THE IDEA AND PRACTICE OF SYSTEMS THINKING AND THEIR RELEVANCE FOR CAPACITY DEVELOPMENT

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CONTENTS

1 Introduction

1.1.   The European Center for Development Policy Management (ECDPM) is engaged in a research project on the issues of capacity, change and performance sponsored by the GOVNET (Governance and Capacity Development Network) of the Development Assistance Committee (DAC) of the Organization for Economic Cooperation and Development (OECD) in Paris.[1] The purpose of the research is to contribute to the on-going debate on capacity and capacity development that is taking place around the world in both high and low income countries. We are giving particular attention to clarifying the nature of capacity and how it emerges, declines or sustains itself in a variety of settings.

1.2.   We are also exploring both the explicit and tacit mental models that people use to think about capacity.[2] DFID and some other international funding agencies are using a political economy view and analyzing the way societal structures and institutions shape the capacity and performance of organizational actors. Economists emphasize the power of market forces to influence capacity development. Supply and demand and incentives in the context of individual and organizational choice is highlighted. NGOs tend to focus on the perspective of organizational development and the ways in which participation, commitment and empowerment can be key forces for capacity development. Other international development agencies that are more oriented toward technical subjects see knowledge management as an essential part of any change strategy. Enhancing skill levels at the individual and organizational levels is key from this perspective.

1.3.   One other mental model that is getting more attention - again - is that of systems thinking. A large body of writing and experience exists on systems thinking and acting. Some of this has been applied in the private sector.[3] Its influence is starting to be more apparent in the public.[4] But to date, systems thinking has been used in a very limited way in development cooperation.[5] It usually appears under the label of 'systemic approaches' and is focused on the analysis of inter-organizational issues. To date, we have found few analyses that apply systems thinking to capacity issues.

1.4.   This paper has been prepared as background for a workshop held at ECDPM in Maastricht March 16-17, 2005, on the subject of systems thinking and its relevance for capacity development. It gives an general overview of the main issues and explores the utility of systems thinking for improving our understanding of capacity issues. Readers should understand this is not an advocacy paper. Its goal is not to promote the value of systems thinking or to suggest a particular set of tools or frameworks. It offers no recommendations. It is not suggesting that systems thinking offers a complete perspective on capacity issues. The point here is explanation and exploration of the basic ideas connected with systems thinking. If the workshop discussions see it as contributing some potential value, more work will need to craft these ideas to apply to capacity issues. Some questions are included at the end of the main sections for use in discussion.

1.5.   More specifically, the paper tries to address the following questions:

- What is systems thinking? Are there different types of systems thinking? What are the main concepts? How would these relate to capacity development?

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[1] Readers wishing to know more about the ECDPM research may wish to consult the website at www.capacity.org.
[2] "Mental models are conceptual structures in the mind that drive cognitive processes of understanding. They influence people's actions because they mould people's appreciation of what they see. People therefore observe selectively. Mental models most often invisibly define our relationship with each other and with the world in which we find ourselves...Consequently mental models can undermine and limit the vision of what can be seen and done" Peter Senge, *The Fifth Discipline,* Chap. 10 "Mental Models".
[3] See Peter Senge, *The Fifth Discipline: The Art and Practice of the Learning Organization,* 1990
[4] See Jake Chapman, *System Failure: Why Governments must learn to think differently,* DEMOS, 2004
[5] See Paul Engel, *The social organization of innovation: a focus on stakeholder interaction,* 1997 Also Samir Rihani, *Complex Systems Theory and Development Practice, Understanding non-linear realities,* Zed Books, 2002

- What are the advantages of systems thinking? What value, if any, would it add to what we already know or do? What are the limitations?

- Is systems thinking a fundamentally new and different way of thinking about capacity issues or is it just another perspective to combine with existing approaches?

- Is it feasible for practitioner groups and organizations to use it? What are the operational implications?

1.6.   A further qualification is needed here. To date, most systems analysis in development cooperation has focused on one issue in particular: that is, the functioning of large organizational and institutional systems and networks and how donors can better address them.[6] The basic idea here is that any capacity intervention in such systems must be based on a theory of action that includes working with a range of organizations and institutions. This view applies especially to the 'levels' above that of single organizations. The debate about how best to structure SWAps and program support is the most obvious example.

1.7.   This paper has a different focus. It looks mainly at three other issues connected to systems thinking. The first is that of systems thinking itself as a particular analytical and learning technique that can be applied in almost any situation. In this sense, systems thinking can apply to any human activity at any 'level'. The second issue is that of human systems as an organizational form and an object or theater of systems thinking. Such systems can also operate at any level of development activity ranging from the individual to the national. All organizations, for example, are systems by nature. So are families, ethnic and tribal groups, soccer teams, church choirs, organizational sub-units, restaurants and banking systems. Large systems are an important but not exclusive part of this analysis. The third issue is that of capacity and capacity development and the ways in which systems thinking can help us to better understand its nature and dynamics. What this paper is trying to understand is the potential contribution which systems thinking and systems acting could make to capacity development.

1.8.   Readers should also realize that some of the writing associated with systems thinking is unconventional ranging from the mundane to the metaphysical. Insights come from a variety of non-traditional sources including quantum physics, evolutionary biology and religion. These may or may not be engaging for many people used to sector strategies and result matrices but they are useful to inject some fresh air into our thinking. Those of us still using the linear, mechanical, machine building approach to capacity development need to suspend judgment, at least for a while, before dismissing the whole exercise of systems thinking. Those who are allergic to theory of any kind also need to take a deep breath.

1.9.   A word about capacity. We do not want to get into yet another fruitless effort to 'define' capacity and capacity development. In this paper, we have used the term 'capacity' to mean some sort of ability to perform or to create or deliver value. In many ways, capacity is about the potential to act as opposed to performance which is about execution or implementation. In this paper, we use the term 'capacity' as referring to the overall ability of a system to perform. The term 'capability' refers to a more specific collective ability to do something more specific such as learning. 'Competence' refers to individual ability or mastery.

1.10.   Finally, we would add that this paper is intended as a general summary of the systems thinking issue. For the purposes of explanation, it uses a few examples from the ECDPM case research. But it is not an effort to rethink the results of those cases from a systems perspective.

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[6] See UNDP, *Capacity Assessment and development in a Systems and Strategic Management Context,* January 1998.

2 A Brief Overview of Systems Thinking

2.1.   This paper sees systems thinking as a way of mentally framing what we see in the world. It is a way of thinking that looks at the 'whole' first with its fit and relationship to its environment as a primary concern. Attention to the constituent elements or parts of the system is secondary. Systems thinking is more an orientation or a perspective than it is a formula or prescription. It can be used to help people understand how systems work and how people can deal with them more effectively. It is a way of exploring real life rather than representing it. It is a technique to figure out what's going on. It encourages people to look for patterns of interaction and underlying structures that shape the emergent patterns of systems behavior. A corollary to this approach is the idea that structures matter much more than individual events in terms of determining outcomes.

2.2.   The focus of systems thinking moves in a variety of different directions compared to the linear style of conventional thinking. It is more than lateral thinking. It is also vertical and horizontal and circular. Systems thinking pays much more attention to movement and dynamics. Systems thinking is oriented more towards capturing flow and movement. In particular, it focuses on processes, patterns and relationships. What matters more is understanding the effects of the interactions as opposed to detailed efforts to predict outcomes. Systems thinking also assumes a good deal of randomness and unanticipated consequences that cannot be foreseen even under the most laborious exercises in risk analysis.

2.3.   Systems thinking thus looks quite differently at the issue of attribution or cause and effect. From its perspective, explicit inputs alone never lead to outputs as in the log frame. Cause and effect are separated in time and space. Micro effects can have macro causes and visa versa. The linear, mechanical concept of results chains is not used. The vast number of system interrelationships leads to unpredictable patterns of disorder and instability. No single factor can produce desired outcomes with any certainty or even a high probability. All outcomes can best be understood in terms of probabilities that are themselves subject to change. But it does not put forward a view of totally random outcomes. Certain kinds of actions and influences can improve the odds of channeling system performance in a certain direction. The challenge in systems thinking is to try and make possible desired outcomes more probable.

2.4.   Systems thinking places less faith in planned, engineered solutions. It is not big on up-front detailed design. Systems are seen as having a dynamic of their own that is only marginally open to management and direction. There is more emphasis on evolution, on discovery and emergence and in some cases, in mimicking the behavior of other life forms which accounts, in part, for the interest in biology and other natural sciences. It also focuses more on the dynamics of human behaviour and gives less attention to technical issues as a contributor to improved capacity and performance.

2.5.   Systems thinking pays little attention to the idea of 'objective' knowledge 'out there' that can be collected to make a particular case. It takes a post-modern way of seeing the world. Nothing is objective and independent of its context. The reality of a system and its behavior depends on the nature of its relationships and the eye of the beholder. It assumes that no single actor will have a comprehensive view of a process such as capacity development. The choice of every analytical exercise to look at some things and not others changes the nature of the system. The outcomes of measurement, for example, turns on who is measuring what and in what way and why. Knowledge can only be constructed by taking different perspectives using a range of different tools and frameworks. Many 'answers' make work in different ways and for different reasons. Ideologies and dogmas are out. Using different frames and analytical disciplines is in. Harnessing diversity is part of the learning process to gain a sense of the whole. Principles claiming universality need to be customized. The flip side of this inclusivity, however, are continuous battles over objectives, interests,

boundaries and ideologies. Systems thinking uses a good deal of 'both-and' reasoning as opposed to the 'either-or' variety.

