How to improve systems thinking in aid:
A conceptual framework for the implementation of systems thinking
in development aid programming

A thesis submitted in fulfilment of the requirements for the degree of Doctor of Philosophy

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May 2019
Declaration

I certify that, except where due acknowledgement has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the thesis is the result of work which has been carried out since the official commencement date of the approved research program; any editorial work, paid or unpaid, carried out by a third party is acknowledged; and ethics procedures and guidelines have been followed.

I acknowledge the support I have received for my research through the provision of an Australian Government Training Program Scholarship.

Mihaela Balan

May 2019
Acknowledgements

First, thanks to my dear Dan, who has provided inspiration, love, devotion, sacrifice, encouragement and support during this long endeavour for so many years.

To Teodora: for foregoing times together in order for me to complete this research and for being supportive in your little way. I look forward to making up for lost time.

To Mom: for instilling in me an appreciation for the value of trying new things, being innovative, and curious.

To my supervisors: Professor Simon Feeny, Associate Professor Dave Mercer and Associate Professor Paul Battersby. They appropriately criticised, praised, cajoled and restrained me.

To Stavroula: for always believing in me.

To my colleagues and friends from the development aid community, Sarah, Arthi, Tim, Sanju, Nick, Marcus, Lucho, Mike, Farida, Hamza, Bashir, Ronke, Ben, Phitcha, Nabanita, Hans, Aly, Khodeza, Mehnaz, Hafeez, Con, David, and many, many more, who have been supportive in words, and deeds.
Abstract

This research is inspired by a belief that systems thinking can play a decisive role in addressing design and implementation challenges in international development aid. There is a search underway for new approaches to make aid more effective which is leading to practitioners embracing systems thinking in response to criticisms that development programmes fail to achieve beneficial impacts. There is an appetite amongst the donor community and practitioners to use systems thinking in ‘market development’ programming. However, the practice is still nascent and characterised by ambiguities and misconceptions in what systems thinking is, or does.

The research ascertains the degree to which the limited application of systems thinking in development aid is due to challenges faced by practitioners in adopting it and how these challenges could be addressed for systems thinking to be successfully applied to international aid. To study this problem, I sought the views and opinions of a variety of development practitioners, especially those working in market development programmes, as these are at the forefront of promoting systems thinking in aid. Through this endeavour, a hundred challenges were identified. By sorting and rating these challenges across six domains, a ‘conceptual framework of tactics and action’ was generated. By viewing the conceptual map from the perspective of a complex adaptive system, with domains as agents, at least 30 possible solutions to move towards effective planning and implementation of systems thinking in development aid were generated. This study offers a way forward. Equipped with the results of this research and delving deeply into the solutions, one can now embark on a more comprehensive dialogue to policy makers, practitioners, donors and implementers to plan what is needed if an authentic systems orientation is to drive and thrive in development aid.

The research concludes on the need for an institutional home: a place where action can be taken; where challenges, the six domains, and the 30 plus solutions can be taken forward; and where practice can demonstrate the benefits as well as the pitfalls of the use of systems thinking in development aid.
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List of acronyms

AEA  American Evaluation Association
BEAM Building Effective and Accessible Markets
CAM Complexity Aware Monitoring
CAS Complex Adaptive Systems
CEO Chief Executive Officer
CLA Collaborating, Learning, and Adapting
CLD Causal Loop Diagram
DAP Development Aid Programming
DCED Donor Committee for Enterprise Development
DFAT Department of Foreign Affairs and Trade
DFID Department for International Development(UK)
DDD Doing Development Differently
DSRP Distinction, Systems, Relationship, Perspective
FGD Focus Group Discussions
GEMS3 Growth and Employment in States Business Environment
GST General Systems Theory
HCA Hierarchical Cluster Analysis
ICAI Independent Commission for Aid Impact
IFC International Finance Corporation
LEO Leverage Economic Opportunities Programme
LGA Local Government Area
LMIC Low and Medium Income Countries
M4P Making Markets Work for the Poor
MDP Market Development Programming
MDS Multidimensional Scaling
MNC Multi national corporation
MSD Market Systems Development
NGO Non Government Organisations
NVA New Vision for Agriculture
ODI Overseas Development Institute
OECD Organisation for Economic Co-operation and Development
PHH Post Harvest Handling
<table>
<thead>
<tr>
<th>Abbreviation</th>
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<tr>
<td>PSD</td>
<td>Private Sector Development</td>
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<td>SDC</td>
<td>Swiss Development Cooperation Agency</td>
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<td>SSM</td>
<td>Soft Systems Methodology</td>
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<td>ST</td>
<td>Systems Thinking</td>
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<tr>
<td>USAID</td>
<td>US Agency for International Development</td>
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<td>WEF</td>
<td>World Economic Forum</td>
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<td>WHO</td>
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Chapter One: Introduction
1.1. Overview

While multiple definitions exist, ‘Systems thinking’ is an approach which recognises that any phenomenon occurs within a broader system and that the multiple linkages and interactions between the agents of a system and the rules that they follow will determine the outcomes from the phenomenon. Awareness and support for systems thinking in the sphere of international development aid\(^1\) are growing, yet there are many practical challenges to its implementation. This research focuses on identifying these challenges and identifying potential solutions to improve development practice.

Development Aid Programming (DAP) is the primary means by which international donors design, implement, monitor and measure the impacts of initiatives in developing countries to reduce poverty and promote sustainable livelihoods. There is a recent discourse within the development aid community that applying systems thinking may improve the impact and sustainability of development initiatives (Ramalingam 2013; Cunningham & Jenal 2013, 2016; Jenal & Cummingham 2014, 2015a, 2015b; Crowford & Pollack 2004; Barder 2012a, 2012b, 2012c, 2012d, 2015, 2016; Barder & Ramalingam 2012; Burns 2013; Hummelbrunner & Jones 2013a, 2013b; Jones 2011; Ramalingam et al. 2008; Ramalingam & Frej 2011; Boulton, Allen & Bowman 2015; Burns & Worsley 2015; Snowden (cited in Jenal 2013)).

First attempts to introduce systems thinking in aid originated in the early 2000s, with the introduction of market systems approaches. These approaches include: (i) ‘Making Markets Work for the Poor’ of the Springfield Centre in the United Kingdom, later called ‘Market Systems Development’; (ii) Michael Porter’s ‘shared value’ model; and (iii) CK Prahalad’s discourse about the fortune at the bottom of the pyramid and the push for innovation in ‘inclusive business’ models. All three initiatives see market systems as an essential model of engagement with the poor. These approaches are now implemented worldwide.

This thesis focuses mainly on this sphere of development aid: the programmes that use market systems approaches (MDP\(^2\)), and especially Springfield’s Market

\(^1\) In this thesis, ‘international development aid’ is used interchangeably with development aid programming (DAP).

\(^2\) MDP is referred to throughout this thesis to include programmes in DAP which apply market systems approaches.
however, because of the early stages of adopting systems concepts, reference is also made to other types of development assistance and comparisons with other sectors beyond foreign aid are also made.

My personal perspectives on this research arise from being a recipient of aid, having lived in a developing country, and as a consultant working in development for over twenty years, reviewing programmes to ensure that aid is delivered effectively. Both perspectives have helped inform this thesis, on how to improve (the use of) systems thinking in aid to better respond to the social, economic and environmental challenges facing developing countries and ultimately to improve its impact in reducing poverty.

A healthy and robust international aid sector is important and I believe, where it preforms well, it offers enormous opportunity for improving the lives of poor people and other disadvantaged. Some pockets of good practice, such as the work through market systems exist in aid delivery. However, they have not translated widely in shifts of aid to a more effective delivery system. More research, I argue, is required to understand systems thinking in the aid sector and to address the challenges that exist to amplify the practice as a way to better respond to developing countries’ needs.

This introductory chapter proceeds with a history of aid delivery, which points to the evolving nature of the sector and present where it stood before the birth of systems approaches. It highlights the main criticisms of the direct delivery of international aid and the pressure that came in the early 2000s to move the aid sector towards alternative delivery models. The response that came from the development community through the birth of markets system approaches is then presented. This is followed by a discussion of the newest wave of criticism of systems practice in light of the ‘complexity’ dimension that DAP has to deal with. This leads into the penultimate section of the chapter which presents the key research questions. It concludes with a summary of the subsequent chapters of the thesis.

1.2. History of aid delivery

Official development assistance (ODA), is the most commonly used measure of foreign aid. It is defined as flows of resources including financial resources to developing countries and multilateral institutions which are administered with the objective of promoting economic development and welfare. In simple terms, it
consists of physical goods, technical know-how and financial resources that are concessional in character and that are transferred from donors to recipients (Riddell 2007; OECD n.d.). At a broader level, aid includes interpersonal experiences and interactions that fundamentally alter the relationship between its actors. Development assistance is therefore about institutions, people, resources, programmes and, of course, change.

Aid is not immune to controversy. With so many people questioning what, if any, value it really adds, there is a need to demonstrate that it reduces poverty and achieves value for money for support to continue. Also, the history of giving aid has been one of competing pressures, different motivations and changing interests. For example, Riddell (2007) identifies six core motives of donors giving aid, to:

- help address emergency needs;
- assist recipients achieve development goals;
- show solidarity to strategic partners;
- further their own national, political and strategic interests;
- support historical ties; and
- advance commercial interests.

This collection of motives highlights the complexity inherent in the development sector. Reducing poverty is often referred to as the overarching aim of DAP. However, many critics say that poverty alleviation has become an easy label to attach to these diverse motives and a simplistic 'catch-all' phrase for what they entail (Ellerman 2004).

There have often been complaints that many large-scale, government-initiated programmes perform poorly in their attempts to reduce poverty (Mansuri & Rao 2004). Critiques come both from post-development thinkers such as Arturo Escobar (1995, 2007), Wolfgang Sachs (1992), Gustavo Esteva (1992) or David Korten (1995) for whom development aid is unjust and does not work but also from ‘insiders’ such as William Easterly and Joe Stiglitz.

Arturo Escobar (1995), a major voice in the post-development academic discourse through his influential book *Encountering Development*, posed a serious critique to the development edifice of Western ideas to reduce poverty in the ‘third world’. According to Escobar, the problem with so-called development is that it is externally-driven, based on a model from developed countries that improperly
understands the cultures and values of people from developing countries. What is needed instead are more contextualised discourses that acknowledge the diversity of cultural views and priorities (Pieterse 2010; Waibel 2012).

More challenges were identified in Amartya Sen’s (1999) book Development as Freedom. Sen dismisses wealth or economic prosperity as an indicator of development and instead, he argued, development should be seen as a process of expanding people's substantive freedoms. Sen’s influential capability approach and objective of empowering poor people to take control over decisions greatly influenced the development community in the 1990s. The essence of development or poverty is about whether any expansion among the individuals' freedoms has taken place, not about how much income they have earned. Development is accomplished, through the expansion of individuals ‘agency’ within an enabling environment that creates opportunities for all (Sen 1985, 1999).

About the same time, critics pointed to top-down approaches as being disempowering and short-sighted. These critiques resulted in a transition to a model reliant on a bottom-up approach with a new participatory movement arising with external actors taking on a more facilitative role (Mansuri & Rao 2004). Led by Chambers (1983), the slogan of ‘participatory’ or ‘community-led development’ became popular, with an attendant rush to jump on the participatory bandwagon. Advocates of participatory development approaches claimed greater efficiency and effectiveness of investments, contributing to democratisation and empowerment. The problem of ensuring the sustainability of development interventions could be solved with the involvement of beneficiaries in the supply and management of resources, services and facilities. Martinussen (1997) talks about ‘development by people’. Gran (1983) is known for ‘people-managed development’ strategies and a shift away from western-copied ready-made solutions. Chambers (1994) and Korten (1980) wrote about the importance of learning processes and success coming from teamwork where locals take a lead role. This paradigm shift (Waibel 2012) led to the emergence of now popular ‘community-based’ or ‘community-driven’ development but also other bottom-up approaches such as asset-based community development, capacity building and local knowledge (Mansuri & Rao 2004).

Despite these changes, Dewey (cited in Ellerman 2006) suggests there was still little apparent evidence of the long-term effectiveness of participation materially improving conditions for the most vulnerable people. Nor was there evidence that it
constituted a strategy for social change.

1.3. Shift towards market systems

More recently, aid has come under intense scrutiny with more rigorous benchmarks being introduced. For government agencies, there has been increasing pressure from taxpayers, both to deliver impact to intended beneficiaries (the very poorest), and to demonstrate credibly that there is value for the donors investing taxpayers money.

There is a growing sense that development approaches, generally, have not achieved a sustainable impact over the long term:

‘Schools are built but children do not learn. Clinics are built but sickness persists. Governments adopt reforms but too little changes for their citizens’ (Andrews et al. 2014, p.1).

Critics of international development practice purport several reasons for this. One is that the power was still with the donor agencies. Since development assistance conformed to a business model reliant on concrete results, and since donors tend to have greater power and wealth than the implementers, a direct and controlling form of development assistance was practically guaranteed, even if a partnership approach was followed (Dewey cited in Ellerman 2006). Development was concerned with intervening directly. A ‘hands on’ approach where agencies, government, not-for-profit organisations provide whatever is required, e.g., advice, inputs or services, directly to beneficiaries (Fargher et al. 2010; Elliot et al. 2008a, 2008b, 2008c):

‘The first strand of development practice has been concerned with intervening directly to ‘get things done’. Here the essence of the approach is that, if market system is not delivering well, ‘we’ (agencies and governments) should replace it and provide finance, advice, materials, services...whatever is required directly. We should do it ourselves to ‘get on with the job’ (Elliot et al. 2008c).

