied. In addition, I hope to have shown that there is a range of promising and quite diverse methods that have been usefully informed by complexity theory

[7] *See IKM Working Paper 13 for the framework and Working Paper 12 for related background*

which have the potential to strengthen a rigorous participatory practice in a way consistent with some of its insights. By attending to the 'two faces' of complexity there is potential to link concern with participatory engagement in local processes with attention to some of the wider social factors that influence the way development initiatives unfold, including relatively enduring differences of resources and power – no less real and influential for the fact that they are emergent – and strengthen a critical development practice and its evaluation.

Combining insights from complexity with the new synthesis of relational sociology highlights how personal and social action and change are intertwined and mutually influencing. It also highlights the negotiated nature of social norms, practice and knowledge and points to some relational mechanisms, including the dynamics of social networks, which provide powerful analytical tools for understanding social change and development processes. I have highlighted some parallels with the way the IKM-Emergent programme has characterised development as a 'Knowledge ecology' negotiated among a range of stakeholders. Further, the conclusions of the programme's first phase about the incompatibility of many linear and technocratic practices and management technologies currently dominant in development receive support from the converging insights of critical social theory and complexity. At the same time, the endeavour to develop a 'knowledge commons' and a more cumulative and collaborative development practice, without sacrificing diversity (Powell and Cummings, 2010) could be strengthened by some of the approaches outlined here. Realistic Evaluation and QCA both recognise the complexity and specificity of individual cases but also seek to find modest generalisations and guide their responsive and informed application in different contexts.

It seems ironic that just as a number of new sophisticated methods for analysis of social change and social programmes are emerging, we see a number of international donors returning to an emphasis on a particular version of results-based management based on analytical frameworks of linear causality. The complexity-informed methods outlined above bring rigour and empirical analysis,

and an integration of quantitative and qualitative methods, to guide context-sensitive programming. There is also a notable convergence with the recent developments in feminist evaluation (Batliwala, 2010) and feminist theory focusing on 'intersectionality' which examines how gender is mutually constituted and influenced by other axes of social difference (Sen et al., 2009). In each there is a common concern to show how social practice may produce some enduring social regularities and dominant forms of knowledge, with very real effects on the differential opportunities and constraints for individuals who are positioned differently. At the same time, however, such social regularities are sustained by a range of identifiable ongoing social mechanisms, which are nonetheless amenable to change.

In contrast the predominant applications of results-based management, by bracketing out variations in 'context' as well as differences of power and resources that interact to pattern social outcomes, provide an approach that is arguably less scientifically valid, and risks masking the very factors which make a difference in development contexts. This paper builds on recent work to suggest that important insights can be drawn from complexity theory, and highlights the promise of some of the methods of enquiry and evaluation that have been developed. The application of such methods to international development contexts deserves greater investment, testing and adapting, so that the facilitation of inclusive social change for development can flourish and the development of participatory methods focusing on empowerment can benefit from additional rigour. This is important at a time when the international financial crisis appears to be increasingly evoked as a rationale for a focus on 'value for money', which, in turn, is read as implying a focus on delivering short-term, tangible results. While it is easier to measure and demonstrate the delivery of service infrastructure and input of technical expertise, it is important that we find better ways to understand and address the role of the more intangible social processes of development that build capabilities, confidence and abilities for social innovation. Such processes are vital to a development based on social inclusion and ownership and the respect of multiple knowledges. A better understanding of what underpins social

development that is inclusive and equitable, in the North and the South, may also be an important way to forestall the apparently waning confidence in investing scarce resources in international development. The insights of relational sociology and some of the insights of complexity applied to social theory offer some useful resources in this direction.

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