2.6. Despite its aura of fashion and novelty, systems thinking has a long history going back thousands of years. Indeed, some writers see it as the most common form of human thinking over the millennia until the advent of western rationalism in the early part of the eighteenth century. Many thought patterns in indigenous people are based on systems principles. Its modern form began to take shape in the 1920s influenced by the study of biology. To this day, the attraction of systems thinking is based on the demonstrable existence of systems effects in the natural world. Margaret Wheatley has written extensively about dramatic changes in our collective knowledge of science and physics, most of which have undermined the mechanical Newtonian view of the world that dates from the eighteenth century. Advances in thinking about subjects such as biology, quantum mechanics, the environment, sustainable development and climate change have also changed public thinking about the way human life works and unfolds.

2.7. Systems thinking as discussed in this paper takes a variety of forms including the four schools of systems thought that are prominent in the literature. Annex 2 gives a rough summary of these four approaches. Paul Engel will speak more about one in particular - soft systems methodology - at the workshop. These four variations are the following:

- Complex adaptive systems[7]

- Soft systems methodology[8]

- Systems dynamics[9]

- Chaos and complexity theory[10]

2.8. The idea of 'hard systems' thinking needs to be briefly discussed here. This particular approach which derives from earlier engineering systems models looks narrowly at the transformation of inputs into outputs in support of specific goals and objectives.[11] The most famous application of the 'hard' systems approach is that of the logical framework analysis approach introduced to development cooperation in the early 1970s and still used by most international development agencies.

2.9. Much of the interest in systems thinking is based on a reaction against the analytical approach known as reductionism, a style of thinking that still dominates much of the discussion about capacity development.[12] We can briefly summarize this approach as follows:

- Human activities can be broken up into their component 'parts' or elements (e.g. roles, structures, resources) and then analyzed from the perspective of the behavior of and the forces acting upon each one.[13] The resulting conclusions or findings at the part level will then tell us something significant about the whole system. Explanation of the whole comes from the cumulative properties of the parts. This leads, in turn, to the search for the building blocks or elements of capacity. In human terms, the cell would be the ultimate component of life. Once these

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[7] Ralph Stacey, *Complexity and Creativity in Organizations*, 1996
[8] Peter Checkland and John Scholes, *Soft Systems Methodology in Action,* 1990
[9] Peter Senge, *The Fifth Discipline: The Art and Practice of the Learning Organization,* 1990
[10] See for example, L. Douglas Kiel, *Managing Chaos and Complexity in Government: A New Paradigm for Managing Change, Innovation and Organizational Renewal,* 1994
[11] For a useful comparison of 'hard' versus 'soft' systems thinking, see Paul Engel, *The Social Organization of Innovation,* 1997, p. 26
[12] We have not addressed other forms of thinking here such as spiritualism.
[13] Most organizational assessment frameworks are structured on this basis including the one used by ECDPM in its capacity research.

adjustments at the part level are in place and working, the essential features of the whole system can be recreated. The focus here is on things or parts rather than the interrelationships amongst these elements. This mental model leads, in turn, to specialized ways or discipline-based ways of thinking about human behavior.

- Much of this model has deep roots in Newtonian images of a giant clock or some sort of machine that can be 'fixed' or engineered for better performance through the installation of improved components such as more skilled staff.[14] One variable can be used to control another or to shape the behavior of the whole.

- Activities should be simple, sequential, linear and stepwise generating maximum outputs from minimum inputs. Human events move through stages as in planning versus implementation. They should also be non-redundant. Also crucial to the machine model is the value of planning, control, order, efficiency, standardization and prediction. Ambiguity, paradox and lack of clarity are seen as constraints to be overcome rather than inherent conditions. Efficiency and effectiveness are desirable and mutually supportive. Process, including that related to capacity development, is a means to an end. Categorization and 'either-or' dichotomization are useful.

- Reductionist thinking tends towards a closed systems view of the world, i.e. phenomena can be explained as isolated events. The system and the context are separate, deterministic and predictable. In addition, the relationship between cause and effect is linear in the sense that A affects B which affects C. This approach can be operationalised through the use of results chains much like audit chains that can then be tracked to assess results and performance. It tends to see problems in terms of simple causal relationships rather than a broader systemic awareness.

2.10. So what's the problem with this approach to thinking from a systems perspective? .

- It ignores or, worse, destroys the most critical aspects of human systems, e.g. the interconnections amongst and between the parts. Reductionism is no longer appropriate for dynamic systems which comprise most human activities. It encourages fragmentation and isolation and a undue concern with individual events. We are becoming 'micro-smart' and 'macro-dumb'. We are losing the capability to make sense of how and why things work. Yet most current analytical tools and techniques in development cooperation are still dominated by quantitative and qualitative data collection and analytical methods based on a reductionist way of thinking.

- Reductionism cannot keep up the complexity of life. It tries to deal with problems one at a time and leads to them backing up and getting worse. Its simple approach to cause and effect is no longer relevant. It is not helpful in dealing with multiple or delayed causality. It is leading to simplistic ways of seeing the world.[15] Too much of its thinking focuses on 'either-or' choices in and world that is more and more 'both-and'. It also leads people to focus on low-leverage points of intervention and to focus on dealing with symptoms. Interventions aimed at fixing things can end up making things better in the short term and worse in the long run.

- Reductionism is fundamentally about exerting control over people and processes. But in applying these techniques to human systems, it can undermine the very objectives that participants are seeking. It tends to act against innovation and adaptation, the very qualities that are crucial for long-term effectiveness. Conventional approaches are seen to focus too much on analyzing static 'snapshots' made up of disconnected pieces, almost like putting crossword puzzles together.

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[14] This mechanical image of organizations comes with its own vocabulary including tools, frameworks, mechanisms, pillars, machinery of government, installation, tool kits, changing direction, roll outs, upgrades, building blocks, aid architecture, problem fixes, policy levers, foundations, components, instruments, results chains and many others.
[15] The 'blame mentality' is one example.

- The reliance on reductionism is creating the fiction that prediction and control are workable approaches to dealing with complex systems. An endless parade of tools and frameworks or recipes is used to try and ensure success. When these fail, a variety of reductionist explanations are used to explain events including personal failure, resistance to change and so on. The cycle repeats itself. People and organizations get trapped in fixes that fail.

"Our learnt instinct with such issues based on reductionist thinking is to trouble shoot and fix things - in essence to break down the ambiguity, resolve any paradox, achieve more certainty and agreement and move into the simple system zone. But complexity science suggests that it is often better to try multiple approaches and let direction arise by gradually shifting time and attention towards those things that seem to be working best."[16]

Is reductionist thinking still as prevalent as described in this section? If it is so dysfunctional, why do we still use it so pervasively? What is keeping it going?

If systems thinking is such a great idea, why has it had so little influence in development thinking? What's the problem with adopting it?

Can we think of examples where systems thinking has been rigorously applied in the study of human systems in development cooperation?

Is the use of these two styles of thinking also a 'both-and' situation? Can they supplement each other and if so, under what conditions?

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3 An Overview of Some Key Systems Issues and Concepts

3.1.   We discuss below some key issues and concepts that arise in systems thinking. We would point out that not all are used or even accepted in all branches of systems thinking. This paper has not gone into detail about which approaches support which concepts. Appendix 2 sets out the outlines of the four main approaches..

The nature and type of human systems

3.2.   We start with a general explanation about the nature of systems. A system is an entity that maintains its existence and functions as a whole through the interaction of its parts or elements. It is a group of things that are connected in some sort of way. The behavior of the parts depends more on how the parts are connected rather than on the nature of the parts. The resulting assembly does something and its activities are of interest to other groups. These interrelated elements are affected by being in the system and are changed by leaving it. The key point is that the character and properties of any system come from the myriad of interrelationships between and amongst the elements. Little about the whole system can be inferred from studying the workings of individual elements. The focus is on the behavior of the inseparable whole

3.3.   Systems come in many forms. Natural systems - rain forests, climate, biodiversity - exist all around the planet. Technical systems - communication networks, credit card companies, tsunami

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[16] quote from Jake Chapman, p. 63

warning arrangements - are pervasive. So are human systems - families, groups, organizations, networks, partnerships, consortia. All these human systems are webby, non linear, entangled, wandering messes that do not lend themselves easily to traditional analysis and action. All societies contain an almost infinite number of systems, most of which are themselves interconnected or nested in the sense of a group being part of another system that is part of a national system that is, in turn, part of a regional or global enterprise. Some may be formal and institutionalized. Others such as cultural or belief systems are more informal.

3.4.   The literature contains many different frameworks for describing and mapping systems.[17]. We have mercifully not tried to summarize them all in this paper. We know from our own experience of the many different types of human systems that exist. These can be characterized in many different ways but here are some that may be illustrative.