This of course leads to quick wins, but have failed in many other ways: limited outreach and impact and ultimately poor sustainability of benefits after donors’ funding ceases (Fargher et al. 2010; Elliot et al. 2008a, 2008b, 2008c; ADE 2005):

‘European Commission programmes often focussed on the direct provision of services for immediate impact, rather than addressing the constraints that preclude correct functioning of the market. As a result activities are not designed so as to improve the competitiveness of the private sector in a sustainable manner (ADE,
There was also a growing sense that many programmes have failed to tackle deeper problems or ‘systemic barriers’, and instead they focus on symptoms of deeper, systemic problems that arise from the structure of a system for which a systemic solution is needed (Albu 2007; Cunningham 2011; Cunningham & Jenal 2013; Elliot et al. 2008a; Gibson, Scott & Ferrand 2004; Hitchins et al. 2015; Hitchens, Elliot & Gibson 2005; Fowler & Dunn 2014; Gradl & Jenkins 2011; Humphrey et al. 2014; Osario-Cortes & Jenal 2013; Ruffer & Watch 2013; Taylor 2013; USAID 2014).

For example, ‘The interveners’ instinct has been to ask the question ‘what problems do people have and how can I solve them?’ and not to ask the more relevant questions: “why isn’t the [market] providing solutions” to these and “How can I address the constraints that prevent it from effectively doing so?” Improving the functioning of the market systems and addressing the underlying causes shaping behaviour of the [market player]s have not been priorities’ (Elliot et al. 2008c, p.18).

Impact from traditional approaches was also limited. Programmes that have taken a narrow focus on individual agency failed to achieve durable change in the position of the poor or other disadvantaged groups in wider society. To obtain value for the money invested, aid initiatives must stimulate wider sustainable changes and engage directly with the poor. There was a need for a shift in focus from individual drivers of change (people or firms) to system drivers. The scale of impact would then increase dramatically. An excerpt from a recent design document on a DFAT funded programme in Indonesia explains this (Figure 1.1). The left side of the diagram presents the direct delivery assistance, where the programme works directly with poor people farmers (‘F’), with only a few reached. The right side presents the work through the market system agents, the ‘Firm’ which has a network of Intermediate Service Providers, ‘ISPs’, who, in turn, can reach hundreds or thousands of farmers. As a result, the outreach is much bigger in this case. Incentives for market players are also clear:

‘...all actors in the network [in Figure 1.1] have a commercial incentive to attract and retain customer loyalty, in order to maintain market share – interests and motivations are aligned towards the long term’ (Fargher et al. 2010, p.13)
What Figure 1.1 points to is that improving the lives of the farmers, poor people – stimulating growth and expanding access – comes from transforming the systems around poor people to become more inclusive (Elliot et al. 2008a, 2008b, 2008c; Hitchins et al. 2015). The key to reducing poverty at scale is to change how the systems function (market systems, health systems, education systems) as well as their biases, rules and norms.

Significant improvements in poverty reduction, such as increased employment for women and more secure incomes for small-scale farmers, will not occur unless the broader system of interrelationships in markets adjusts to accommodate the desired goals (Cohen & Lavach, cited in Foster-Fishman, Nowell & Yang 2007).

The role of donors and their implementing agencies should also change: an indirect, enabling or facilitation approach is preferred to direct delivery because it would lead to more sustainable solutions that could continue after the project funding had ended (Dunn 2014; Dichter 2003). Agencies role is to catalyse others without becoming part of the system, thereby ensuring sustainability. The best assistance could only be indirect, and not direct (Dewey, cited in Ellerman 2006, p.6):

‘…the best kind of help to others – helping them help themselves – is indirect
Learning from these experiences pointed to the need for donors and implementers to ground their work more and more in the reality of the markets (Elliot et al. 2008a, 2000b, 2008c; Ruffer & Walch 2013).

1.4. Getting at the core of market system approaches

These challenges and shortfalls in the delivering assistance have led to the rise in the interest of governments, donors and non-government organisations (NGOs) to find new ways to address poverty by working through the market systems approach. The birth of new approaches such as MSD, Shared Value, and Inclusive Business models emerged.

1.4.1. Crying out for help

It was the World Bank’s three parts series *Voices of the Poor* (2000), a multi-country research approach to understand poverty from the eyes of the poor, that brought a new perception of poverty: those interviewed talked about their situation as fundamentally being about a lack of access to goods and services and access to economic opportunities, and not only a lack of income.

‘The struggle for livelihoods is described through the scarcity of rural production, the diversified cities' bondage, and, the limited opportunities of life, and individual breakthroughs challenging their livelihoods... It finally challenges the meaning of development, and of power, calling for change...’ (Narayan et al. 2000).

Markets do not work for the poor and they have to pay more for services than those living at the top of the pyramid. Jenkins et al. (2010) introduces the phenomenon of a ‘poverty penalty’.

1.4.2. Crying out for change

Prahaland (2004) points to the important role that poor people can play in markets as consumers or entrepreneurs by seeing them: ‘... not as victims or as a burden and start recognising them as resilient and creative entrepreneurs and value-conscious consumers, a whole new world of opportunity will open up’ (Prahaland 2004, p.25).

The central idea of the market systems approaches is that the poor obtain their livelihoods from markets as producers or employees, by selling inputs or their labour
into the ‘factor markets’, or as consumers of goods and services (see Figure 1.2):

‘The involvement of poor people in economic growth is the best way to get people out of poverty and represents the exit strategy for aid’ (Elliot et al. 2008b, p.iv).

![Figure 1.2. Market interactions (Source: Schiller 1999, p.51)](image)

Schiller (1999) argues that there are four separate groups of participants in a market: business firms; consumers; government; and foreigners. They all play different roles to make the market work. Businesses key role in the market is to provide goods and services to ‘product markets’, and to buy factors of production in ‘factor markets’. Individuals – ‘consumers’- are also active in the marketplace by purchasing the goods or services supplied by the businesses in the ‘product markets’, but also by supplying factors of production (‘selling their own labour’ or providing inputs to other firms) in the ‘factor markets’. Government has also a key role in both ‘product’ and ‘factor’ markets. They also provide goods and services. foreigners participate through imports/exports and buying and selling other resources in these markets. Even if the arrows in the diagram go only in one direction, there is an implicit ‘return arrow’ to show transactions between market players going in both directions: labourers are paid in return for their work, businesses sell their products.
and services and receive money from buyers or consumers in the diagram (Schiller 1999).

Theoretically, the poor people and disadvantaged could play a role in these markets as consumers or as factors of production. Participation of the poor and most disadvantaged in markets and market transactions is seen as a process of expanding their substantive freedoms (Sen 1999). However, the poor often don’t have freedoms to sell or buy, or able to access economic opportunities and actively participate. If they have a small business, they face challenges to sell their products or access inputs and services. Many markets that are important to the poor do not function well, restricting their choices and opportunities (Figure 1.3). These are what economists and economic theory refer to as ‘failures’ of the market systems, where the allocation of resources or products and services in a free market is not effective. These market failures are important for public policies and interventions that government or other players – such as donors - need to take on and ‘correct’.

Figure 1.3: When markets do not work for the poor (adapted from Schiller 1999, p.51)

Focussing on these markets and changing them to work more effectively for the poor will improve livelihoods and consequently reduce poverty. A well-functioning market system will trigger wider economic benefits in the community, increase investment, create jobs and make goods and services available to more
people. In essence, the market systems approach has at its core two principles: (i) the poor as viable market players; and (ii) markets as an essential mode of engaging with the poor. New models which emerged based on this approach are presented below.

1.5. The change: new models

1.5.1 Market systems development approach

The introduction of Making Markets Work for the Poor (M4P), later called Market System Development (MSD) as an approach to poverty reduction originated as a response to the direct delivery approaches that had often been seen as unsustainable, short-sighted and delivering limited results, despite being resource-intensive (Ruffer & Wach 2013).

The description of markets as systems, the backbone of MSD, was used for the first time by Elliot (2008) at the Springfield Centre in the United Kingdom, and was widely regarded as ground-breaking, challenging the way development aid was delivered.

However, if in economics, a market system is presented as a medium of exchange between buyers and sellers, the Springfield Centre developed the concept further (Figure 1.4) to include ‘supporting functions’ (infrastructure, information, skills and technology), and ‘formal and informal rules and norms’ (Elliot et al. 2008, Hitchins et al. 2015, BEAM Exchange n.d.).
The MSD approach works indirectly to address market failures. It does that through its work in the ‘Supporting functions’ area of the market system (upper level in Figure 1.4). In this example, the programme decided to focus on two main areas: ‘sustainable networks’ and ‘planning and coordination’, with a later addition of ‘market access and information’ (all three areas are circled with different colours in the above diagram). Similarly for the ‘Rules’ side of the market system, the programme’s focus was only on ‘regulations’. By improving ‘informing and communication’ and by ‘strengthening and enforcing rules’, the core function of the market system is strengthened by either increasing access to products or services for the poor, or offering poor people opportunities to participate in economic opportunities as suppliers of inputs or as labourers.

Another view of a market systems approach comes from Technoserve for the case of a poultry system (Figure 1.5). A market system consists of three types of players: a network of direct market players which are producers, buyers and consumers (the ones which drive the direct economic transactions in the market); suppliers of goods and services which support these ‘direct market transactions’; and,
lastly, organisations which have influence on the business environment where these transactions take place, such as government and other regulatory or infrastructure development bodies.

Figure 1.5. A poultry market system (Source Technoserve)

Many programs have embraced MSD approach since its ‘official launch’ in 2008. Every design highlights what MSD is about at its core: solutions are not delivered directly, but through the market systems. A very recent Australia Department of Foreign Affairs and Trade (DFAT) funded programme in Indonesia highlights the key principles of the MSD approach: solutions are not delivered directly, but through markets ‘with the expectation that if the innovation is relevant, market forces will sustain the change’. The approach is analytical and relies on rigorous measurement: ‘...It starts small, tests, and then scales up: testing and proving the feasibility and relevance of pro-poor commercial concepts that will attract further commercial investment, to create a multiplier effect that leads to large-scale and sustained impact’. The approach is based on partnerships with the private sector players and built around the incentives of these players ‘...Interventions are more likely to succeed if there is a private sector partner with the motivation and capacity to invest, and continue to do so in the long run, because it is in their commercial
interests to do so’ (excerpts from DFAT 2017, p.12).

The Springfield Centre piloted the MSD approach on a few projects, and developed, with support from donor agencies (DFID\(^3\) and SDC\(^4\)) operational manuals and guidance notes with rules, definitions and guidelines for how to put it into practice.

MSD brought with it a shift in the role of project managers. Instead of ‘doers’, they became ‘enablers’ or ‘facilitators’ having an active, yet temporary, role in the system. They would facilitate and enable other market players to address market failures, by recognising that a facilitator could not be part of a system in the longer term (SDC 2010).

The approach was also expected to bring about an improvement in the measurement of results that come out of the market system, collecting data periodically to see if the ‘new arrangements’ in the market are working and generating benefits. Based on this feedback players would take action to improve outcomes. This was possible by referring programmes to the seven-step process developed under the Donor Committee for Enterprise Development Standard (DCED): ‘The DCED Standard is a framework which helps practitioners to articulate the hypothesis very clearly, and to systematically set and monitor indicators which show whether events are occurring as expected’ (DCED 2018, nd).

The Standard states that there are seven elements that are needed to be in place for a programme to comply with good results measurement practices. Amongst them a ‘theory of change’ or ‘results chain’ developed at the beginning of any intervention. This diagrammatic representation on how poor people will ultimately be affected presents progressive results in a cause-effect sequence – starting from activities through to wider impact in markets and benefits for the poor.

‘Results chain …. represents a programme theory as a linear process with inputs and activities at the front and long-term outcomes at the end’ (Funnell & Rogers 2011 p. 387).

The Standard also requires that indicators to measure the changes in the ‘results chain’, and projections to determine the scale of impact are established up-front. Other elements of the Standard require, among other things, programmes to

\(^3\) DFID is UK Department for International Development

\(^4\) SDC is Swiss Development Cooperation Agency
take attribution into account when reporting results, the necessity to plan for and measure systemic change in markets, or to report results widely. Over 150 projects in more than 50 countries are currently applying the DCED Standard in sectors ranging from value chain development, to challenge funds, and to business environment reform (DCED 2018).

Training on MSD approaches is also offered. Organised by the Springfield Centre, the training package offers a two-week intensive program of the theory and practice of the concept. It also includes a session on measuring results in MSD where the DCED Standard is presented to support the approach. Other providers copied the model and began offering short courses through: the SEEP Network, or The Centre for Development and Cooperation (NADEL). The past five years or so have seen an upsurge in interest by many donor agencies, with many projects put up to tender embedding the approach in their design.

The practice of MSD has helped create groups of practitioners clustered around blogs and other initiatives, such as the MaFI (The Market Facilitation Initiative), Microlinks and the SEEP Network, which started discussions of aid working through market systems. The learning that arose from the application of the approach and the debate generated from practice led to Springfield releasing Version 2 of the Operational Guide in 2015.

This seems to be a successful example of how practitioners adopted a systems lens and changed the way they viewed and acted in the delivery of aid initiatives. It took time to spread across regions and donors, but the approach had the right ingredients to succeed: it had ‘rules’ through the operational manual and guides; it had ‘agents’ that followed the rules: practitioners, including donors, who believed in the benefits of the approach and supported it; it had ‘platforms’ to build the capacity of agents and spread the application of the practice to others and encourage debate. Most importantly it had an ‘owner’, the Springfield Centre, which developed and embedded the approach into its work and propagated to others. It also has an interest to adapt it, in order to increase uptake, implying continuity of the initiative. This approach is now the norm in the majority of private sector development programmes.

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5 SEEP is a global learning network working to mobilize knowledge and foster innovation, creating opportunities for meaningful collaboration to support strategies that create new and better opportunities for vulnerable populations, especially women and the rural poor, to participate in markets and improve their quality of life.