- Systems that are small (e.g. a single person or an single unit within a larger organization such as ECDPM) versus those that are gigantic (e.g. the Chinese transport system).

- Those that are formally connected by contracts, regulation or statute (e.g. a health system) versus those that are largely informal and voluntary (e.g. communities of practice in a particular field).

- Those that young and only partially formed (e.g. a group of collaborating NGOs in most countries) versus those that are more mature and fully formed (e.g. banking and judicial systems in high-income countries).

- Those which have a high level of agreement on basic goals and ideas (e.g. a national defense system) versus ones where there is hardly any agreement on ends or means (e.g. an artistic community).

- Those that are highly centralized around a single node or organization (e.g. suppliers to a major corporation) versus those that widely distributed with few direct ties (e.g. the local government system in the ENACT case in Jamaica or the Internet).

- Systems that are unstable in their behavior versus those that are mainly stable. In the cases, the Tanzanian political system has evolved into a state of some stability. The one in Papua New Guinea remains, on the other hand, largely unstable.

- Those that are mainly 'soft' in nature (e.g. an international community of practice in learning) versus one that is much 'harder' (e.g. a factory).

What is likely to be the relationship between different types of systems and different approaches to capacity development? What difference, for example, does size and complexity make? Or loosely-coupled versus tightly-coupled? **Would different styles of systems thinking work better with different kinds of systems? If so, which ones?**

The behavior of human systems

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[17] There is a whole sub-industry in the systems literature that attempts to find ways to identify and classify a system. One classic definition sets out 31 properties of a system. Robert Axelrod and Michael Cohen put forward a dozen.

3.5.   We are focusing in this paper on human systems mainly in the form of organizational, institutional political, economic, social groups of actors. They obviously differ in their inherent nature from technical or engineering systems but share a number of behavioral characteristics in common with natural systems

- Human systems are living organisms. They are more than just delivery systems or pieces of performance machinery. They come to life. They have an identity, a memory, patterns of behavior, disabilities, a life span and, in most cases, death.[18] Their behavior can be understood partly as an outcome of the workings of feedback loops where variables are interrelated.[19] Human systems show pathways, patterns of behavior and communication flows. They are constantly engaged in some form of capacity change regardless of their involvement with external actors. Systems that do not change begin to decline and die. Almost all human systems are open to their context to a greater or lesser degree given the many interconnections in modern life. These complex contexts provide both support and threat. Human systems usually try to adopt a range of strategies to deal with contextual factors including buffering, resource extraction, adaptation and reconfiguration, aggression and so forth.

- Complex systems can behave in non-linear ways and produce escalating levels of unintended consequences through spontaneous self-organization. Cause and effect becomes separated in time and space. According to chaos theory, systems can converge to a point of stability or equilibrium, can oscillate in a stable way or can tip over into chaos and then return back to equilibrium. Systems seek order but they do so by evolving though messes. They seek more complexity. They discover what is possible. They experiment constantly. They tend to begin in randomness and end in stability. One tactic used by system participants is to push the organization into disequilibrium and then help it to stabilize in another pattern.

- System attributes or properties emerge over time as individual system components are combined into increasingly complex systems. Most of the time, they evolve into the classic system form - the network. The system or network produces components and is then itself changed by the new interrelationships induced by the introduction of those new components. The system works to connect, expand, reconfigure and transform. It shifts to ever greater diversity. In this sense, human systems have the potential ability to self-organize or to keep creating themselves. Most systems tend to become more complex themselves as they try to deal with complex contexts and performance improvements. They add components, functions, interrelationships and resources. When they do change, they can do so quite suddenly.

- Many systems have or, at least, need 'loose-tight' properties, i.e. the combination of autonomy and flexibility with allegiance to a common endeavor. In the same way, many actors within a system frequently both compete and collaborate. These can be combined in a positive sum way to increase overall benefits.

- Many systems exhibit what is called entropy. For a variety of reasons, a system starved of nourishment - common values and identity, money, information, legitimacy, commitment loses energy and the drive to survive. It begins to decline. Beyond a certain tipping point, it collapses altogether as we have seen in various political systems or private corporations. Human systems struggle to survive as described above but can lose quickly resilience.

- A branch of systems thinking - systems dynamics - has laid out a series of 'archetypes', that is, patterns of systems behavior that can be seen in many situations - vicious and virtuous circles, the

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[18] Most estimates of the life span of commercial companies range from 12 to 40 years. Most die of learning disabilities.
[19] The working of feedback loops is a key part of systems thinking. This includes negative and positive feedback.

tragedy of the commons, limits to growth, shifting the burden.[20] We can see these patterns at work in a variety of real world situations including a run on the banks, the collapse of ENRON, climate change, stock market fluctuations, traffic jams, the sudden popularity of a movie or song and many others.

Some form of capacity 'change' is underway in all human systems all the time. How can we tell what that process is? And how should we as external interveners react to that on-going process?

Many people are interested in the question.. 'So what' when it comes to capacity assessment. But we also need to be concerned about the issue of ...'Now what'. How will this system continue to evolve and in what direction?

Are there systemic patterns that correlate with low-income or unstable organizations?

The effects of accelerating complexity

3.6.   One of the advertised benefits of systems thinking is its greater ability to help people deal with two interrelated phenomenon: complexity and uncertainty.[21] All countries, regardless of their level of income, now have many groups, organizations and institutions which in some way influence national development. Democratic practice and changes in roles and attitudes have expanded the range and the diversity of the human and organizational actors. Improved development performance generally implies greater systems complexity. Over the last fifty years, most countries have developed huge systems in areas such as health care, the judiciary and education that appear to some to be becoming unmanageable in their size and complexity. Globalization has also increased dramatically the range of actors and events that affect national life. The rise of information and communication technology has led to an increase in human and organizational interaction. New bodies of knowledge have appeared in areas such as gender, conflict and systems thinking itself. We are living in a much more dense, interconnected world. The speed of interactions in all societies has increased.

"What makes prediction especially difficult is that the forces shaping the future do not add up in a simple system-wide manner. Instead, their effects include non-linear interactions among the components of the systems. The conjunction of a few small events can produce a big effect if their effects multiply rather than add ....It is worth noting that the difficulty of predicting the detailed behavior of these systems does not come from their having large numbers of components ..For us, complexity does not connote large numbers of parts. Instead complexity indicates that the system consists of parts which interact in ways that heavily influence the probabilities of later events"[22]

3.7.   Proponents of systems thinking see complexity in a variety of ways. Most distinguish between 'difficulties' that come from *detailed* complexity and 'messes' that come from *dynamic* complexity.[23] 'Difficulties' refer to issues in 'hard' systems that can be addressed by linear, sequential steps such as de-bugging a computer, a process which can be complicated but not intractable or even uncertain assuming the required level of knowledge. But 'messes' refer to situations in which there is a range of

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[20] See Peter Senge, *The Fifth Discipline: The Art and Practice of The Learning Organization,* 1990
[21] "If there is a unique quality to the modern era, it is that the conditions of existence have changed to such a degree that something explicitly recognized as 'complexity' now continually forces itself into our awareness" Langdon Winner quoted in Thomas Homer-Dixon p. 118
[22] Quote from Jake Chapman, *Systems Failure.*
[23] See Jake Chapman, *System Failure*, p. 36

contested issues, no agreement on basic goals or strategies, no clear idea of cause and effect, a shifting cast of players and the likelihood of unintended consequences, in short, situations with high levels of uncertainty. Most efforts at public sector reform, for example, would fall into this category of a 'mess'. It should also be kept in mind that technical systems and human systems differ in many ways but one in particular. Human systems tend to follow written and unwritten rules of conduct - institutions - that the participants might wish to change. Human systems have the potential for change and adaptation. The nature of complexity is different.

3.8.   Conventional reductionist thinking sees complexity as a liability that must be addressed with some remedial measures. Systems thinking, and particularly complexity theory, sees it as a challenge and potentially an advantage that can act to destabilize organizations and institutions in productive ways.[24] Systems thinking and acting deals with complexity in four main ways:

- by focusing attention on a higher level of aggregation than the individual components or parts of the system

- by searching for patterns or order within complex situations that would allow people to understand the systems dynamics better. This understanding would hopefully lead, in turn, to better choices regarding the type and nature of any interventions undertaken to improve system capacity and performance.

- by encouraging higher levels of self-organization within the system.

- by changing the structure of the system in order to increase its performance

The phenomenon of emergence

3.9.   One of the key ideas in systems thinking is that of emergence.[25] Emergent properties of a system do not arise from the nature of the parts that make up the whole. Such properties are the outcome of overall systems behavior or synergy. Emergent properties come from the dynamism of the interrelationships within the system. Such properties exist in all systems. The challenge is not so much to build or enhance them as it is to unleash them or find ways to encourage their emergence.

3.10.   Three points are key here.

- This deeper process of emergence is not one that can be easily controlled or structured particularly by external actors. Emergence is not predictable because it derives from a intricate pattern of interactions that is basically beyond human comprehension.[26] It obviously does not respond to detailed plans, targeting or timetables. It involves deeper processes of change and adaptation that lie at the heart of the system. It is these emergent processes that spin human systems into place. Efforts to impose system change from the outside are as likely to damage emergence as they are to improve it.