1.5.2. Inclusive Business models and Creating Shared Value

Alongside MSD other initiatives within the ‘working through the market systems’ approach have seen an upsurge in interest from the development community. These include inclusive business models and shared-value initiatives discussed below.

1.5.2.1. Inclusive business models

Inclusive business models started in the early 2000s with Prahalad’s idea about the opportunities that exist at the ‘bottom of the pyramid’ which multinational corporations (MNCs) can tap into. Investments in ‘inclusive capitalism’, would include doing social good by ‘lifting billions of people out of poverty’, so that ‘the gap between rich and poor countries’ narrows instead of widening. The perception that the bottom of the pyramid is not a viable market is gone, according to Prahalad: ‘The real source of market promise is not the wealthy few in the developing world, or even the emerging middle-income consumers: It is the billions of aspiring poor who are joining the market economy for the first time’ (excerpts from Prahalad & Hart 2002, para. 3, 4)

He posed it as a ‘challenge’ to MNCs to tap into this golden opportunity and sell to the poor in a sustainable but also profitable way: ‘the poorest populations raise a prodigious new managerial challenge for the world’s wealthiest companies: selling to the poor and helping them improve their lives by producing and distributing products and services in culturally sensitive, environmentally sustainable, and economically profitable ways’ (Prahalad & Hart 2002, para. 4).

Donors started talking more about the importance of businesses working with the poor and seeing them as viable market players. The argument for businesses to develop more ‘inclusive business’ models was there: poor people are pulled into the market systems as suppliers, consumers or factors of production (employees) and committed funding to initiate them.

‘Inclusive business models are those which integrate low-income consumers, suppliers, retailers or distributors in their core business operations, on a commercially viable basis’ (IFC 2018, para. 2).

Jenkins and Eriko (2010) in Scaling up inclusive business lay out the

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7 International Finance Corporation
incentives for all market players to support these models, which are very similar to those brought by the MSD approach: ‘...it can offer new opportunities for innovation, growth and competitiveness as the same time as positive and social impact’; donors, government or civil society would have an interest as well to support it ‘...because it has the potential to drive development impact in self-sustaining, self-multiplying ways that do not require infusions of grant funding’; and most importantly, poor people would buy into the model ‘...because it brings greater access, choice, and opportunity in their lives and futures’ (excerpts from Jenkins & Eriko 2010, p.4).

Since 2005, the International Financial Corporation (IFC) has committed ‘over $18 billion and worked with over 550 inclusive businesses in more than 90 countries’ (IFC 2018, para 3). To enable the upsurge of more inclusive business by increasing private sector engagement in the issues of inclusive and sustainable agriculture the World Economic Forum’s (WEF) New Vision for Agriculture (NVA) initiative was created. Additional platforms such as Grow Africa and later Grow Asia, were funded with support from other donors. The NVA/Grow Africa/Asia model envisages that the involvement of agri-businesses in successful ‘pilot’ projects that NVA supports, would help them develop sustainable and commercially viable inclusive business models, which they would then implement at scale, or that might be copied by other companies.

The United Nations Development Programme (UNDP) Growing Inclusive Markets program aims to create new opportunities for the poor through its global multi-stakeholder research and advocacy initiative that seeks to understand, enable and inspire the development of more inclusive business models around the globe. Donors, organisations, universities, even the Group of 20 (G20) talk about and search for successful inclusive business models. Through its G20 Challenge on Inclusive Business Innovation, this international forum challenges the business community to come up with innovative, scalable, and commercially viable ways of working with low-income people in developing countries (G20, 2012).

1.5.2.2. Creating shared value

Michael Porter, one of the world’s most distinguished strategy gurus, brought to life another similar concept that he called ‘shared value’. He explains the concept in the in an award-winning article from Harvard Business Review he co-authored with Mark Kramer (2011) where they argued businesses can address social issues and
market failures while simultaneously creating business value for the company and creating new stakeholders. Hence the term ‘shared value’. The purpose of the businesses must be redefined, he argues, to create shared value. This could open the door for innovation, for a business to find ways to serve the unmet needs of the disadvantaged, and at the same time to bring productivity growth, efficiency gains, differentiation or expansion to new markets. This is the only way ‘to legitimise business again’ (Porter & Kramer 2011, p.4)

Porter suggests three ways in which businesses can create opportunities for shared value: by ‘reconceiving products and markets’; ‘redefining productivity in the value chain’; and by ‘enabling cluster development’. These three are not mutually exclusive but reinforcing: a gain in one model could lead to opportunities for growth in another.

By making products and services accessible to new customers, which often are poor people whose needs and wants are so often unmet, the businesses would also expand in the global economy and make profits. New ways of innovating in the value chains to address operational deficiencies could also provide opportunities for new suppliers or distributors (poor people), with businesses gaining productivity and benefiting. Firms building clusters around the businesses to improve a company’s productivity is what an ‘enabling cluster development’ model is about. Deficiencies in the systems surrounding the business create internal costs. However, building stronger local capabilities in areas such as ‘skills development’, ‘transportations services’, or other clusters can boost productivity for firms. By addressing skills shortages and investing in a local training provider to upskill workers, the business can ensure it has capable workforce or capable suppliers that provide good quality inputs.

Porter’s shared value reinforces the argument that the engagement of the poor in markets is critical and there are wins for all players in the market system. The businesses benefit from improved efficiencies and at the same time, the lack of opportunity and restricted access to products and services that poor people face, could be sustainably addressed.

Shared value has become more popular among donors. For example, DFAT invested in a shared value initiative in 2016. The Business Partnership Platform (BPP) was established as the flagship investment in response to the Ministerial Statement on Engaging the Private Sector in Aid and Development – Creating Shared Value through Partnerships (DFAT 2015). It was designed to leverage the presence and
competitive advantage of the private sector in contributing to development impact. The goal of the BPP to “create scalable shared value partnerships that advance Australia’s economic and social development objectives” was envisioned as enabling DFAT and its business partners to explore the potential for collaboration and contribution to development outcomes. The BPP was founded on the concept of shared value – that business can deliver sustainable social impact in developing countries while achieving commercial returns (DFAT 2014). The Ministerial Statement acted as a call to business, and BPP was positioned as the mechanism. Both private sector organisations and DFAT could engage in a meaningful way through the provision of matched grant funding under the auspices of shared value partnerships. The mechanism also provided a useful platform to support engagement between NGOs and the private sector, in three-way partnerships with DFAT. These partnerships were expected to provide a demonstration effect, increasing DFAT’s understanding of the private sector and testing new ways of working.

As with the inclusive business model, donors, organisations, universities, think tanks, and consulting firms promote, support or provide training to the private sector or other stakeholders in order to implement the shared value approach.

1.5.3. What do these three examples of market systems approaches tell us?

There is not much difference between these three approaches. Although the terminology of each approach and its delivery model might differ, all three seem to agree in seeing the market system as an essential model of engagement with the poor in order to achieve sustainable development outcomes.

These models are working on addressing market failures. The market fails to make products and services accessible to poor people or give the poor equal access to economic opportunities. These models aim to correct these failures by seeing the poor as viable market players and pulling them into the market systems.

There are overlaps and linkages among these models. A ‘shared value model’ is an ‘inclusive business model’. The shared value or inclusive business model is a way to make markets work better for the poor, and hence a representation of Springfield’s view of the market system.

All these three initiatives contributed to the growth of systems thinking in international development assistance, though among the three, Springfield’s MSD is still the most developed, referenced and hence popular model.
1.6. The newest pressure: complexity crisis

Within a difficult global financial environment and aid falling for some donors to the lowest levels in the last decade (Australian National University Development Policy Centre, cited in Belot 2017; Organisation for Economic Co-operation and Development 2015), donors starting to work through markets systems and partner with the private sector to achieve development outcomes became increasingly popular.

However, a 2013 report that analysed 32 MSD programmes, by consulting with individuals from projects, donors and other organisations in the field have raised a number of issues. There is little evidence for transformative change – the core of what MSD is about. Further, the analyses and methodologies used to measure results have not been effective at reviewing systemic aspects, again a core claim of MSD approaches (Ruffer & Wach 2013). Limited impact was identified as an issue during DFID’s mid-term review of Katalyst, a MSD programme in Bangladesh that has been running since 2001. The reviewers praised the work done to date, but concluded that, after ten years of implementation, the types of systemic impact – a major rationale for using the market development approach - are yet to be seen (DFID 2012).

Some investments in popular inclusive business models fail to generate impact beyond the funding period. Reviews of these programmes show that, only a few years after completion many recipients of aid money either abandoned the ‘inclusive’ model to go back to what they were doing before, moved to corporate social responsibility (CSR), or sold their businesses. Inclusive business models in agribusiness – the most popular sector where these models have been tested - went through intense scrutiny recently. Woodhill (2016) in his recent report Inclusive Agribusiness: The State of Play, developed for the Global Donor Platform for Rural development finds that implementing the model is still challenging. Companies who see the commercial opportunities of incorporating more smallholder farmers into their value chains face multiple risks and challenges, so it often requires a good deal of expertise and patience to find a way through. International experience suggests that even large companies often need access to external expertise to help identify and develop such

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8 a systemic impact is a an impact that is transformative and lasts beyond any donor funding or other support.
opportunities, and that such expertise is in short supply. In the face of those challenges, much of the private sector effort in this space, tends to fall back on corporate social responsibility projects that are of limited scale, usually unprofitable and therefore cannot be sustained, phased out, or replicated by others without the additional injection of public funds (Woodhill 2016).

Many development initiatives promote irrelevant interventions that have little positive impact and fail to address complexity (Andrews et al. 2014; UK Independent Commission for Aid Impact, cited in Mar Maestre 2015). The complexity debate, by seeing development as a complex, unpredictable process, is growing in popularity amongst development practitioners and this has therefore crossed into market systems approaches.

‘Increasingly, the development aid sector is confronting complex problems with outmoded delivery models’ (Nelson 2014).

Explicit recognition that markets are complex arose in 2013, with a small group of practitioners in the Market Facilitation Initiative (MaFI) introducing fresh views in the development debate, referring to markets as Complex Adaptive Systems9 (CAS). Since 2013 these claims have increased (Jenal 2013, 2016a, 2017a, 2017b, 2017c, 2018). Reference to CAS was previously applied to the health sector in DAP. Studies initiated by a World Health Organisation (WHO) initiative in 2007 ‘Advancing the Application of Systems Thinking in Health’ noted that health systems are complex and that linear approaches do not work. In proposing solutions they pointed to systems thinking with resources committed to initiate and test systems thinking in the health sector.

For the market systems practice, the complexity discourse was a turning point. Through this complexity lens, the practice is now seen as trying to offer simplistic solutions to complex development problems. Problems in development are messy, uncertain, complex and diverse and they do not lend themselves to reductionist methods of inquiry. They remain unsolved (Atkinson 2016; Barder 2012a, 2012b, 2012c).

9 This is not new in terms of markets, e.g., Holden (2005) or Holling (2001) made reference to the complexity of markets, but it was the first time in terms of markets in the context of international development assistance.
This reflects the reality market systems practitioners encounter every day: market systems are dynamic with rich interactions between a large number of diverse actors. Changes in these systems are difficult to predict and development interventions often, if not always, lead to unintended consequences' (Jenal 2018, para. 4).

Other influential organisations such as the Santa Fé Institute and the Centre for Global Development, Organisation for Economic Co-operation and Development (OECD) and Institute for Development Studies (IDS) in UK have published various reports, working papers, think-pieces and blog posts, acknowledging the complexity of market systems (Barder 2012a, 2012b, 2012c, 2012d; Barder & Ramalingam 2012; Hummelbrunner 2010; Hummelbrunner & Jones 2013a, 2015; Jones 2011; OECD 2017; Ramalingam et al. 2008; Ramalingam & Frej 2011).

Question-marks are raised over the linear approaches used and the thinking that sits behind these approaches. Many practitioners see international development aid in thrall to linear, mechanised thinking. Mechanistic approaches that lock down programmes into rigid cause/effect thinking and make them work with projections and pre-approved business models do little justice to the changing and often complex reality on the ground. The approach is wrong and hence results are poor (Barder 2012a, 2012b, 2015; Green 2014a, 2014b, 2017c; Jenal 2014; OECD 2017; Ramalingam 2013; Root, Jones & Wild 2015). Rigid frameworks with pre-determined solutions imported from developed countries that completely ignore the systems and context developing countries have done even more harm (Pritchett 2014).

Questions also arouse around the tools used: the theory of change, results chains, or logical frameworks that have been at the core of all aid initiatives including those that use market system approaches came under intense scrutiny. These tools which underpin the ‘development promises’ have locked donors and implementers into their established processes: ‘There is a sense in the development aid community that the existing structures only enable the system 'to function' (Wigboldus & Schaap, cited in Nelson 2014, p.44-45).

Consultants at BEAM Exchange acknowledge results chains are commonly
used in a wide range of development programmes, but that there are some specific issues to consider when using them in a complex market systems context.

‘Results chains specify linear pathways and therefore have limitations in dynamic situations where unintended results (both positive and negative) are likely’ (BEAM 2018a).

Pritchett (2014) asserts the use of inappropriate tools is a major reason for projects failure. Recurring failures in implementation across an array of initiatives are not mistakes the staff make but rather the visible expression of failure in the underlying theory of change, with programmes applying a flawed and rigid theory of change. A call was made for these models or tools to be revisited, or even discarded and replaced by a complexity-based understanding of how change happens (Jenal 2013, 2015, 2016a, 2017b; Nelson 2014).

‘If we are to further our understanding of what development aid entails, what it requires and how it influences different stakeholders, then the existing model needs to be revisited’ (Nelson 2014, p.43).

For Burns and Worsley (2015), interventions often fail because development practitioners simplify the world by seeing it as linear, static and predictable when, in reality, it is dynamic, complicated, complex, and totally unpredictable. Predictability and control of tools such as results chains are also criticised as being inappropriate to solve complex problems (Jenal 2018, para. 5). The same message occurs again and again. Things rarely happen in the way that they are planned and thinking needs to be challenged and replaced by a complexity-based understanding of how things unfold (Nelson 2014). Logical models are out-dated tools and need to be replaced (Burns and Worsley 2015).

‘I believe the current adherence to program logic, forecasting outcomes, and working towards designated targets limits the potential for change’ (Nelson 2014, p.43).

The prediction period is also scrutinised. How far in advance is it possible to plan in a complex environment?

Programmes and their designs are too rigid and they do not allow for flexibility in implementation.

‘Now there is recognition of the complexity of growth processes and the need to adapt approaches (to some degree) to different contexts’ (Elliot et all 2015, p.18).

To tackle complex issues requires a broader approach on ‘how we view and
research development issues’ and a new more flexible structure, ‘...it requires a structure built on diversity and variation rather than one built on order and intentional capability’ (Nelson 2014, p.45).

Research by the Harvard Kennedy School’s Corporate Social Responsibility Initiative (Humphrey et al. 2014), found that inclusive business projects failed to reach their full potential because they were carried out in isolation from the broader efforts by other stakeholders. Programmes fail to consider the broader picture, the ‘nesting’ and ‘being nested’ character of interventions and consequence of their actions. Interdependencies and interconnection of programme work with the work of others, of programmes results and the impact on others are often missing.

As social and economic systems are seen as increasingly complex, interconnected and adaptive (Harford 2012, 2016), they demand a different approach (Barber 2012a, 2012b, 2012c; Barber & Ramalingam 2012; Burns 2013; Cunningingham & Jenal 2013; Jones 2011; Harford 2012, 2016; Ramalingam et al. 2008; Ramalingam 2013; Ramalingam, Laric & Primrose 2014).

I was recently involved for six years in a challenge fund programme operating in the Asia-Pacific. These are development models where, through a competitive process, a donor challenges the private sector to come up with initiatives that will produce pro-poor outcomes. They partner and co-invest with the business in the initiative to test the model. There were high expectations that these business models would work and could be scaled-up, so that the impact was projected to double with time. I went on to review these business three years after the donor funding completed. Scale did not happen in all cases. Despite good intentions, many initiatives were not successful at transforming the markets in which poor people operate and did not continue to deliver social benefits and generate commercial outcomes. Regardless of whether this result was due to the mechanism designed - a challenge fund, the inflexibility of the programme to changing circumstances, unrealistic projections, or the tools used, there was a much deeper problem at the core: there was a mismatch between how the implementers believed the model would work, and how in fact it worked. The ‘mental models’ did not match the ‘reality on the ground’.

Planning for shorter periods, stopping and assessing results before renewing planning was viewed as the way forward. If there is considerable uncertainty, the horizon should be shorter (BEAM Exchange 2018). I argue, we need much more than that.
Ramalingam’s critique of international development aid points to ‘thinking’ or the ‘mental models’ that exist in our heads and become entrenched in the solutions offered: too linear and simplistic, identifying single, often ready-made, technical solutions to complicated problems. Ben Ramalingam makes a call to the development community to ‘rethink’ and improve aid, increasing the good and reducing the bad (Ramalingam 2013).

Nelson (2014) argues also that a ‘shift in thinking’ is needed due to the aid sector's inability to deal with complex issues.

Jenal asks practitioners to change ‘thinking’ as we face complex problems in market development; he quotes Einstein: ‘We cannot solve our problems with the same type of thinking that created them’ (2018, para 6). He gets to the roots of the problem, again naming ‘thinking’ when he argues that the use of inappropriate tools is also a result of the ‘type of thinking’ practitioners have. He further argues that ‘...there remain... big challenges... including those related to the functioning of the markets ... that these methods – and the thinking modes behind them – are not able to address.... In some cases, the situations are made worse by the inappropriate way in which they are tackled’ (Jenal 2018).

1.7. Where to from here? Thesis contribution to answering this question

The analysis thus far has highlighted the shortfalls in the use of systems thinking in practice, most recently in the light of ‘complexity’, that has led to poorer than expected results. So where to from here?

Dealing with complexity, or the incapacity to deal with it, is not unique to development. It is worth mentioning an example from the business sector, as it resonates well with what is happening in aid. In 2012, for its global annual survey, IBM interviewed over 1,500 senior executives (CEOs) in 60 countries and 33 industries regarding their views on complexity and how it is dealt with inside their organisations. The ‘Capitalising on Complexity’ report (IBM 2012) shows that there is a ‘complexity crisis’ and that those interviewed - the world’s private and public sector leaders - believe it is the biggest challenge they face, and that it is expected to continue — indeed, to accelerate in coming years. The IBM report found that there is a ‘complexity gap’ emerging from these organisations, defined as the difference between the complexities of the challenges faced in business and the preparedness to deal with them, (IBM 2012). “A surprising number of CEOs told us they feel ill-
prepared for today’s more complex environment” (IBM 2012, p. 8). The ‘complexity gap’, according to the report, was at 31 per cent (see Figure 1.6).

Figure 1.6. Complexity gap (Source: IBM 2012, p.22)

This poses considerable challenges to them and their businesses. These challenges require system-level thinking, the CEO of IBM suggests in the introduction of the report: “We occupy a world that is connected on multiple dimensions, and at a deep level—a global system of systems. That means, among other things, that it is subject to systems-level failures, which require systems-level thinking about the effectiveness of its physical and digital infrastructures” (IBM 2012, p. 3).

This ‘complexity crisis’ is now realised by development practitioners: they have to deal with complexity in development programmes. What can they do to close the ‘complexity gap’? Can they learn from IBM? The importance of ‘thinking’ and how systems thinking can help with complexity came up again and again in the review undertaken by this chapter. It was also the conclusion of sessions at the Joint Canadian Evaluation Society and American Evaluation Association conference held
in 2005 in Toronto, Ontario. The session had participants brainstorming what was exciting about the use of systems’ concepts in evaluation. Top of the list were the following: ‘makes you think differently; offers more effective ways of dealing with complexity and complex situations; develops new models to understand situations; allows for measuring or accounting for dynamic changes in a programme or system; recognises the evolutionary nature of programmes’ (American Evaluation Society 2014).

There is already an attraction to systems thinking and encouragement to move more towards this path, with the shift that was made ten years ago to markets systems approaches. Systems thinking is not new to DAP. A fundamental explanation exists for this attraction: it offers a model to think differently (Cabrera 2006; Cabrera & Colosi 2008; Cabrera & Cabrera 2015; Barder & Ramalingam 2012; OECD 2017). Practitioners see the complexity of their problems and may unknowingly be trying to point out that systems thinking may provide a solution.

This interest needs to be met with clarity at every level and in every form. What is needed now to improve the existing practice and address the so many above-mentioned shortfalls? New thinking, other tools, or new approaches as the critics pointed to? If not approached systematically, there is a real danger that little progress will be made in international aid; systems thinking will (continue to) be misunderstood, misapplied and because of poor results, eventually, discarded.

This thesis ascertains that shortfalls in the systems practice, such as incorrect or limited use, is due to challenges practitioners face. Addressing these challenges means that development practice could improve. Therefore, identifying these challenges to improve the practice becomes critical and it is therefore the focus of this research.

This hypothesis is not unsubstantiated. Other fields faced challenges when first embracing systems thinking. Cabrera (2006) in his PhD thesis provides an example of the public health sector in the US. A critical part of his research is about identifying challenges in applying systems thinking to public health initiatives, which then led him to provide solutions. He also pointed out in his thesis that these challenges were a result of misconceptions and definitional ambiguities that the systems thinking construct carries with it. Cabrera argues later in his thesis that similar challenges have been faced in the business and education sectors in the USA.
1.8. The objectives of this thesis

The purpose of this research is to investigate challenges that practitioners face in using systems thinking in programmes implementing market systems approaches. It also aims to propose solutions within a conceptual framework of tactics and action on how these challenges could be addressed for systems practice to improve by better responding to the social, economic and environmental challenges facing developing countries.

To achieve its purpose, the research will answer three series of questions. Each question sets the stage for the next question.

First, ‘Within the theoretical realm of systems thinking are there any definitional ambiguities or misconceptions, or other barriers that could lead to challenges in implementing systems concepts?’ The answer to this first question provides the research with an overarching theoretical ‘background’ to review on how systems thinking is applied in the MDP practice.

The second research question aims to determine if these misconceptions, definitional ambiguities or barriers have crossed into the MDP practice. Using a ‘theoretical findings’ lens: ‘Are there any misconceptions, ambiguities, or barriers in practicing systems thinking in MDP?’ This question is key to this research. Cabrera (2006, 2008) and later Sellers (2017) identified a series of misconceptions, definitional ambiguities, or barriers they argued could lead to implementation challenges.

Finally, the thesis examines a third question relating to the need for these implementation challenges to be identified: Are there any challenges development practitioners face in implementing systems thinking? Findings in this area are important for at least two reasons: they will provide the list of challenges to be actioned upon so that the systems practice of MDP in DAP can improve; and they will also refute or validate Cabrera (2006) and Sellers (2017) assertion that misconceptions, definitional ambiguities and other barriers lead to implementation challenges, but this time in a new field, MDP.

1.9. Overview of chapters

In Chapter Two: Systems Thinking: A Literature Review, the literature is reviewed to identify the current state of the field of study, and whether any ambiguities exist in its conceptualisation. Chapter Two concludes that, even if these
ambiguities exist, new perspectives, with the introduction of a fourth wave of systems thinking could offer hope in addressing them.

Chapter Three provides a Discussion on the Systems Thinking Practice in Programmes Applying Market Systems Approaches. In this chapter the researcher adopts a theoretical concepts lens, presented in the previous chapter, when exploring how systems thinking is being applied in market systems development programmes to see if any ambiguities or misconceptions exist. It looks at donors, funded programmes, organisations, practitioners and implementers. As a result it provides evidence that some of the ambiguities and misconceptions that systems thinking carries have crossed boundaries and are absorbed by market system approaches. Chapter Three concludes that these results are most likely due to the challenges that practitioners face. It sets the stage for one of the key contributions that this thesis brings to the field: an experimental research study that attempts to clarify what the challenges faced by development aid practitioners are, and to what extent there are patterns or ‘themes’ that could be addressed or actioned.

Chapter Four: Identification of Challenges (the Methodology), outlines the overall approach for the study and the reason for choosing ‘concept mapping’ a structured conceptualisation method, amongst other methods, to identify the challenges practitioners face in implementing systems thinking. This chapter also provides the products of the group concept mapping process, including a list of challenges to contribute to the research hypothesis that these challenges are in fact a contributing factor to the limited or incorrect use of the concept.

In Chapter Five: Concept Mapping, Results and Interpretation, an interpretation of the results of the concept mapping process is presented. A number of concept maps are generated and discussed using different variables, including participants’ demographics. The conceptualisation framework for this study, the cluster map, is also generated and discussed.

Chapter Six: Recommendations, follows up on the findings from previous chapters to provide recommendations on how to address these challenges and identify a way forward. The implications of the findings are considered, with a set of possible solutions and solution types that could then be used as a starting point by practitioners, implementers and donors.

The thesis concludes with Chapter Seven by reflecting upon the findings through the lens of recommendations and solutions. It concludes that there is a way
forward with 30+ solutions which provide direction but also suggests that more work is required to determine how systems practice could be improved in MDP to better respond to the challenges facing developing countries.
Chapter Two: Systems Thinking: A Literature Review
This chapter introduces the theoretical concepts in the field of systems thinking. It examines the vastness but also the evolution of systems approaches, concepts, theories and methods over time. In so doing, it identifies some of the conceptual ambiguities and misconceptions or other barriers that come from the practical application of this field of knowledge and presents how these have been recently addressed through a ‘fourth wave’ of systems thinking. Finally, Cabrera’s Distinction Systems Relationship and Perspectives (DSRP) theory is examined. These theoretical aspects of the systems thinking literature are critical at this point in the research. They will provide the background through which the market systems practice in the next chapter will be assessed.

2.1. The approach

There are many ways to conduct a review of theoretical concepts and it is important to outline the reasons for the choice of what theories and publications to include and what to exclude. These decisions as Boote and Beile (2005) argue, must be justified in a transparent way. This is particularly true for this thesis which embraces two vast fields of study ‘systems thinking’ which crosses many fields and disciplines and is understood in many different ways; and the market systems practice in DAP which is equally vast, covering a huge number of sectors.

To narrow it down and address the core purpose: to identify challenges practitioners face in using systems thinking, the literature review of systems thinking focuses on ‘barriers’ or ‘obstacles’, ‘ambiguities’ or ‘misconceptions’ or other ‘limitations’ in adopting and practicing systems thinking. This is a more appropriate and manageable task and it provides the overarching background through which the practice of MDP can be reviewed.

This approach narrows the boundaries as to what constitutes a literature review in the context of this research and is still good practice. Bertalanffy stated that ‘an attempt to summarise the impact of ′systems′ would not be feasible’ however ‘...a few examples, more or less arbitrarily chosen, must suffice to outline the nature of the problem and consequent reorientation’ (Bertalanffy 1968a, p. 5).

Figure 2.1 presents the result of this approach: the systems thinking focuses on concepts and theories but as much as possible wearing the ‘barriers or obstacles, misconceptions and ambiguities’ in adopting and practicing systems thinking’ lens.
The results of this analysis will inform Chapter 3: *Discussion on the market systems practice in DAP* where the practice of MDP will be discussed and reviewed (see Figure 2.2).

There are several issues with the systems thinking ‘construct’ and its adoption that emerged from the literature review. They are presented below.