- Emergent properties can appear slowly or, on occasion, can reach a critical mass and a tipping point that pushes the system in a new direction or up to a new level of capacity and performance.

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[24] "I am convinced that the societies that master the new sciences of complexity and can convert that knowledge into new products and forms of social organization will become the cultural, economic and military superpowers of the 21st century". quoted in Kiel, p. 221

[25] The study or emergence has become a mini-industry. See the journal called *Emergence: A Journal of Complexity Issues in Organizations and Management.*

[26] This leads to the famous analogy of a butterfly flapping its wings in the Amazon rain forest and causing a tornado in North America.

In effect, the system leaps to new possibilities. Such dramatic shifts can be anticipated or, more likely, unanticipated. Small imperceptible changes can combine and lead to major changes.

- Efforts at analysis, i.e. focusing on the parts, lose the ability to highlight their emergent properties. *Knowledge* can come from analysis of the parts. But *understanding* comes from synthesis and a systems approach. There is a danger with emergence that people will begin to treat emergent properties as discrete elements or parts. That trends leads back to fragmentation and the loss of attention to the whole. But a full understanding of the whole escapes us. It will always be partial and subjective. It escapes at this point into mystery. Systems thinking is thus always struggling to balance mystery and mastery, between failing to understand anything of significance and claiming to understand everything.

What is likely to prevent or constrain emergence?

Can we think of examples of emergence in development cooperation?

Do our current tools and frameworks tell us much about emergence or how to encourage it? Can we tell if a system has a basic structure and identity that supports the emergence of capacity?

If emergence is such an ethereal concept, is it open to empirical validation? Can we monitor something such as emergence?

The need to learn and experiment

3.11.   Virtually all the systems thinking literature points to the importance of learning as a way to improve systems capacity and performance. Human systems survive by experimenting and evolving. They seek order but mainly by creating 'messes' through which they evolve. They try to find out what works and what does not. They seek out possibilities and opportunities in order to survive. They are less interested in the idea of efficiency at least at the outset. Communication becomes a key systems function as individual actors engage in mutual adjustment. Connected to the issue of learning is the idea and practice of feedback, another concept central to systems thinking.

- Systems gain energy from information and new understanding. Learning is critical to prevent entropy and the gradual decline of systems functioning. The relationship here is interactive. A systems perspective is needed to ensure effective learning. And effective learning is needed to help ensure systems survival. Each action that participants take must be partly instrumental and partly an effort at learning.

- The learning process is likely to be messy. It will likely contain a good deal of redundancy, fuzziness, overlap, experimentation and trail and error. Efforts to overmanage it start to diminish its effectiveness as a systems process.

- The actors in the system may have quite different learning styles and may wish to learn about quite different things. Different types of learning must take place at different levels in the system to be effective. Peter Senge talks about 'personal mastery' at the individual level. Organizational learning as a capability is a constant topic. And different people and groups may come to quite different conclusions on the basis of similar experiences. Understandings have to be constantly negotiated.

- In complex systems, there may a great distance between causes and effects. Feedback is a circle and it may take a good deal of time for the experience to travel around the system. Judgments may be made too early about success or failure. There is a time dimension to the learning issue.

- Learning should be aimed at constant experimentation and finding out what works. The idea is to optimize not maximize the fit of the elements in order to maximize the whole. Normal system behavior will produce a range of unforeseen consequences. Learning in the form of conventional monitoring systems that focus on the achievement of, or deviance from, pre-set targets will miss the mark.

> **Do we understand how learning works from a systems perspective? How would that differ from what we currently do?**

The importance of interrelationships

3.12.   Systems thinking is about interdependence and interrelationships. Systems are, in practice, patterns of relationships. They are webs of connections, some formal but the rest mostly tacit and informal. The elements or the components derive their existence from their relationships with others. A number of writers such as Albert Hirschman and Norman Uphoff have remarked on the critical role of what they call social energy within living systems.[27] Networks of social relations form, center around certain values or ideas and then unleash capacity in their participants. From this perspective, capacity is as much about energy as it is about skills and resources. Nor are the relationships just between people. Much of the systems thinking approach deals with the interrelationships between the macro and the micro, between ideas and resources or between theory (principles) and practice.

3.13.   This issue of relationships in systems thinking has a variety of aspects:

- It gives added importance to the idea of process. People in systems live in a relational world in which their interconnections with other people have to be constantly managed. Trust, amongst other qualities, matters a good deal in systems. This leads systems thinking to pay less attention to the conventional categories of tasks, functions and hierarchies. It looks more at the patterns of relationships and the structures that might facilitate them.

- The idea of legitimacy becomes a part of systems thinking. An organizational actor must develop or enhance its capacity by creating something of value to others in a systems world. Others must bestow legitimacy and meaning. Without being attached to some sort of value structure that is validated by others, capacity cannot succeed. In the ECDPM research, we are looking separately at the legitimacy issue.

> **When working on capacity development programs, do we give enough attention to understanding relationships?**
>
> **Do we understand our own relationships as external intervenors and their effect on system behavior?**

The importance of identity and meaning

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[27] Albert Hirshman, Getting Ahead Collectively, 1984 and Norman Uphoff, *Learning From Gal Oya: Possibilities for Participatory Development and Post-Newtonian Social Science,* 1992

3.14.   Systems behavior is largely driven by shared interests and identity, information, processes and relationships. Systems, and especially loosely-coupled ones such as networks, are held together by some sort of shared identity and meaning in the form of values, core beliefs, competencies, principles, purpose and mission. Effective systems have some sort of coherence and shared understanding (although not necessarily integrity) at their core. This combination of identity and meaning also helps to create the internal energy that, in turn, leads to the deeper capacity which is the foundation of systems performance.[28]

- Systems identity and meaning are the key to self-organization or 'autopoiesis'. In many ways, they are the ultimate control structures in systems. Order comes out of a pattern of accepted values rather than hierarchical imposition. They can give shape and direction to human behavior. They provide focus and shared interests. Identity and a clear purpose give more security than plans or outcome statements.

- Systems leadership has a great deal to do with shaping values, purposes and mission. People in a system respond to legitimate purpose more than to technical plans. Ideas matter as does their communication through the system.

- Competencies and capabilities depend on identity and meaning. And they become part of that same identity. Capacity development has to be concerned about more than technical interventions. The benefits of training, for example, can never overcome deeply incoherent patterns of identity in the system.

Can values and their systems implications be designed and managed?

Can outside interveners have any role?

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4 Operational Implications of Systems Thinking for Capacity Development

4.1.   What are the implications of systems thinking and acting for capacity development? Clearly, many issues associated with systems thinking - order, control, growth, synergy, identity, structure, information, planning, prediction, adaptation and stability - are part of the capacity process. We address some of these interconnected issues in this section.

Systems identification, mapping and assessment

4.2.   One of the key systems issues, both from the point of view of analysis and management, is that of systems boundaries, something that defines the action area of the system. Who or what is in and who or what is outside the edges of the system? Who benefits from being inside and who loses from being outside? Who decides about exclusion and inclusion? What are the possible consequences of this pattern?

- Human systems, in many ways, are mental constructs that involve political and ethical choices. Systems are not objective structure 'out there' simply waiting to be mapped. Systems boundaries

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[28] An analysis of the role of identity and coherence at the core can be found in Alan Kaplan, *The Developing of Capacity* on the CDRA Website 1999.

depend greatly on the perceptions and interests of those doing the mapping. The way the issue of boundaries is addressed has organizational, analytical and political implications. Boundary setting thus raises issues of ethics as well as effectiveness.

- The conventional idea of capacity development occurring on different 'levels' needs rethinking. In practice, most systems draw information, resources and energy from a whole range of places and span many boundaries and levels. The question is less about the identification of the hierarchical level and more about the nature, distribution and interconnection of the system actors.[29]

- The idea of focusing on the individual formal organization loses relevance. In practice, organizations derive their performance largely from the ecosystem of which they are a part.[30] They are a system within other systems. Part of their capabilities lies outside the formal structure of the single organization. Focusing solely on the internal capabilities of a single organization misses the systems point. And within the formal organization or system, there will no doubt exist one or more 'shadow' systems that operate in pursuit of other objectives. In practice, the whole idea of formal structures looks different.

- We know that individuals and organizations can belong to different types of systems simultaneously, some of which may be in conflict. Systems constantly collide. In many low-income countries, for example, people can be caught between the demands of being in a formal, professional public sector system and being part of an informal network aimed at competing for resources with public organizations.[31] Networks - themselves little systems - exist along side and inside formal organizations. The interrelationship amongst the two is critical.

- Systems are obviously nested within or at least intertwined with other systems, large and small. Political systems affect organizational systems and visa versa. Different perspectives - economic, social, political, symbolic - may be needed to shed light on the nature of these other systems.

Do we have effective ways of mapping systems that can show capacity and capability?

Is mapping a huge system a feasible exercise?

Improving systems self-awareness

4.3.   One of the main contributions of systems thinking should be to help people gain a systems appreciation, both of the systems of which they are a part and of the interrelationships that shape their own role and work. Systems thinking tries, in practice, to get people to see the big picture. In doing so, it works to combat systems blindness which works as follows:

- First, people see the part to which we are connected but are largely unaware of the bigger system(s) that surrounds it. They miss their impact on others and others on them. They miss causes and effects that are separated in time and space. The clearer they see their own part, the fuzzier the wider system becomes. They tend to see themselves as free-standing and autonomous. To the extent they see connections, it is in the form of constraints.

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[29] As usual, there is a debate abut the value of the concept of levels in systems thinking. See Stephen G. Haines, *The Manager's Pocket Guide to Systems Thinking and Learning,* HRD Press, 1998, p. 13

[30] For an analysis of this perspective, see Marco Iansiti and Roy Levien " Strategy as Ecology" in *Harvard Business Review,* March 2004 .

[31] For a startling analysis of this aspect, see The DFID Drivers of Change study on Cambodia available on the DFID website.

- Second, people tend to lack a time dimension. They see the present but not the past. They are intent on figuring out where a particular system should be in the future. They have some interest in knowing where it is now. But they have little inclination to understand where it has been. They do not know the history of the present.

- Third, participants miss - and in many cases mischaracterize - many of the key relationships that shape events. Operational staff end up distrusting senior managers. Politicians become wary of bureaucrats. Field offices remain suspicious of headquarters. They do not fully understand the crucial role of relationships in systems performance.

- Fourth, people suffer from process blindness. They do not grasp the process dynamics, especially the deeper ones, that are ongoing even within smaller systems. They suggest improvements which do not fit or even acknowledge the way the system actually works. They see individuals or events but not the processes of which they are a part. The more systems become complex, the fewer people understand them. They tend to opt for differentiation and move away from collaboration. They take less responsibility for the system as a whole. The system loses energy and begins to encounter entropy.

4.4.   The point here is the importance of systems self-awareness. All systems have a story. Part of the challenge is help people see it.[32] If they can grasp the whole system in action, their perspective changes as well as their actions. Part of any effort at capacity development is to help the system to reconnect with itself again and discover shared interests.[33] The goal is to better understand the workings of the system so that actors can interact more harmoniously. Participants need to sense its movement and shape in order to better guide it in a more productive direction. The strengths of systems have to be better appreciated so as to encourage them to flourish.

4.5.   One slightly depressing stream of thought in systems thinking puts forward the view that many systems are now so huge and so complex, e.g. the US health care system, the global economy, the European Union - that mere mortals can no longer understand them.[34] The tendency to misunderstand what is going on is accelerating even with the application of systems thinking.

The more people try to think systemically and globally, the more they bump up against the mysteries of complexity. What can be done about that?

What can be done to make a system see itself? To be more self-aware? Or to use a phrase, can we recognize the dance while we are dancing?

What if a system were committed to doing this? What would it do to the nature of the relationships?

What can funding agencies do to realize their part in the system?

If people can no longer grasp the dynamics of the systems they are part of, what are the implications?

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[32] "Each of us has the power to turn the lights on for the other" Barry Oshrey, *Seeing Systms*, p. 123

[33] The ESDU case in the ECDPM research is an example of a system trying to reconnect with itself.

[34] For an account of how the participants in a big system, i.e. the interconnections between the global and the Argentine financial systems, were simply unable to understand its functioning, see Paul Bluestein, *And The Money Kept Rolling In (And Out)*, 2004.

The importance of context

4.6.   If we assume that firstly, almost all human systems are open to conditions in their context and secondly, that all human systems are customized responses to those conditions, then it becomes clear that understanding contextual issues matters both for country participants and for external actors. And there can be a range of contexts both outside and within individual organizations. This, in turn, has a range of operational implications:

- Any contextual analysis needs to be situation specific by its very nature. Yet many capacity analyses remain relentlessly a-historical, apolitical and a-cultural. They focus on bringing generic solutions such as decentralization or the new public management and overcoming contextual constraints in an effort to apply them. The current enthusiasm for 'best practice' intensifies this trend. Part of the DFID Drivers of Change Program with its emphasis on context, change and political economy is a deliberate effort to overcome this pattern in the aid system.

- There are obviously ranges of contextual influences. Some systems can be 'tightly coupled' to their surrounding contexts, e.g. most public sector organizations. Their sensitivity to nonlinear trends in the context will be greater. Other systems are more buffered from contextual forces. The idea of a protected operating space matters here. One of the issues coming out of the ECDPM research has been the balance between openness and vulnerability and the resulting effects on capacity development. Many examples exist of countries buffering key systems e.g. ministries of finance, central banks, in order to protect them from politicization.

- All contexts change. If capacity must shift in response to these changes, participants are looking at the need to deal with adaptation and change. The more complex the system, the more demanding the change process becomes. Capacity development is thus not just installation. It is about adaptation, innovation, ingenuity and change over time.

4.7.   We are exploring in this paper the question of the relevance and applicability of systems thinking to capacity issues. Part of the analysis of that issue will turn on contextual conditions in low-income countries. Generalization can be misleading but here are some factors about the nature of systems in low-income states that may affect the discussion.

- Most systems will be only partly developed. They can be missing some organizational actors or the rules and regulations to govern systems behavior.

- Many participants at the country level are natural networkers and systems dwellers. Most countries have a profusion of different kinds of systems. But many tend to be organized on an informal basis sometimes contending for resources and power with more formal ones.

- Many systems are under going rapid change and are highly unstable. But many also face great opportunities and room for action.

- Most systems are characterized by weak demand and low public expectations.

Do we have the inclination and the means to address contextual issues in a serious way?

Are we clear about the interconnections amongst contextual factors - culture, institutions, political trends - and the behavior of organizational actors?

Do we have the capability to do serious analyses of the context?

The nature of capacity from a systems perspective

4.8.   We may be able to understand more about the concept of capacity by trying to see it not just from a systems point of view but as a system itself. From this perspective, capacity is an aggregated, nested attribute that goes beyond the elements of the system and also goes beyond the logistical and the technical. We are unlikely to get a real understanding of the nature of capacity by reductionism, quantification, analysis and fragmentation. We need ways of thinking and talking about capacity that can show us patterns, flows and processes.

What else is a systems thinking perspective likely to tell us about the nature of capacity?

- Capacity is an emergent property that comes about through the interrelationships and interactions amongst the various elements of the system of which it is a part. In practice, individual competencies and collective capabilities are themselves nested sub-systems. Individuals have their own capabilities which have their own systems qualities. Collective capabilities form within a system and depend to a large degree on the willingness of individuals, groups and organizations to collaborate in pursuit of shared goals. And both these individual and collective abilities combine in some way into a larger overall systems capacity. Capacity thus has to do with group dynamics, collaboration and joint performance. It also has to do with participants optimizing their capabilities as opposed to maximizing them. Capacity as a system interrelates with other systems inside the larger organism - systems of processes, of structure, of meaning, of power, of information and knowledge.

- Capacity comes in variety of forms including permanent and transitory, internal versus external and specific versus cross-cutting. But the most profound may be the 'deeper' capacity that forms at the core of the system and has to do with the its ability to exist and sustain itself - the ability to be aware and conscious, to bring about its own transformation, to engage the energy and commitment of its own staff, to reflect and learn, to maintain its own integrity, to treat itself as a human community and so forth. This deeper capacity is the foundation upon which is based the more transitory capabilities which come and go depending on need and opportunity. Key issues here are the way people learn to treat each other, how they work with information and how they develop a collective identity. These aspects of the deeper capacity cannot be shaped by technical interventions such as training or restructuring or by incentives, rewards and punishments. Change frequently involves altering the structures and strategies of the system but it must do so based on the strength of the deeper core capacities in the system. Capacity is thus as much a state of being or existence as an ability or a skill. It is a social energy structure within the system. But we still tend to see it very much as a technical ability that can be improved through training and skills development. From a systems perspective, capacity may have as much to do with 'how to be' as it does with the more western instrumentalist idea of 'how to do'.

In article in The Systems Thinker (Feb. 1998), Daniel Kim talk about the three core capabilities needed to master organizational learning - aspiration, generative conversation and understanding complexity. The idea is that all three capabilities must be in place and in interaction to achieve effective learning. Staff must get to a certain level of competence in order to for the critical mass needed to produce systems learning.

If a systems perspective does not add much insight into the nature of capacity, does that mean we can explain capacity by existing ways of analysis? And if that is the case, what, if anything,

does the overall concept of capacity add to any development discussion? Why even bother with it?

Are external interveners only focusing on those aspects of capacity iceberg that are above the waterline? Is that enough?

How can external interveners address the issue of the deeper capacity? Should they try?

When we assess capacity, what is it exactly that we think we are assessing?

Does it help our understanding to see capacity as a systems issue? Do we have the language to talk about capacity as a systems issue?

Understanding change as part of capacity development

4.9.   What insights does systems thinking offer in terms of dealing with organizational change? How does it see systems changing and altering their capacity?