**2.2. Defining systems, a paradox?**

‘*The basis of systems thinking is systems theory. The basis of systems theory is the concept of a system*’ (Thomas & Walstrom 2017, p.38).

What Thomas and Walstrom point to is that in practically every step someone makes, or a book, thesis, journal article that someone reads, or in a discussion or
training session, the concept of systems thinking starts with the definition of what the ‘system’.

The idea of describing phenomena as systems and promoting holistic views by emphasizing relationships that exist between humans and nature, began nearly 2,600 years ago, as far back as the ancient times of the Greek philosophers Heraclitus and Aristotle and ancient traditions of Buddhism or Hinduism (Cabrera 2006; Reynolds & Howell 2010). The word ‘systems’, as it is used now, was first introduced in documents of the eighteenth century by Immanuel Kant (Ulrich 1983).

There are many definitions of a system and many types of systems. There is no single definition of systems widely accepted outside the systems community.

With this view, almost any phenomenon can be regarded as a system. Systems can be physical, e.g., forests, rivers, oceans; living systems e.g., organisms, people; designed systems, e.g. cars; social such as communities, households, markets; even abstract systems, political, philosophical; or a result of human activity, such as quality assurance systems. In truth, examples of systems abound to explain somebody’s area of work.

There are also examples where authors define the system by listing what they think the specific parts of the system are, and they list the interrelated parts, boundaries, and so on. Because of this there are definitions of systems like the following: ‘A system is a set of interrelated parts that form a whole. A system is not the sum of its parts, but rather the product of their interaction’ (APPC, 2018). This view of a systems is depicted in Figure 2.3: the system with sub-systems which themselves could have parts. It also shows relationships and its distinct boundaries, to delineate what is ‘inside’ and what is ‘outside’.
Understanding systems means looking beyond individual parts and boundaries to identify the relationships and relational rules that agents follow and that affect how the system operates. It also means looking and understanding what is (left) outside the system. Through fluctuations and adjustments, all systems seek to maintain their stability (Harich 2010).

This definition based on what constitutes a system seems to be one of the most common view of the systems which is consistent with which the systems community believes a system is.

Bertalanffy (1968a), one of the world’s most famous biologists, was the first to argue that organisms should be studied as complex systems. Systems, for him, are integrated wholes whose properties cannot be reduced to those of smaller units. The systems view looks at the world in terms of relationships and integration. In 1950 he published an article in which he clarified the distinction between open systems and closed systems, but not necessarily to “open systems,” such as living things. His mathematical model of an organism's growth over time, published in 1934, is still in use today (https://www.goodreads.com/author/show/541865.Ludwig_Von_Bertalanffy).

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10 Bertalanffy is an Austrian-born biologist known as one of the founders of general systems theory, an interdisciplinary practice that describes systems with interacting components, applicable to biology, cybernetics and other fields. Bertalanffy proposed that the classical laws of thermodynamics applied to closed systems, but not necessarily to "open systems," such as living things. His mathematical model of an organism's growth over time, published in 1934, is still in use today (<https://www.goodreads.com/author/show/541865.Ludwig_Von_Bertalanffy>).
closed systems. A living organism is an open system that engages in exchanges with its environment. A closed system does not. Through these exchanges, open systems are continuously building up and breaking down their parts to return to the environment as they depend on the environment to maintain their existence. They adapt in reaction to changes in the outside world (Bertalanffy 1968a). Bertalanffy’s lasting influence came from his suggestion that these sorts of behaviour are not unique to systems in biology but could be experienced by systems in other fields. These views were translated into what he then named ‘General System Theory’ where systems are studied in their own right. The theory became an important theoretical underpinning for ‘controlling and instigating the transfer of principles from one field to another’, which meant that “it will no longer be necessary to duplicate or triplicate the discovery of the same principles in different fields isolated from the other” (Bertalanffy 1968a, p. 80). However even Bertalanffy was criticised on how he uses the word ‘system’.

‘...Bertalanffy himself used the word promiscuously both as an abstract idea (i.e. epistemologically) and as a label-word (ontologically) ’ (Checkland 1999, 45-56).

Defining the system by listing specific parts of the system is popular amongst systems community. Systems share basic attributes or conditions which are called boundaries, relationship and perspectives (Cabrera, Colosi & Lobdell 2008; Midgley 2004a, 2004b, 2007; Williams & Imam 2007).

Hoos (1984) book System analysis in public policy: A critique, highlights this major problem the systems community has. There are 15 different classes of meaning for a system in Webster’s dictionary, and there is ‘anything and everything’ defined in these examples as a system, with very few exclusions. Hoos argued that the systems movement is now more metaphysical than physical and that systems were ‘merely arbitrary mental constructs and therefore useless’ (Hoos, cited in Sellers 2017).

Checkland (1981) takes a constructivism approach when defining systems. Constructivism is taken where any definition of reality requires an observer. In Checkland’s view is that characteristics of systems, e.g., the function or purpose of the system, definitions of problems related to the system and the relevant boundaries, are defined by the perception of interested parties based upon their position, role and experiences, and may be experienced and understood differently by various stakeholders. Sellers (2017; 2017, p.33; 2017 p.34) points to issues with the scientific community when a constructivism approach is taken, as a ‘subjective’ interpretation
of the observer view of reality ‘might not reflect the scientific truth’. It does not confirm Popper’s criterion that ‘any scientific theory must be falsifiable, or provable’. The definition of systems, being subject to interpretation of observation is not scientifically accepted.

Sellers suggests there is a different perspective in defining systems in Meadows and Wright (2007) definition of systems ‘… there are no separate systems. The world is a continuum. Where to draw a boundary around the system depends on the purpose of the discussion – the question we want to ask’ (Meadows & Wright 2007, p.188). There are positives with this definition as the ‘results are more intuitively accessible’ (Sellers 2017), but the same issues arise and it fails the ‘scientific test’: including ‘everything in the world in the definition is problematic’ (Sellers 2017, p.37). The scientific community would not accept it. ‘To accept this definition the system thinker must start with the idea that a ‘universal system’ is the supreme of knowledge’ (Sellers 2017, p.37).

Sellers (2017) concludes that in order for systems thinking to progress, there must be an agreement between scientific community and systems community on what systems are.

What does this mean? Ackoff (2006) argues this inability of the systems community to communicate effectively with the outside world is a fundamental problem in understanding and expanding systems thinking.

### 2.3. Defining boundaries, another paradox?

Defining boundaries of systems is sometimes viewed as a controversial part of systems work, inquiry or thinking. It is often questioned whether one should set them or not. The ‘boundary problem’ relates to systems thinking thought to be holistic and hence ‘bounder-less’. This is considered one of the misconceptions of systems thinking (Cabrera 2006).

Williams(2007) points to it as a ‘feature of any systems inquiry’: ‘Decisions and insights about who or what is ‘in’ and what is ‘out’ of an inquiry, its boundaries, are key features of a systems inquiry (Williams 2007, p.9).

Kurtz and Snowden (2003) note that ‘boundaries are possibly the most important elements, in sense-making; because they represent differences among or transitions between patterns we create in the world that we perceive’ (p.474).

Questions arise over how boundaries are drawn. For example, in education,
Squire and Reigeluth (2000) have found that different people use the term ‘systems’ to communicate very different ideas and to advocate very different approaches to improving education. This led to confusion and misunderstandings depending on whether the system under examination is the local school system, the district education system, or the state education system. Who, or what decides what is in the system and what is external to the system? The question of boundaries is another paradox for systems community. For Cabrera (2006) the question of boundaries is definitional and is related to what one includes in a system (Cabrera 2006).

What does this mean? Cabrera argues that what defines a system is also its boundaries. They differentiate between externalities and internalities. No system is infinite, unless it is the universe. Even an open system must have some enclosure (Cabrera 2006). Defining boundaries is therefore an essential part of systems work or thinking (Cabrera 2006, 2015a, 2015b; Williams & Imam 2007; Williams 2008).

2.4. Defining systems thinking: systems thinking as…?

Modern systems thinking did not fully develop until the 1940s and 1950s. 32 core systems concepts were identified by Ackoff (Ackoff & Emery 1972; Williams & Imam 2007) in the late 1970s. The field expanded quickly and there is no shortage of concepts, theories, or methods in the systems literature. As in the case of systems, there is no agreed definition of systems thinking.

2.4.1. Systems thinking as…. General Systems Theory

The science of studying systems and General Systems Theory (GST) became popular in the mid-twentieth century because it was seen as an alternative to the reductionist science. Reductionism focuses on parts of a system and seeks to identify and understand them and work up from an understanding of these constituent parts to an understanding of the whole. This was the beginning of the traditional scientific method for studying systems. Proponents of GST argue that there is a problem with this: the whole often seems to take on a form that does not mirror the parts. It emerges from the interactions between the parts, which affect each other through complex networks of relationships (Ackoff 1999). GST introduced holism as an alternative for studying systems, the opposite of reductionism. Many different academic disciplines embraced holism, from the failure of reductionism to address problems of complexity and to better understand change in complex adaptive systems. Both the open system
model and GST were soon embraced by management thinkers in the study of organizations.

2.4.2. Systems thinking as… systems dynamics

The inclusion of systems thinking to study more strategic problems in organisations has led to the development of systems dynamic. Forrester (1994) believed that Operational Research (OR) in management was only dealing with specific tactical issues amenable to mathematical modelling, involving just a few variables in linear relationships with each other. By learning how complex systems work, managers could bring about improvement in the organisations they manage. Nevertheless, the central feature of his approach was the development of rigorous, computer-based simulation models that could be tested for validity against the behaviour of the real-world systems they were supposed to represent.

If Forrester and his team at the Massachusetts Institute of Technology (MIT), performed the solid groundwork necessary to establish system dynamics as a rigorous and respected applied systems approach, it was Peter Senge, with his book *The Fifth Discipline* (1990), who popularised system dynamics. This volume, promoted system dynamics (the ‘fifth discipline’ of the title) as the key to creating ‘learning organisations’ and hit the best-seller lists worldwide (Senge 1990). Systems thinking is described in the book as the most important of five disciplines that define a learning organisation and responds to: (1) the increasing complexity in our lives; (2) growing interdependence of the world, and; (3) emergent revolutions in management theories and practice.

2.4.3. Systems thinking as …complexity theory

In order to understand complex systems Kellert (1993) and Wheatley (1999) developed Chaos theory. The authors stated that ‘beneath the apparently chaotic behaviour of a complex system lay certain patterns that can help one to both understand and influence the behaviour of the system’ (Reigeluth 2004, p.2). One of the most important popularisers of complexity theory, Gleick (1988), has argued that twentieth-century science will be remembered for three things: relativity, quantum mechanics and chaos. Emergence occurs when diverse elements or agents interact with each other in unexpected ways to create something new. Complex aspects of a situation cannot be known or predicted ahead of time; cause and effect are only
visible retrospectively. Complexity theory focuses attention on those aspects of organisational life that bother most managers most of the time – disorder, irregularity and randomness. It accepts instability, change and unpredictability and offers appropriate advice on how to act (Kellert 1993, Wheatley 1999).

Complexity theory\(^\text{11}\) is seen as being applicable to the behaviour over time of complex social, as well as natural, systems. Social systems are not just ‘complex adaptive systems’ bound by the fixed rules of the interaction of their parts. Rather, they are ‘complex evolving systems’ that can change the rules of their development as they evolve over time. The phrase ‘complex adaptive systems’ is thought to have been created in the 1980s at the Santa Fé Institute, a New Mexico think tank. The most common definition of a complex adaptive system, based on the work of John Holland (1995), is a dynamic network of agents acting in parallel, constantly reacting to what the other agents are doing, which in turn influences behaviour and the network as a whole. Control tends to be dispersed and decentralised and the overall behaviour of the system is the result of individual agents decisions that constantly change. It is thought that in a complex adaptive system, order cannot be predetermined but emerges from agents’ behaviour and interaction. The future cannot be predicted, and it is not possible for the system’s history to be reversed.

Understood as embracing complex evolving systems as well as complex adaptive systems, new applications are constantly being found in many fields (Bosch, Nguyen & Sun 2013; Ha, Bosch & Nguyen 2015; Cabrera 2006; Harford 2012, 2016). These include astronomy, geology, physiology, economics, computer art, music, management, business, organisational learning, natural resource management, sustainability, commodity, food security and, very recently, in market system development programming as the next Chapter will demonstrate.

2.4.4. Cabrera’s view of systems thinking

One key focus of Cabrera’s literature review on systems thinking he conducted for his PhD (2006) was to identify themes and claims, each summarising a conceptual theme commonly found in the literature that he called ‘misconception’.

For example, what he found and demonstrated then was that many academics and practitioners propose special models (usually of their own making) and claim

\(^{11}\) Often, the terms complexity science, complexity theory and complex adaptive systems thinking are used interchangeably.
their model constitutes systems thinking. He considers this a misconception on systems thinking.

‘Systems thinking is defined as [X claim], where [X claim] is some special model of systems thinking, the foundations of which are grounded in a particular specialised field’ Cabrera (2006, p.40).

Cabrera gives the example of the systems theorist, Capra (2002), who developed a systems thinking model he calls ‘ecoliteracy’. He points then to Bertalanffy (1968a, 1968b, 2003) who sees systems thinking as synonymous with GST, yet GST is a biological and holistic theory of organisation. Hammond in The Science of Synthesis: Exploring the Social Implications of General Systems Theory, (2002, 2003) follows Bertalanffy’s lead when she explores systems thinking through General Systems Theory and the profiles of its founders. Then Checkland (1981,1999) who introduces the Soft Systems Methodology model and uses it and the concept of systems thinking interchangeably. There is then a relatively small but influential field of system dynamics12 where some systems dynamicists explicitly differentiate their style of systems thinking as the systems thinking, while others make less explicit claims by using system thinking and systems dynamics interchangeably or even synonymously. Richmond (1994) is one of many systems thinkers who support the argument that systems thinking overlaps in many ways with systems dynamics.