- Systems thinking, especially complexity and chaos theory, points to the value of instability, disorder and variation. These conditions act against inertia. They allow organizations to seek new opportunities and ways of doing things. Systems thinking places less emphasis on the traditional notions of consistency and control that underlie much thinking about public management. The tendency in systems thinking is to give more attention to adaptiveness, to innovation, to change management and to understanding risk and uncertainty. Order, as opposed to control, is achieved by mastering the deeper rhythms and dynamics that move the system such as variation. The job of leaders is to get the organization to perform with a range of 'bounded instability'. Organizational culture, for example, cannot be such that it limits the capacity or inclination of the organization to shift direction. It must contribute to diversity and fluctuation. Also on this list would be the valuing of multiple perspectives, flattened hierarchies, citizen participation, communications, process management, innovation, information technology, employee empowerment.

- Much of the literature points to the importance of changes in perception and meaning within a system. Individual actors within the system detect a contradiction between its functioning and the needs/demands of the context. Within the system, there can emerge a new interpretation or a new self-perception. Actors work, successfully or not, to put in place a new meaning. A coalition of sorts tries to get the issue on the agenda. To do this, they must let go of old frameworks for seeing the world. Interventions in support of capacity development would thus work differently depending on their effects on the system's self-perception.

- Much of the current capacity development literature comes from a top-down, strategic viewpoint. Senior managers and funding agencies formulate a capacity 'plan' that they then try and implement. Systems thinking would say that other, more middle-up-down, spontaneous processes are already at work and need attention. The danger is that the planned, top-down tends to stifle the spontaneous variety.

- The idea that all systems are constantly changing is key. External interveners need to get a sense of how and why and where such changes are taking place. And they need to be conscious of the match between their intervention and the on-going patterns of change. The western perception that systems are huge inert machines that must be shoved or pressured into action by external forces is not one that comes from systems thinking. Some sort of change and capacity development is always going on. All systems either self-organize or die. From a systems

perspective the key to effective change and capacity development is to create the conditions in which self-organization can flourish.[35]

- Systems thinking seems only partly convinced about the value of incentives. There is less faith in the ability of incentive designers to put in place the rewards and punishments needed for behavior modification. Most incentive systems are seen to fail in the medium and long-term. Systems thinking also has less inclination to treat social or collective phenomenon as if they were simply reflections of individual interests. Deeper motivation comes from a collective commitment to the meaning the system is enacting. Incentives based on an intent to alter individual behavior can well lower the level of collaboration.

- Systems thinking pays a good deal of attention to process and systems dynamics. The formal structural changes that dominate most thinking about capacity -roles, responsibilities, structures, incentives, timelines, accountabilities - are seen as effects associated with deeper process changes. Those changes have to do with rejuvenation, adaptation, renewal and sense-making. Structural changes that impede these processes act against the development of capacity. The point here is that efforts at capacity development, in a systems context, can easily make things worse instead of better.

- Systems thinking focuses more on transformational change and the best ways to achieve this. Incremental steps and stable organizations are seen as inadequate to meet current demands. In this sense, systems thinking has a more ambitious approach to change. Systems thinking is about more than muddling through or around constraints to change.

- The concept of 'self-organization' is key to systems thinking especially chaos theory. Systems have the innate ability to break apart into disorder and then reassemble themselves into some new form or structure. The key here is the system having the deeper capacity for renewal and transformation. The trick for external facilitators is to help put in place the conditions that encourage this self-organization. Or at the very least, not to hinder the process of self-organization. Systems thinking puts great importance on adaptation, flexibility and learning by doing.

- A systems view of leadership in support of capacity development takes a less heroic view. Leaders must foster learning and values. They need to treat capacity development as an end in itself. They need to work with the whole system and help it to develop the capacity for self-organization. They need a sense of optimism that can help the system deal with complexity, risk and uncertainty. They need to help the system maintain a coherent identity.

- Systems thinking puts a good deal of stress on dialogue amongst actors within the system especially in terms of understanding the mental models of others. Some types of systems thinking see the achievement of consensus as critical for systems participants to make progress. Others see accommodation as the best that can be hoped for. Still others see conflict and differences as essential to maintain the diversity that is needed for innovation and adaptation.

Much of the current wisdom about capacity development is focused on solving 'problems' or 'gaps' in a structured, managed way. From a systems perspective, when is such an approach useful and when is it not? Are we addressing problems or issues or what?

Is the whole concept of planned change valid?

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[35] This is the theory underlying Adam Smith's 'hidden hand' that allows markets to function or the evolutionary dynamics that Charles Darwin brought to the world's attention.

The use of language and images

4.10.   We need to think about the issue of language.[36] Systems thinking has its own set of terms, some of which e.g. equifinality, befuddle most people. Capacity development, on the other hand, has no real language of its own that participants can use to communicate other than terms borrowed from disciplines such organizational development, adult learning or institutional economics. But if capacity is a systems concept and derives its contribution from its emergent nature, how should we talk about that? In systems terms, is capacity development about doing more things? Or doing the same things better? Or doing things faster? Or doing things for more people? Is it about changing the ability of a system to adapt and change? Or all of the above? Is there a systems language to talk about this?

4.11.   Few will welcome any more additions to development jargon but we need to at least free ourselves from the mechanical or econocratic images that still pervade most discussions on capacity. Some participants have shifted to more organic images in an effort to capture different, more systems ways of thinking. Some talk, for example, about institutional and organizational processes as a river compared to a machine. Jake Chapman has a wonderful analogy comparing a rock and a bird. Whatever the form, some ways need to be found that can capture the unique role and nature of capacity. [37]

Is there a systems language we can use to talk about capacity development?

What is the danger of creating yet another set of terms that act to create rather than eliminate barriers to learning and communication?

Planning, goals and targeting

4.12.   Proponents of systems thinking differ on the value and feasibility of planning, goal-setting and performance targeting. Chaos theory proponents see the imposition of specific targets through planning as a sure way to undermine the very capacity and performance that the participants are supposedly seeking.[38] The argument here is as follows: Systems behavior is unpredictable. In practice, a complex system can be neither controlled nor tightly directed in any hierarchical way. Locking it into preselected patterns prevents the natural evolution and experimentation upon which complex systems depend. Rigid performance management styles are inherently dysfunctional when imposed on living systems. Systems by their nature are not aimed at one solution in a plural and diverse world. In the end, planning and targeting amount to yet another mechanistic effort to frame social and organizational processes in reductionist terms in an effort to meet a pre-determined end point selected by the donor. Order is being confused with control. Detailed planning especially using the mechanical, plodding stages model is a waste of time. It invariably leads us back to what we already know. It collapses the world of possibilities into a narrow band of observation. In short, the world cannot be designed or engineered into existence.

4.13.   The other view is more supportive of goal setting. All systems have some sort of implicit goals even if it is just one of survival. They can be assigned a purpose provided it is arrived at as part of a process of internal accommodation and negotiation. Putting together plans and measures can help

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[36] I am indebted to Charles Lusthaus of Universalia in Montreal Canada for raising this issue.

[37] Systems thinking comes with different images - e,g. that of a development program as a river, or the comparison between throwing a rock and a bird into the air. One writer has said that the strategy of the development industry is to strap a rock to the back of the bird and throw it in the air.

[38] See Margaret Wheatley, *Leadership and the New Science,* 1992,

systems participants discover shared interests. Goals can serve as boundaries or field areas whose achievement can serve as a learning device. Other approaches can substitute for planning and targeting. Systems members can work for the establishment of a general vision and direction, the encouragement of a set of guiding principles and values, the support of learning and experimentation, the setting of rough boundaries, the protection of an operating space and the nurturing of participation. Planning can take different forms including scenario planning which tries to capture the benefits of advance preparation as well as guidelines for action. Scenario planning also can provide a just-in-time range of responses once the inevitable unforeseen outcomes begin to appear. The issue here is putting in place a process that will create an environment for effective system functioning and goal achievement.

4.14.   Systems thinking thus contests current assumptions about how to achieve improved results and performance. It does not support the view that strong leadership, effective and comprehensive management systems and explicit strategy are essential or that results should be pre-selected or that the system should be 'driven' to achieving these results. Almost all forms of systems thinking take a dim view of the input-output-results chain methodologies that are now pervasive in development cooperation. Results-based management is seen as a linear, mechanical, overly deterministic way of thinking and acting which has little to do with how systems actually operate in real life. Systems thinking rigorously contests the view that if we cannot know and predict the outcome in advance and if no one heroic leader is in charge, we are facing anarchy. A systems view would point to the amazing amount of order that does exist amidst the pervasive failure of most plans and predictions.

One implication of systems thinking is that the very idea of detailed, preselected objectives is not useful. Under what circumstances could that be true?

Systems thinking and especially complexity theory is saying that the whole idea of long-term intended action is not feasible. Does that view fit with our own experiences?

Systems thinking is also saying that we can only learn - not plan - our way into the future. Is that on overstatement?

Can approaches such as chaos theory be more relevant in special circumstances such as conflict management or working in fragile states?

The time dimension

4.15.   Some current trends in development cooperation act to break programs up into smaller chunks that can then be tracked in terms of short-term results. To use some of the language in this report, this trend tries to convert 'messes' into 'difficulties' that can then be addressed in conventional ways. But if we accept the systems ideas that capacity has to do with both the adaptation of complex systems and the engagement of deeper capacity within those systems, it is likely that the time dimension of capacity interventions will have to be rethought.