Through these examples Cabrera (2006) demonstrates a similar pattern in the literature exists: when defining the concept, academics are prone to offer their special model as synonymous with systems thinking. He criticises this limited view of what systems thinking is, that is confusing for those who want to embrace systems thinking. He also points to the fact that one model is necessary, but might not be sufficient for responding to the challenges one might want to address by using systems thinking: these authors account for only a handful of ‘nodes’ in Schwarz’s map, and only a few of the brief 3,806 entries in Francois’ encyclopaedia (Cabrera 2006, 2008).

Cabrera (2006) concludes that it is important to take a pluralistic view encompassing the many rich traditions of systems thinking. A pluralist view is

12 System dynamics is an approach that uses stocks, flows and internal feedback loops, amongst other tools to understand the complex and nonlinear behaviour of systems.
inclusive of the vast and rich traditions about systems from across disciplines. Systems thinking is not one kind of thinking, but rather is thinking that utilises an understanding of many types of systems (Cabrera 2006). If there are over 600 systems methods, concepts and theories in Schwartz’ map, all would inform systems thinking.

All misconceptions that Cabrera identified, are presented in Table 2.1. He offers four corresponding counterclaims, or counterarguments (Table 2.2) which he then uses in defining what systems thinking is (2006, 2015a).

Table 2.1: Misconceptions in the systems thinking literature (Cabrera 2006, p.30)

<table>
<thead>
<tr>
<th>Systems thinking is…</th>
<th>defined as [X claim], where [X claim] is some special model of systems thinking, the foundations of which are grounded in a particular specialised field.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>holistic. The focus is on the whole rather than the parts.</td>
</tr>
<tr>
<td></td>
<td>thinking in which the whole is greater than the sum of its parts.</td>
</tr>
<tr>
<td></td>
<td>methodological, scientific, practical, or best framed in biological, ecological or organic terms.</td>
</tr>
</tbody>
</table>

Table 2.2: What ultimately systems thinking is (Cabrera 2006, p.35; Cabrera 2015a)

<table>
<thead>
<tr>
<th>Systems thinking is…</th>
<th>a plurality of hundreds of methods and models.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>balanced thinking (both holistic and reductionist, and/both not either/or)</td>
</tr>
<tr>
<td></td>
<td>the whole is always precisely equal to its parts.</td>
</tr>
<tr>
<td></td>
<td>Systems thinking is conceptual. The special system under question, observation, or application determines the terms that best frame the system.</td>
</tr>
</tbody>
</table>

Sellers (2017) found a list of common themes that most systems thinkers seem to agree with: ‘Perspectives not reductionism’, ‘Relationships not elements’. These
very recent examples confirm that these misconceptions still exist in the systems community.

From the misconception and their counterarguments, Cabrera develops his view of systems thinking, which is conceptual. Cabrera’s systems thinking definition is a conceptual orientation that is informed by knowledge-about-systems:

‘Systems thinking is a conceptual framework, an orientation to the world, and a model for thinking about and learning about systems of all kinds’ (Cabrera 2006, p.93).

What does it mean? Cabrera’s misconceptions are important for this thesis. They will be later used in Chapter 3 to see if they crossed the boundaries into the market systems practice of international development aid. It also means that a limited, narrow view of systems thinking narrows down work, and hence possible solutions.

2.5. Sociological barriers to adoption

In a study focusing on the enablers of, or barriers to, systems thinking, Sellers lists a number of obstacles. Some of these are particularly relevant to this thesis as they relate to sociological obstacles to adoption.

2.5.1. Difficulty in acceptance of the new paradigm

The ease in adopting a new paradigm depends on the success that the old ‘paradigm’ has had (Kuhn, cited in Sellers 2017). The more successful it is, the less likely is that people will shift to the new paradigm, ‘those which have made a successful career under the old paradigm will resist the change’ (Sellers 2017, p.38). There are two groups that will resist the change: (i) a successful group of traditional thinkers, those which discovered the paradigm and understand the underlying methodologies; and (ii) a large number of organisations and trained practitioners ‘which have built their success around the old thinking paradigm’ (Sellers 2017, p.38), have learnt to implement the methodologies but never really understand the fundamentals of that paradigm.

Attention should be given especially to the second group, Sellers argues, as “it is particularly a difficult group to convert because without an understanding the flows in their current paradigm they are unable to grasp the significance of the change” (Kuhn, cited in Sellers, p.38).
2.5.2. Mental models of traditional thinking and beyond: an obstacle

The most difficult aspect of learning systems thinking is the requirement for a new perspective or paradigm. Midgley (cited in Tuan, Bosch & Nguyen 2013) considers systems thinking as an old concept but a ‘new way of thinking’ to tackle the increased complex problems that the world now faces and an abandonment of the existing mental models (Bosch et al. 2007; Cabrera et al. 2008; Tuan, Bosch & Nguyen 2013; Sellers 2017). There are challenges with getting this ‘new way of thinking’ adopted.

Sellers points to the ‘convenience’ of the old approach that he calls ‘traditional thinking’, as it offers an easy way to show how successful we are. He points to the requirement of a change in paradigm, the need to take a new perspective if to move to systems thinking. For him, this is a major barrier to overcome. He concludes it is not as simple as many think, by adding new tools or frameworks to ‘traditional thinking’. It requires a fundamental shift in paradigms and in our beliefs (Sellers 2017).

2.5.3. Intrinsic characteristics of the practitioner

Some of the characteristics needed to become a systems thinker could be taught or acquired in life, some of them are intrinsic, personal talents, and they cannot be taught (Sellers 2017).

These intrinsic characteristics of mental processing must be present to enable complete systems thinking (Seller 2017, p. 39). He refers to this barrier as ‘insurmountable’.

2.6. Presenting systems thinking: another challenge

2.6.1. The vastness of systems thinking

The field of systems thinking expanded rapidly. However, it is difficult to combine all the authors, their theories, concepts, methods into a common though simple structure. Various authors have attempted, unsuccessfully, to capture that.

One contribution came in Williams and Hummelbrunner’s book, Systems Concepts in Action: A Practitioner’s Toolkit (2010). The book is intended to provide an introductory primer to systems thinking and its concepts and it is structured as a reference guide to various methods used in systems thinking. However, while the
book offers a wide-angle view of the systems landscape, it is really only a snapshot (Cabrera 2006).

Charles François’ two-volume *International Encyclopedia of Systems and Cybernetics* (Francois 1997) had over 1,700 entries of systems concepts. Some of these – such as cybernetics – are entire fields in and of themselves, composed of many more systems concepts. While Francois offers a wide-angle view of the field landscape, it is again viewed as only a snapshot of the knowledge-about-systems (Cabrera 2006).

Midgley’s four-volume publication, *Systems Thinking* (Midgley 2003a, 2003b, 2003c, 2003d), provides a list of systems ideas and a history of the systems movement. His collection includes 97 chapters, each dealing with a specific method, that he and an International Advisory Board believed were important. He explained the purpose of these volumes as: “to consolidate key writings on systems thinking”; ‘I have attempted to represent the broadest possible range of systems ideas’ (idem).

Eric Schwarz (1996) and the International Institute for General Systems Studies (2001) tried to pull all the various authors and their concepts into a complex map entitled ‘Some Streams of Systemic Thought’. A very complex map with 694 nodes and thousands of colour-coded connections, pointing to systems thinkers, frameworks, methods and theories, such as General Systems Theory, cybernetics, physics, mathematics, computers and informatics, biology and medicine, ecology, philosophy, systems analysis and engineering, among others, was created. The map presented in Figure 2.4 is clearly impossible to read and is included just to emphasise the vastness of systems thinking, the large number of different domains within systems thinking and the multiple relationships between them. A higher-resolution version of this image is available for download at [http://www.visualcomplexity.com/vc/project.cfm?id=273](http://www.visualcomplexity.com/vc/project.cfm?id=273).

These last three of these authors are often referred to as the MFS ‘Universe’ (Cabrera & Cabrera 2015, p. 21): M(Midgley), F(Francois), S(Schwarz). What these authors show is that there is no shortage of concepts, approaches, theories, frameworks or methods in the systems field; because of the vastness of the field it becomes difficult to capture all of them in one work. Together, their work can provide a comprehensive overview of systems thinking. It covers a pluralism of systems types and theories, systems concepts and approaches (Cabrera 2006).
More recently, Sellers (2017) offers the newest attempt to combine authors and present a comprehensive picture of their work on systems thinking. He acknowledges upfront that without clear criteria it is difficult to combine all concepts, theories, elements etc. into a simple structure. He uses mind mapping to address this issue as ‘in this process the elements are organised visually and sorted intuitively’ (p.41). He developed what he calls a ‘complete mind map of all authors’. The map available for download at https://drive.google.com/file/d/0Bw01fdrJa-vzNzFaR0lnV0hGeFU/view (slide 20), shows that the largest contribution on systems thinking comes from two authors placed in different places on the map: Meadows and Weinberg.
Figure 2.4. Schwarz’s ‘Some Streams of Systemic Thought’ (Schwarz, 1996)
2.6.2. A simplified categorisation of systems thinking: Systems thinking typologies

With such a large number of systems approaches, concepts, methods and theories there have also been attempts to simplify them by organising them into categories. Again, nothing has been agreed. Authors look at systems thinking from many perspectives.

2.6.2.1. Sellers’ typology of systems thinking

Based on his map Sellers (2017) argues five schools of thought on systems thinking emerged: Systems dynamics (Donella Meadows, Peter Senge, Barry Richmond, Management (Russell Ackoff, Dietrich Dorner, Systems science (Gerard Weinberg, George Klir), systems engineering (Moti Frank), and evolutionary epistemology (Derek Cabrera). However, he acknowledges that this map is not exhaustive, and with a set of other authors the results could be different. The point he wants to make is that many perspectives of systems thinking exist.

2.6.2.2. Systems thinking as hard, soft and critical

Systems approaches can be categorised as ‘hard’, ‘soft’ and ‘critical’ (Table 2.1). These three sets build on Checkland’s (1978) earlier classification of hard and soft systems. He introduced soft systems, as a response to the thinking at that time that systems thinking was based on systems that exist in the real world – ‘hard’ systems. He introduced the notion of ‘soft’ systems by considering systems as epistemological concepts and not just real-world entities. It was Hull University in the UK which paved the way to, and the need for, the third distinct strand of systems thinking. Werner Ulrich and his two other colleagues were trying to address inadequacies in the previous two strands: hard and soft, in addressing power relations. They suggested Critical Systems Thinking. Table 2.3 presents the grouping of the approaches based on the three strands.
Table 2.3: Traditions of systems thinking (Source: Reynolds and Holwell 2010, p.10)

<table>
<thead>
<tr>
<th>Systems type</th>
<th>Systems approaches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard systems</td>
<td>General Systems Theory (Bertalanffy 1956)</td>
</tr>
<tr>
<td></td>
<td>Classical (first order) cybernetics, ‘mechanistic cybernetics (Ashby 1956)</td>
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<td></td>
<td>Operations Research (Churchman et al. 1957)</td>
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<td>Systems engineering (Hall 1962)</td>
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<td>Socio-technical systems (Trist et al. 1963)</td>
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<td>RAND-systems analysis (Optner 1965)</td>
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<td></td>
<td>System dynamics (Forrester 1971; Meadows et al. 1972)</td>
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<tr>
<td>Soft systems</td>
<td>Inquiring systems design (Churchman 1971)</td>
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<td></td>
<td>Second order cybernetics (Bateson 1972)</td>
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<td></td>
<td>Soft systems methodology (Checkland 1972)</td>
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<td></td>
<td>Strategic assumption surface testing (mason and Mitroff 1981)</td>
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<td></td>
<td>Interactive management (Ackoff 1981)</td>
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<td></td>
<td>Cognitive mapping for strategic options development analysis (Eden 1988)</td>
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<tr>
<td>Critical systems</td>
<td>Critical systems heuristics (Ulrich 1983)</td>
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<td></td>
<td>System of systems methodologies (Jackson 1990)</td>
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<td></td>
<td>Liberating systems theory (Flood 1990)</td>
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<td></td>
<td>Interpretive systemology (Fuenmayor 1991)</td>
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<tr>
<td></td>
<td>Total systems intervention (Flood and Jackson 1991)</td>
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<tr>
<td></td>
<td>Systemic intervention (Midgley 2000)</td>
</tr>
</tbody>
</table>

These three strands are referred to as ‘waves’ of systems thinking (Midgley 2000).

2.6.2.3. Systems thinking based on level of complexity (Jackson’s view)

There were other attempts to categorise the vast number of approaches, systems methods, and concepts. Jackson’s (2000) *Systems of systems methodologies* matrix is based on a situation where these concepts are applied. Two variables were used to generate a six cell matrix: the level of complexity of the problem under consideration (with two options: simple or complex based on level of interdependencies and interrelatedness) and the level of engagement between participants (with unitary, soft or coercive relationship options).
2.6.2.4. Systems thinking based on authors’ life and work

Another perspective from Ramage and Shipp in their book *Systems Thinkers* (2009) has groupings based on types systems thinkers. The typology was based on the life and work of authors behind the systems concepts and approaches and not the concepts themselves. The typology generated seven groupings: early cybernetics, general systems theory, systems dynamics, soft and critical systems, later cybernetics, complexity theory, and learning systems.

2.6.2.5. What does this mean?

Due to vastness of systems thinking, authors tried to put them into categories. While all these typologies are helpful in understanding how concepts may relate to each other or relate to a situation where they might be used, they have been criticised for: creating silos, breaking the possible links between concepts, and not promoting cross-fertilisation amongst systems concepts, ideas, theories, methods or tools (Reynolds & Holwell 2010).