- If, for example, cause and effect can separated in time and place and if learning in big systems can take a good deal of time to be circulated and absorbed, the greater danger in terms of time is premature abandonment. A good number of the ECDPM cases showed this dynamic at work.

- Another implication is the need for much greater attention to gathering data and insight over a much longer period of time in an effort to capture the flow and evolution.

- The idea of 'windows of opportunity' also seems to be important. The system evolves and shifts. Windows of opportunity open briefly and then shut as events move on. The issue here is one of timing as well as time.

How should we think about the time dimension of capacity interventions in complex systems?

How would different time frames fit within the existing operating practices?

A systems approach to learning in support of capacity development

4.16.   If capacity is a system by itself and if it forms within the context of other systems, we know that processes to do with feedback, information sharing, knowledge management are critical for success. These processes are no longer useful by-products of capacity development. They lie at the heart of the exercise. We therefore need to know much more about how systems learn to build capacity and performance. One example of an effort to promote this kind of systems learning is the Pelican Initiative supported by The International Development Research Center, ECDPM, Exchange, Bellnet, and the UNICEF East African Office. This work looks at learning across a variety of situations but is giving special priority to learning in organizations and amongst partners and society-wide learning among a multitude of stakeholders.[39]

What issues are most important in terms of linking system-wide learning and capacity development?

What would a systems capability for systems-wide learning look like? Do we have examples?

Monitoring and evaluation

4.17.   We have seen the critical importance of learning to systems thinking and action. An implication of this idea is that the monitoring and evaluation of capacity may need some reconsideration. Assuming that capacity as a systems concept is based on commitment, learning, teamwork, and quality, what measures have we been able to find that help sustain these behaviors over time? Why is it that the monitoring of capacity seemed so irrelevant in the ECDPM cases? Part of the reasons is that it contributed little to that essential systems element: feedback. In many of the ECDPM cases, M&E was instead used for control, accountability and symbolic protection, mainly in the service of the funding agencies.

4.18.   If we want to put M&E to the services of capacity development using systems thinking, what would we have to do?[40]

- If capacity is an emergent property, it would have to be assessed as such. That would, in turn, mean less attention to individual elements. And capacity would have to be seen as an end in itself.

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[39] A useful case study in multi-stakeholder learning can be found in Rejoice Mabudafhasi, *The Role of Knowledge Management and Information Sharing in Capacity Development for Sustainable Development: An Example from South Africa,* WBI Working Papers, 2002

[40] ECDPM is following the work of an Internet group that is looking at M&E from a systems perspective. A final report should be available in mid-summer.

- Measures of capacity would have to be created by those doing the work. People will only support the measures they create especially when it comes to capacity development, an intensely personal process. M&E systems may have to be more distributed and participatory to match the complexity of the systems they are addressing. Techniques that are largely centralized and extractive are not likely to be effective in a systems context.

- M&E must serve the deeper purposes of work and capacity. If it does not, it becomes an exercise in program housekeeping and accountability. M&E must do more than focus on technical outcomes. It must address itself to human issues including the modification of behavior, commitment, changes in values, beliefs and the reshaping of relationships. It must help participants to learn about the intangible aspects of capacity.

- M&E must contribute to collective learning at the systems level. It must increase the level of self-awareness. It must support the internal processes of experimentation that hopefully encourage systems change.

- M&E from a systems perspective needs to be less target-oriented and less quantitative. It must search for evidence of the pervasive unintended consequences that are typical of system outcomes. The process must have some awareness of missing information as opposed to the extracted 'found' variety. Part of this may come from stories and other soft information that circulates throughout living systems.[41] M&E systems will have to collect a broader range of data and experience.

- The significance of conclusions and meanings coming out of the M&E process may have to be negotiated on a regular basis to help maintain the level of shared understanding needed to keep the system coherent. Evaluations should revise their design in an effort to capture the evolution and the dynamics of the system they are studying. And they must look at both micro- and macro-patterns and structures. Evaluation strategies will have to include more organic and flexible approaches.

What are the chances of designing M&E systems with a view to both measuring and developing capacity from a systems perspective?[42]

What would have to happen to enable that to happen?

When it comes to adopting new approaches to understanding adaptation and change, evaluation is a follower not a leader. What chances are there of introducing systems thinking through the evaluation route?

Points of intervention and leverage

4.19.   One of the more difficult aspects of systems thinking and acting is to determine the point of intervention and leverage. If everything is connected to everything else, where to start? What are the limits to the thinking process? One of the contributions of systems thinking should be to help us sort the leverage points and trade-offs in a complex system. What kind of capacity development interventions are likely to meet real resistance and which have the potential to stimulate large

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[41] See Stephen Denning, *The Springboard: How Storytelling Ignites Action in Knowledge-Era Organizations,*
[42] For a discussion of this issue, see Jonathan Boston, *The Challenge of Evaluating Systemic Change: The Case of Public Management Reform,* March 2000.

productive effects? How can we think about the structure and pattern of behavior of the system and that, in turn, leads to enduring significant improvements in capacity and performance.

4.20.   The various approaches to systems thinking have different approaches to this issue. System dynamics emphasizes the application of its various 'archetypes' to give participants a sense of where to intervene. Chaos and complexity thinking talks about focusing on the deep order - the attractors- that exist in all systems. Others suggest simply starting something and seeing who notices, starting somewhere and following it everywhere.[43] But some common approaches are evident:

- The point(s) of intervention in support of capacity development cannot be set by reference solely to an external theory of change disconnected from the context, e.g. skill development at the individual level is always the most effective way to enhance capacity.

- The general art of systems thinking and, more particularly, finding the right intervention lies in diagnosing the working of the system in which people propose to intervene. Peter Senge talks about intervenors needing some sense of how the system actually works, e.g. what are likely to be the few real drivers of change. In thinking about this aspect, they need some sense of the possibilities and the probabilities.

- Real leverage exists deep in the recesses of the system - mindsets, values, beliefs - where identity is created. The dilemma here is that the points of greatest leverage are usually the more difficult to change. These are the connections that hold behaviour in place and that act to block emergence.

- Leadership is key here. One of the challenges of the systems leader is to help develop organizational processes and patterns that support the self-renewal of the organization or system.

How do we find a place to intervene when cause and effect is never clear? How can we avoid getting lost in a labyrinth of relationships and unfathomable emergence? Does this mean that systems thinking only has operational relevance in local, smaller situations?

Survival and sustainability

4.21.   Systems thinking can help us to better understand the dynamics that lead to either resilience or entropy.

- The system either does or does not acquire an identity, a set of values and the will to survive. These factors give it real protection in a hostile environment. Resilient organizations develop a stable core and integrity that helps them to persevere. Part of what others deride as 'resistance to change' is, in practice, the drive of the system to maintain its identity.

- The challenge for most systems is to develop the deeper capabilities that they need to keep functioning. Perhaps the most obvious are capabilities to get access to resources and support and to adapt and change. Systems in general that keep open to the environment and have high levels of autonomy and identity are linked to responsiveness. They have the ability to create their own ecosystems by forming relationships and alliances with other actors that work to help them survive.

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[43] Margaret Wheatley , *A Simpler Way*

> **The ECDPM cases have some useful insights into organizations sustaining themselves under difficult circumstances. What are those insights?**

Tools and frameworks

4.22.   What kind of tools and frameworks exist that can support a systems approach to capacity development? This paper obviously did not have space for a detailed inventory of various tools and frameworks given the huge number available. But a few points may be useful.

- Many analytical tools exist that were designed to assist participants with organizational and institutional analysis.[44] Most, however, are reductionist in nature and are not designed to bring out the systems issues.[45] They look at the 'parts' independently. They treat the organization or capacity in question as free-standing. And they are not that helpful in analyzing contextual issues. Many are seen as contributing to a pattern of misdiagnosis that is undermining the effectiveness of aid interventions.[46] Systems thinking reserves a special disdain for the log frame which is seen as the symbol of a inappropriate tool based on outdated assumptions and designed mainly to meet donor control requirements.[47]

- There are a variety of tools that can be helpful in promoting a systems approach. Hundreds of websites deal with systems issues. Systems dynamics comes with many tools and frameworks, many of which have to do with causal loop diagrams.[48] Soft systems methodology comes with its own set of tools and frameworks.[49] Systems dynamics has developed a range of techniques such as causal loop diagrams.[50] GTZ has developed some 'thinking tools' that will be presented at the March workshop. One other source of systems tools can be found at bobwill@actrix.co.nz including a review of the strengths and weaknesses of the main approaches to systems thinking. On the process side, a huge number of tools exist, some of which can be found at the website www.mycoted.com which has a collection of over 200 process tools. Few of these tools are used or even known in development cooperation. The problem here is sorting and application, not creation.

- The ECDPM study is still searching for a single, overall framework that can help practitioners map and assess their capacity from a systems perspective. The March workshop may give us more insight into the nature or even the feasibility of such a framework.