2.6.3. Publications on systems thinking increased exponentially

As the systems field expanded quickly, so did the literature in academic journals. Indicative of the size of the body of academic literature on systems thinking, a search on an RMIT University library database shows there are over 2,288 journal articles with systems thinking in the title, twice as many as ten years ago, when only 1,012 are reported. Popular books are growing in number as well. Only 66 were published by the end of 2006, but this number has grown to 333. A snapshot is provided in Appendix 2.1. A similar search of Amazon.com yielded 278 books with ‘systems thinking’ in the title, and there are many other popular books that do not use the term but that strongly promote a conceptual systems orientation of some kind. These books are developing at a rapid pace, with 61 per cent of the Amazon search titles written only in the past ten years and over 40 per cent in the last five years (Figure 2.5). 25 books on systems thinking were published in 2016 and in the first few months of 2017, seven books were published.

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13 Search conducted in February 2017
14 Search conducted in February 2017
What does it mean? This increase could mean there is demand from practitioners, but also shows that the supply has increased dramatically as the systems thinking is applied now in so many fields.
Figure 2.5. Number of books concerned with systems thinking (Source: search on an RMIT University library database)
2.7. Three waves of systems thinking

Gerald Midgley built on the categorisation in Table 2.1 to describe the historical evolution of the concepts, approaches and theories of systems thinking through a number of waves that occurred over 50 years or so (Midgley 2000). In this he recognises a staged development of the field. The first wave, which ended around the 1970s, described systems in physical terms (the ‘hard’ systems), and included theorists such as von Bertalanffy and Gregory Bateson and theories such as systems dynamics, systems engineering and mostly quantitative methodologies. In the late 1970s, soft systems thinking occurred as systems thinkers reacted to the failure of neglecting the human aspect by the ‘physical metaphor’ promoted by the first wave.

Approaches from first wave ‘were criticised for viewing human beings as objects that could be manipulated as parts of larger systems, instead of individuals with their own goals that may or may not harmonise with wider organisational priorities’ (Midgley 2000, p. 191).

Researchers such as Ackoff and Checkland in the 1980s moved to develop approaches appropriate for human systems that focused more on qualitative methods, collaboration, and facilitation. This led to methods known as soft system methodology, sense making or design thinking which have a more interpretative orientation.

‘Interpretive system thinkers wish to promote mutual understanding and learning through the widest possible participation in decision making. They encourage open debate and believe that language is a vehicle which can be used to arrive at a consensus, or at least accommodation, about improvements that can be made to the existing situation’ (Jackson 2000, p.349).

It did not take long for systems thinkers to find themselves under attack and being criticised for starting a ‘paradigmatic war’ between first and second wave thinkers although some people saw the benefit of both approaches to deal with and respond to different types of problems (Dando & Bennett 1981). Jackson and Keys published an influential paper in 1984 that saw these first two waves as complementary and not in competition with each other. Their paper provided the foundation upon which the third wave of systems thinking was built. Advocating for methodological pluralism, Critical Systems Thinking was born in late 1980s and is known as the third wave. Other authors supported the evolving nature of
methodological pluralism in systems thinking (e.g., Oliga 1988; Flood 1989a, 1989b, 1990; Gregory 1992; Jackson 1997, Midgley 2007), emphasising the value of having both views.

2.8. The fourth wave of systems thinking

Cabrera built on Midgley’s waves to propose the birth of a fourth wave of systems thinking (Cabrera & Cabrera 2015, Cornell University 2016). He represented all four waves in the promotional materials for the 2016 Cornell University Systems Thinking Symposium (Figure 2.6).

Cabrera and Cabrera (2012, 2015), Cabrera and Colosi (2008) and Cabrera & Cabrera (2017) consider that what has been developed thus far in terms of systems thinking has been too focused on the ‘system’ side of the concept, by developing concepts, approaches and theories that help understand ‘systems’ at the expense of the ‘thinking’ side of the concept, which had been less addressed and somehow neglected. This, Cabrera claims, led to an unbalanced view of systems thinking (Figure 2.7). He proposes to balance this view with the fourth wave.\(^{15}\)

\(^{15}\) Cabrera often refers to version 1 to include first, second and third wave of systems thinking, and considers DSRP the second wave (Cabrera & Cabrera 2015, Cornell University 2017).
Figure 2.6. Four waves of systems thinking (Cornell University 2016)
He authored two new theories which are part of this wave:

- the DSRP theory, which advances the field by identifying four simple systems thinking rules: (i) making distinctions (D) (ii) recognising systems (S); (iii) defining relationships (R); and (iv) taking many and different perspectives (P). DSRP are rules which underlie the diversity of the first three waves; and

- VMCL systems thinking, with its four principles: a vision (V), mission (M), culture (C), learning (L).

If DSRP are rules to follow by individuals to become systems thinkers, VMCL are also rules, but which should be followed by organisations.

The four rules of DSRP have eight co-implying elements attached:

- Distinctions can be made between and amongst things or ideas;
- Things or ideas can be organised into part-whole systems;
- Relationships can be made between and amongst things or ideas;
- Things or ideas can be looked from the perspectives of other things or ideas (Cabrera & Cabrera 2015, p.52).

DSRP are applicable to any method, approach, tool from the universe of systems thinking, hard or soft or critical systems approaches. Practicing DSRP by mixing and matching the rules and applying them to understand any phenomenon, the author claims, would help become a better thinker. Through its co-implying elements and following the rules one would understand both parts and wholes and view and organise these from different perspectives. One would also identify relationships in and between the parts of the systems that drive behaviour. Practising and viewing the
world through these four rules would help with having a better approximation of reality, thus reconciling the mismatch between mental models that people have and how the real world works (Cabrera & Cabrera 2017; Cabrera, Cabrera & Powers 2015).

The link between systems thinking and its role in addressing mental models is not new. Bosch and Nguyen (2013) refer to Maani and Cavana (2007) and the framework known as the Four Levels of Thinking. The fourth level is the mental model level or mind maps. The others are: systemic structures (level three), patterns (level two), and symptoms/events (level one). They claim that the fourth level hardly comes to surface, which has implications for how one addresses problems as the action often stops at level one - the symptoms level and does not go deeper to address the symptoms, or even deeper to challenge the mental models. Bosch and Nguyen (2013), building from Maani and Cavana (2007), argue that:

‘The systems thinking paradigm and methodology embrace these four levels of thinking by moving decision-makers and stakeholders from the event level to deeper levels of thinking and providing a systemic framework to deal with complex problems’ (Bosch, Nguyen & Sun 2013, p.1).

Cabrera, through his DSRP theory and its rules, also argues on focussing on the fourth level of thinking, by working on the habits of mind, to dig deep into cognition.

2.9. Why DSRP theory?

In his recent theory, Cabrera sees systems thinking as a Complex Adaptive System (CAS), and an emergent property of DSRP patterns (Cabrera & Cabrera 2015).

He applies complexity theory to make the argument for the need for DRSP rules. Thinking is complex, and beneath any complex system sit a number of simple rules. Systems thinking is an emergent property or outcome of the operation of the four patterns of DSRP. Systems thinking is not something we do, but something we get – it is an emergent property.

Building up from the CAS theory, Cabrera (2017) argues that DSRP is at the root of all mental activities and how we think: the mind makes distinctions (D) between and among things and organises systems into powerful groupings (S); it sees relationships (R) between things; and it does this from various perspectives (P). While
the four patterns are very simple, the brain executes them simultaneously, mixing and matching to create complex patterns of thought. The author argues the entire field of systems thinking methods, tools and approaches is characterised by these different patterns of thoughts. Indeed, the third wave of systems thinking became a pluralism of methods, but these methods operated in silos, and the fourth wave breaks down silos by uniting the field with its four rules. Systems thinking is conceptual; and the four rules help to understand how to use the plethora of tools, concepts, methods or approaches. Powerful tools, such as network analysis, in the hands of a binary linear thinker will not make him or her a systems thinker nor will he/she act in that manner. But following a set of rules such as DSRP will help this user understand better how to use these systems tools. According to Cabrera, in practising and applying these rules to tools, approaches and phenomenon one becomes a systems thinker. With the four rules Cabrera brings cognitive science and the importance of addressing cognition into systems thinking.

‘When we change the way we look at things, the things we look at change, including the analysis of solving wicked problem, the mismatch between the real world and how we think about the real world’ (Cabrera 2017, Recording at the Cornell University Systems Thinking Symposium).

DSRP, Cabrera argues (Cornell University 2017; Cornell Policy Review 2016), helps to transcend disciplinary perspectives and emphasise the influence of perspectives in all domains.

Systems thinking is a complex adaptive system. Simple rules and agents must be the focus to bring about systems thinking. Simple rules and agents lead to collective behaviour and emergence. If systems thinking is an emergent property, then those aspiring to be better systems thinkers must focus their efforts where they have influence: executing simple rules (Cabrera & Cabrera 2015, p. 45).

‘DSRP proposes four simple rules that underlie systems thinking:

(1) Distinctions rule: any idea or thing can be distinguished from the other ideas or things it is with — distinction-making simplifies our thinking, but could leave many things out that we are unaware of.

(2) Systems rule: any idea or thing can be split into parts or brought back into a whole; every thing or idea is a system because it contains parts. Organise ideas into part/whole configuration in order to understand meaning. In the end, understanding comes from gaining an understanding of both parts and
wholes. A change in the way ideas are organised leads to a change in the meaning itself.

(3) Relationship rule: any idea or thing can relate to other things or ideas; we cannot understand much about a thing or idea or system of ideas without understanding the relationship between and among the ideas or systems, which could be: casual, correlation, feedback, input output, influence, direct/indirect, all are important for understanding human social dynamics.

(4) Perspectives rule: anything or idea can be the point or the view of a perspective (if you change the way you look at things, the things you look at change); being aware of the perspectives we take (and equally do not take) are paramount to understanding ourselves and the world around us. Any time we explore an idea we take multiple perspectives to it. Looking for something different from our perspectives often yields different parts’.

For practitioners who are interested in applying systems thinking, Cabrera (2006, 2015, 2017) and Cabrera et.al (2008) propose DSRP as a conceptual approach to systems thinking and a framework with the set of the four rules through which to understand and define systems, relationships, make distinctions and have different perspectives. Through these lenses, systems thinking becomes simple.

By teaching us how to think, DSRP helps tackle the mental challenges ahead and address our mental models that so often do not reflect realities on the ground (Cabrera & Cabrera 2015; Cabrera 2017). Mental models are seen as a foundational component of any type of thinking and ‘system thinkers must be aware of the limits of their own mental models and continuously strive to overcome them’ (Sellers 2017, p.13). DSRP can help with that.

2.9.1. Views on DSRP

These four elements are not new to systems thinking (Datta 2008; Rogers 2008; Midgley 2008). Sellers (2017), reviews the literature and provides a ‘unique perspective’ into systems thinking. He found that many ‘themes’ occur often, which represents what he claims ‘some consensus amongst the authors’ (Sellers p.12). Few themes overlap with DSRP: taking different perspectives and focussing on relationships are amongst few mentioned.

What is new about them is how they are brought together in a ‘sort of unified
field of systems thinking’. There is value in the presentation this way as it increases accessibility to the ideas, in presenting them ‘in juxtaposition as a whole, and in offering definitions and processes that potentially could be widely adopted’, (Datta 2008, p.321).

DSRP seems to go well with addressing one of the most important barriers to adopting systems thinking that Sellers (2017) mentioned: transition from old paradigm or thinking to the new one. Practicing DSRP would challenge the old mental model.

For Sellers (2017), Cabrera brings a radically different view of systems thinking from every other author he studied. It is an intriguing theory because it proposes that all of the facets of systems thinking are merely emergent behaviours of a simple underlying mechanism. ‘His concept has merit because we know that the human mind is a complex, self-organizing, adaptive system that exhibits emergent behaviors’ (Sellers 2017, p.26). Sellers argues that although it is too early to determine if it is an accurate theory, ‘…its level of abstraction does not indicate any pragmatic methodology to contrast and compare with the other definitions of systems thinking’ (p.26).

Rogers (2008) is welcoming of the four rules of DSRP that she calls ‘ideas’, which she thinks are relevant ‘across different system methods and techniques’ though she sees it as nothing new for the evaluation practice; the four rules are already being used. In her critique of Cabrera et al (2008) paper she questions if it is enough for evaluators to develop systems thinking skills or even if they need to have these skills: ‘how is it possible to transform someone’s evaluation practice through careful application of the rules and not through extensive training in specific methods’ (p.326). For her the article is not convincing on providing examples on how is applied to evaluation practice. In this respect she would be keen to see a ‘non-system approach to a specific evaluation contrasted to a ‘systems’ approach that used the four ideas’ to then show ‘the transformative power of the rules’ (p.326). She commented that the value added of DSRP came ‘from the ‘interplay between them’ (p.326).

Hummelbrunner’s (2008) response to Cabrera’s DSRP paper was by applying it to his ‘systems framework’ and agreeing with ‘the importance of the four DSRP rules and on their utility for evaluation’ (p.321). Jay Forrest (2008) sees DSRP as complementary to a recent book he co-authored on Systems concepts in Evaluation:
‘eloquent and valuable addition’ to a recent monograph .....the train of logic and perspective presented in that volume’ (p.333).

Midgley (2008) argues there are some issues with DSRP theory. He suggests that the DSRP is very similar to other theories that have been used to underpin methodological pluralism. He also rejects the idea of unification as it might work fine in theory but it is problematic in practice as ‘it limits actually what a single systems thinker can do, as it is hard for anyone to work competently across more than a couple of disciplines’ (Midgley 2008, p.319). The lack of methods is an impediment for people to adopt and use DSRP rules and that DSRP theory lays out a framework of thinking that is free of specific methods (Midgley 2008; Grove 2012). Midgley argues that Cabrera falls into the trap of focusing ‘on the construction of meaning.....to the detriment of those who frame their work as investigations of the nature of biophysical systems’ (Midgley 2008, p.320). Midgley (2008) suggests that Cabrera should accept that DSRP is just one perspective amongst many others. Midgely was referring to the 2008 paper Systems Thinking that Cabrera co-authored with Colosi and Lobdell.