> **There seems little correlation between the number of tools available and the overall effectiveness of development interventions. Why do we think even more tools, even if systems-based, would be a contribution? And if so, to what and whom?**
>
> **Do the tools and frameworks we have for capacity assessment make sense from a systems perspective?**

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[44] A brief review within the World Bank in 2004 came up with over 250 tools that appeared in Bank files.

[45] Many organizational assessment frameworks look at issues such as management, finances, leadership, communications, stakeholders, governance and so forth. They then analyze these issues separately and then try to reach an overall conclusion. We should also point out that the framework developed for the ECDPM research uses this same approach.

[46] See, for example, Jean Horstman, "Reflections on Organizational Change" in Groves and Hinton, *Inclusive Aid,* 2004

[47] See the Earthscan book

[48] See, for example, the Newsletter called The Systems Thinker from Pegasus Communications in the USA which features articles such as "Communities of Practice as a Social System" and "The Inner Game of Work: Building Capability in the Workplace".

[49] See Peter Checkland, *Soft Systems Methodology,*

[50] See Dennis Sherwood, *Seeing the Forest for the Trees: A Manager's Guide to Applying Systems Thinking,* 2002

5 General Challenges to the Use of Systems Thinking

5.1.   Systems thinking was the fashion in the 1960s and 1970s only to fade away for a variety of reasons. It never made the leap into the mainstream. Private companies, for example, shifted to approaches such as strategic planning and management in an effort to get to grips with issues of positioning and performance. But now systems thinking appears to be making a comeback. Assuming for the moment that it has some merit, what challenges will it have to meet in order to be more widely adopted in development cooperation?

Development Cooperation as a system

5.2.   Hinton and Groves put forward the view that the effectiveness of development cooperation is being constrained by two key factors:

- Development cooperation as a system is failing to function effectively. Part of the reason for this outcome is the distorted relationships shaping the behavior of the system including the predominant role of international funding agencies. Despite the current emphasis on partnership, national ownership and participation, there still remains too much funder dominance, control and hierarchy. Development cooperation itself is trapped in a systems problem to do with ineffective relationships.

- The continued use of reductionist mental models and especially the linear pursuit of preselected outcomes is undermining development effectiveness. For the reasons described earlier in this paper, the conventional mental models are not suitable to address the type of development complexity and uncertainty now evident across all programs.[51]

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[51] For two recent books that encourage the use of systems thinking in development cooperation, see Samir Rihani, *Complex Systems Theory and Development Practice: Understanding non-linear realities,* Zed Books, 2002 and Leslie Groves and Rachel Hinton (eds.), *Inclusive Aid: changing power and relationships in international development,* Earthscan, 2004

5.3.　　A perennial critique of functioning of the development cooperation system is the endless parade of fads and fashions each with their own tools and techniques, language, preferred issues and waves of consultants. Few have finished getting established before the next one moves in. Systems thinking could well be seen by some in partner countries as yet another in a long line of these funder-inspired invasions. Systems thinking may appear as yet another effort with a limited shelf life intent on undoing the patterns and structures put in place by previous waves of reform.

5.4.　　Much of the work on systems thinking has also been done in the context of systems and actors in high-income countries in which the level of formal institutional and organizational density is much higher. It is not clear the degree to which it can be crafted and adapted for use in low-income states.

Should systems thinking be seen as simply another passing technique or has it finally arrived as a profound change in the way we see the world? Is it relevant for development cooperation?

Resistance to systems thinking

5.5.　　The adoption of systems thinking can be enormously threatening to many of the established policies and procedures in development cooperation in areas such as monitoring and evaluation, performance management and capacity assessment. Here are a few examples.

- Many busy practitioners remain unconvinced about its operational use. It has not in the past provided a good answer to the question....what specifically do I do now? Soft systems methodologies and systems dynamics have come the furthest in devising tool kits (classic mechanical term) and operational frameworks. But both remain largely unknown within the mainstream development community.

- Enormous pressures exist to maintain specialized, reductionist thinking. Organizations are structured to support it. Professional disciplines fight to protect it. Career paths are built on it. The incentives to drive systems thinking are limited. And individuals are not likely to switch easily from one style to another. List of 'lessons learned' is one thing. Learning to think and act differently is another.

- Systems thinking can also have a disempowering effect on people and organizations used to structure, targets and planning. In particular, it may not be attractive to those wishing to be cast as heroic managers. Many of its ideas such as emergence are not attractive to organizations under pressure to show results in the short term. And systems thinking is not an approach that can be easily sold to domestic groups skeptical about the accountabilities of international funding agencies. Attribution problems are, for example, difficult to resolve in systems given the suspect nature of results chains. And most approaches to systems thinking do not support the current emphasis on results-based management and performance targeting that most funding agencies use to demonstrate their own performance. Systems thinking can have the effect of increasing uncertainty rather than reducing it.

Can we learn from the experience of others in terms of introducing systems thinking? How would that be done?

> **Why has the aid industry been slow to adopt systems thinking? Does that tell us something about systems thinking or about development cooperation?**

Systems thinking and its organizational implications

5.6.   The implications of systems thinking can be far reaching: A few examples now exist of development organizations, mainly NGOs, attempting to deal with the implications of shifting to a more systems-oriented way of working. Many of the resulting challenges may be too much for public sector organizations to overcome.[52]

- It is not clear how systems thinking can fit with other ways of analyzing situations. As mentioned earlier, systems thinking is best at synthesis. But it needs help in terms of empirical analysis. Reductionism has a role. Systems thinking itself may be a element in a larger 'whole' of development thinking. Can it supplement present ways of doing things or does it have to replace them in some way?

- Systems thinking also needs to find ways to at least relate to bureaucratic engineering. Can it lend itself to budgeting, results-based management, work programming and the other part of the aid system? Information systems may be quite inadequate to generate the data needed to use it. What can it contribute to monitoring and evaluation? Participants may also not trust the dramatic conclusions it throws up.

- Systems thinking can generate new requirements for understanding in areas where many external interveners are weak - contextual knowledge in areas such as political economy, history and culture. Systems thinking can be very demanding intellectually. It requires multi-disciplinary approaches. And by its very nature, it needs to take a broad at a wide range of trends, actors, events and patterns. It requires more investment in a wider range of staff skills, a different organizational structure, and a different set of values and perspectives. In many ways, it puts greater importance on generalist staff who range across a series of interrelated issues. People may need training to make systems thinking work. And they can very quickly give up on systems thinking and go back to conventional approaches which are much easier to work with.

> **Could systems thinking be introduced into funding agencies as an isolated technique or would its introduction entail deeper reform?**
>
> **What are the main areas where operational guidance would be most useful?**
>
> **How could these gaps best be filled?**
>
> **Can we be more specific about what situations lend themselves better to the application of systems thinking?**

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[52] See Robert Chambers and Jethro Pettit, "Shifting Power to make a Difference" in Groves and Hinton, pp. 137-162 for the case of ActionAid UK and its Accountability, Learning and Planning System (ALPS).

6 End Note

Systems thinking is a different mental model that has the potential to open up some space for thinking about issues such as capacity development. We look forward to discussing its potential contribution further at the March workshop.

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Annex 2 - Four Approaches to Systems Thinking

Complex adaptive systems
- emphasis on insights from the science of complexity
- includes attention to network structure and functioning
- pays attention to the nature of control and creativity
- focuses on change and adaptation
- incorporates many of the ideas of chaos theory

System dynamics (SD)

- A methodology for studying and managing complex feedback systems
- It assumes that events are part of patterns generated by structures
- It spends more time trying to understanding systems 'archetypes' or basic patterns
- It pays more attention to movement and change rather than a snapshot of the system
- It pays more attention to modeling stocks and flows within systems
- It comes with tools such as causal loop diagrams
- SD differentiates between detail complexity and dynamic complexity
- The debates about the relationships between system components usually exposes very different assumptions about the way the system actually works
- SD is not very good at capturing emerging properties
- SD lends itself to computer modeling
- SD can be enormously difficult in terms of capturing all the components. Boundary setting is difficult.
- It can pay too much attention to the value and feasibility of shared interests inside the system.
- It pays little attention to action research.

Soft systems methodologies
- It focuses on facilitating the design of interventions in contexts of conflicting interests.
- Its central concern is to find out what might work not what is optimal from a technical perspective
- SSM contrasts the world as it is and some models of the world as it might be
- It puts great emphasis on learning, experimentation and action research
- It promotes widespread participation.
- SSM is primarily a learning system that can be used by a range of actors to create a shared understanding and hence improve performance.
- The mechanics of the SSM process can be daunting.
- SSM does include attention to stakeholders, process and change.
- SSM tries to combine logic-based approaches with social and political analysis.

Chaos Theory (CT)
- a focus on rapid, nonlinear behavior
- a focus on turbulence and unpredictability
- A belief in the value and feasibility of self-organization
- the changing patterns of relationships amongst the 'parts' generates rhythms, cycles and disorder
- the ability of small events to have large systemic effects
- the ability of systems to shift rapidly into new forms and processes

- the idea that hidden order exists within chaotic situations
- CT gives greater importance to individual human agency
- CT sees systems having extreme sensitivity to initial conditions
- CT challenges most of the current assumptions about how change takes place. In particular, it takes dead aim at the input-output-results methodology that is a central tenet of aid thinking.