Many critiqued that Cabrera was not offering specific examples on how it has successfully been applied in practice (Rogers 2008; Grove 2012; Datta 2008, Midgley 2008), Cabrera sought to rectify this criticism. DSRP application in practice was then highlighted through various journals, papers released by the authors through Cornell University Public Policy or Cabrera Research Lab, an influx of social media and the two books Systems Thinking Made Simple New Hope for Solving Wicked Problems (Cabrera &Cabrera 2015) and Flock not Clock ((Cabrera &Cabrera 2018). In a recent series of films from the Research Lab, there are plenty of examples and comparisons between results of users and non-users of DSRP.

Immediately after Cabrera published his book Systems Thinking Made Simple - New Hope for Solving Wicked problems in 2015, Midgley, who, as stated above, saw some critical issues with DSRP and how it was presented, acknowledges now the contribution DSRP is making to the field, as a new way for organising the field of systems thinking:

‘We have had 100 years of systems research giving rise to literally hundreds of different methodologies; many, many different systems ideas. I have to ask how we can make sense of this. When I saw DSRP, I realized that it broke systems thinking down to the bare essentials: a set of thinking skills. It also
occurred to me that all the various methodologies that are used in the systems field tend to prioritize one of these skills over the others, so it provides a framework for organizing the field’ (Midgley, cited in Cabrera 2015b; Midgley cited in Thinkwater n.d.(f)).

2.10. Summary

The systems thinking literatures are vast and varied. A complete review is not only difficult to imagine but is not the purpose of this study. But a specific focus on barriers and obstacles, ambiguities and misconceptions in applying systems thinking is a more manageable task. There is a long history of using systems thinking that spans many fields, including education, environment, medical science, health, military and business. The literature is well developed and it has grown impressively over the years.

There are different perspectives on typologies of systems thinking. There are misconceptions about what systems thinking is, for example that systems thinking is a ‘special’ model of some kind and very often the author’s special model. Cabrera proposes a pluralistic view of the concept. In total there are four misconceptions that Cabrera identified, to which he offers four corresponding counterclaims, or counterarguments he then uses in defining what systems thinking is. Acknowledging these misconceptions in this thesis is important because a key objective of this thesis is to see if they have infiltrated the market systems practice in aid. They may also lead to challenges when a new field such as development aid programming adopts systems thinking in an attempt to improve its practice and tackle problems that other approaches fell short of addressing.

There is hope however, and the literature offers solutions with the birth of the fourth wave of systems thinking and DSRP theory. Cabrera uses the analogy of systems thinking with complex adaptive systems and sees it as an emergent property resulting from agents following a set of rules. We can better comprehend systems thinking if we follow some rules. He offers the solution with his DSRP theory and the four rules that underpin this emergent phenomenon (Cabrera, Cabrera & Powers 2015). Cabrera brings up the importance of cognition and how people think; by practising and mix matching the four rules one expands understanding across systems concepts, tools or approaches and this develops mental models which better represent how the real world really works. Ultimately DSRP is a systems thinking tool to better
understand complex systems of any kind.

These theoretical aspects of the systems thinking literature provide the background through which the market systems practice in the next chapter will be reviewed.
Chapter Three: Discussion on the Systems Thinking Practice in Programmes Using Market Systems Approaches
This chapter explores how systems thinking is being applied in programmes using market systems approaches to identify if any barriers or obstacles, definitional ambiguities or misconceptions that systems thinking carries have crossed boundaries and are absorbed by MDP. It critically examines examples from donors, practitioners, organisations and programmes.

The chapter starts with a ‘call’ for a change in current systems practices in aid. Example of commitments and projects funded by donors and other organisations to improve the use of systems thinking in aid follows. A discussion on the findings from this exercise are presented.

3.1. The call

Systems thinking emerged as an alternative to direct delivery approaches that were seen as unsustainable, inefficient, and with little impact on poverty (Pritchett, Woolcock & Andrews 2010; Pritchett 2014). Market system approaches are viewed as a more sustainable mechanism to engage with poor people and offer them opportunities to improve their livelihoods. Market systems approaches such as MSD, shared-value or inclusive business emerged as a response.

Unified calls on practitioners, donors and implementers to act and incorporate systems thinking in international development work have emerged fairly recently. The American Evaluation Association (AEA) at its annual conference in 2014, had a special issue on systems thinking: ‘Let’s use relationships and systems thinking to connect evaluation to the premier challenge of our time’. During the conference, AEA investigated how systems thinking could be integrated into the evaluation of projects and programmes:

‘Bring your insights to help us add a systems orientation to evaluation’s fundamental theory and practice. Through this lens, we will help each other critique evaluation’s boundaries and understand the complexity of its multiple perspectives, diversity, and relationships. Using a systems orientation can help detect influential patterns and trends over time and locations amidst the crowding noise of raw and big data’ (AEA 2014).

This field of knowledge, in their view, would add new perspectives to the evaluation practice by searching for interconnections among evaluands. It would also help evaluators and evaluation users look for patterns and go beyond the boundaries of a programme to find points of influence:
‘Learn more about applying systems thinking to find points of influence within systems that are especially powerful in supporting sustained and equitable change in a desired direction’ (AEA 2014, n.d.).

Another call to consider complexity thinking in development programmes was made in late October 2014. A group of about 40 development professionals, implementers and donors from around the world attended a ‘Doing Development Differently’ workshop, hosted by the Building State Capability (BSC) programme at the Harvard Kennedy School and the Overseas Development Institute (ODI). Acknowledging the complexity of development problems, participants committed to new approaches and tools for designing, implementing and evaluating development projects that would be appropriate to deal with these issues. They branded it ‘Doing Development Differently’ or DDD. The initiative would promote: adaptive programming instead of multi-year strategies, flexible planning and budgeting instead of rigid log-frames and fixed budgets, as well as a focus on feedback, adapting and learning rather than only accountability and monitoring change. At the end of the workshop a Manifesto was issued showing commitment to this approach. Over 400 practitioners and development thinkers from 60 countries signed it. Over the past two years the DDD initiative continue to spread, with ODI promoting and gathering evidence.

The complexity lens put on markets brought a plethora of fresh new calls on the practice to change. Using blogs, presentations, sharing think-pieces or programme reports, publishing articles in journals or books, the same messages emerged: there is ‘complexity’ and a need for ‘systems thinking’. Three books published between 2013-2015 have ‘complexity’ in the title: Embracing Complexity (2015) by Jean Boulton, Peter Allen, and Cliff Bowman; and Navigating Complexity in International Development: Facilitating Sustainable Change at Scale (2015) by Danny Burns and Stuart Worsley, and Ramalingam’s Aid on the Edge of Chaos: Rethinking International Cooperation in a Complex World (2013).

3.2. The commitment

Large donors, such as USAID and the UK DFID have started to explore systems thinking to understand more about systems concepts, especially in the context of their market development portfolios, committing resources to test new approaches.

DFID, a leading donor in funding market systems approaches, committed
resources to various platforms and programmes, more recently to: The Policy Research Fund, Health System Research Initiative, The Ecosystem Services for Poverty Alleviation programme, and the BEAM Exchange knowledge platform, amongst others.

USAID confirmed the Agency was committed to integrating systems thinking and local systems into the programme cycle as well as to developing ways to measure systemic change (Walker 2016). The Agency has funded several knowledge sharing platforms themselves that support new approaches and tools that address the complexity issues in markets: SEEP Network, MaFI, Microlinks, LEO, advancing the Financial Integration, Economic Leveraging, Broad-Based Dissemination (FIELD), Collaborating, Learning, and Adapting (CLA), and Complexity Aware Monitoring (CAM). LEO came after FIELD to continue the debate and find ways and approaches to deal with complex issues in MDP.

All these initiatives are summarised in Table 3.1, together with their objectives and key activities and results.
Table 3.1: Platforms and initiatives funded by DFID and USAID to support the improvement, expansion or initiation of (market) systems approaches

<table>
<thead>
<tr>
<th>Initiative</th>
<th>Year</th>
<th>Objective</th>
<th>Key activities</th>
<th>Results Key focus</th>
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<td>Donor: DFID</td>
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<tr>
<td>The Policy Research Fund’s – Application of Complex Systems Tools to Development</td>
<td>2013-2015</td>
<td>Objective: Attempted to respond to complex and wicked problems DFID had been experiencing in its programming work.</td>
<td>Key activities: research on how to improve the delivery of development in the face of complexity and uncertainty (Ramalingam, Laric &amp; Primrose 2014); Tested the use of new concepts, theories and practices of complex systems to deepen understanding of the strengths and limitations of current aid delivery models. It sought to identify whether these new tools could enhance aid delivery.</td>
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<td>The Health System Research Initiative launched a £15m programme funded by DFID, the Economic and Social Research Council (ESRC), the Medical Research Council and the Wellcome Trust.</td>
<td>2013-on going</td>
<td>Objective: Aimed to generate world class and cutting-edge research to strengthen and improve health systems in developing countries.</td>
<td>Key activities: promotes research that uses a systems approach to inform evidence-based solutions</td>
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<td>The Ecosystem Services for ...</td>
<td>2012-</td>
<td>Objective: Interdisciplinary research</td>
<td>In July 2014, it organised a</td>
<td>Application of complexity</td>
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<tr>
<td>Initiative</td>
<td>Year</td>
<td>Objective</td>
<td>Key activities</td>
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| Poverty Alleviation (ESPA)                      | on-going | programme to generate evidence and tools on how to manage environments sustainably to contribute to poverty reduction.            | ‘Complexity Workshop’ to learn from examples of applying and communicating complex systems approaches in the wider research and policy community, and to compare this to the different applications and systems used in ESPA projects.  
A few initiatives funded by ESPA looked at the complexity theory and how it may be applied to real world situations.  
The ‘Making Systems theory to real world situations to better understand the emergent and non-linear effects in various systems: e.g., food system, food security, socio-ecological system; use of systems dynamics tools compared with more participatory tools (ESPA 2014) |
<p>| Building Effective and Accessible Markets (BEAM) | 2013-    | Objective: A platform for sharing knowledge and learning about how market system approaches can be used to reduce poverty, based on the Springfield Centre MSD framework. | BEAM promoted various discussions around market systems, and actively encouraged the introduction of new tools for measuring changes in complex systems, especially for measuring systemic change. It has organised blogs and webinars, conducted research and developed think-pieces. The ‘Making Systems tools and approaches, such as testing SenseMaker® in various MSD initiatives to see its potential of to measure changes in systems. One of only few programmes that organised a discussion on systems thinking. |</p>
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<tr>
<th>Initiative</th>
<th>Year</th>
<th>Objective</th>
<th>Key activities</th>
<th>Results</th>
<th>Key focus</th>
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<tr>
<td>Thinking Real’ webinar in October 2015</td>
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<td>Thinking Real’ webinar in October 2015 led by Oxfam tried to demystify systems thinking. In 2017 DFID are looking into introducing new language and practice from complex adaptive systems to help practitioners define better realities in the field. One of their key drivers is to ‘achieve clarity on systemic change’ (BEAM 2016)</td>
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<td>USAID</td>
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<td>Papers and think pieces on complexity; Test systems tools; Organise webinars with systems thinking topic, e.g. ‘What’s the fuss about systems thinking’, ‘Practical tools’ and ‘Testing systemic change tools’ webinars.</td>
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<tr>
<td>Leverage Economic Opportunities (LEO)</td>
<td>2013-2017</td>
<td>Objective: Stimulate learning from its work in complex market systems that create sustainable impacts for the poor.</td>
<td>Papers and think pieces on complexity; Test systems tools; Organise webinars with systems thinking topic, e.g. ‘What’s the fuss about systems thinking’, ‘Practical tools’ and ‘Testing systemic change tools’ webinars.</td>
<td>Papers and think pieces Test systems tools</td>
<td></td>
</tr>
<tr>
<td>Initiative</td>
<td>Year</td>
<td>Objective</td>
<td>Key activities</td>
<td>Results Key focus</td>
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<tr>
<td>Leveraging, Broad-Based Dissemination (FIELD)</td>
<td></td>
<td></td>
<td>framing today’s complex development problems; rethink traditional approaches in order to define better pathways to reduce poverty. One of the themes was complexity.</td>
<td></td>
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<tr>
<td>Collaborating, Learning, and Adapting (CLA) USAID Learning Lab</td>
<td>On going</td>
<td>Objective: USAID’s platform for generating and sharing information, tools, and resources on collaboration to integrate learning.</td>
<td>Initiate and promote set of practices that help improve development effectiveness.</td>
<td></td>
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<tr>
<td>MaFI (Note: MaFI continue beyond w/o funding from USAID)</td>
<td>2012-2017</td>
<td>A network of over 300 professionals working in market development programming. MaFI is an influential action and learning network that aims to help practitioners to become more effective facilitators in market systems and enable systemic change.</td>
<td>Their website demonstrates that MaFI is promoting the application of complexity science in the design, implementation, and monitoring and evaluation of MDP under the Complexity Dialogues and Systemic Monitoring and Evaluation (M&amp;E) stream.</td>
<td>Various discussions around systems thinking were initiated through this network &amp; tools promoted.</td>
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There were also other organisations and individuals showing interest in market systems approaches. A few examples are summarised below.

Marcus Jenal, who is part of Mesopartner but has also led the Building Effective and Accessible Markets (BEAM) programme, a monitoring and evaluation practice until mid-2017 committed to tackling complexity. He considers himself a systems thinker in the field of complexity and international development. In his blog (2016), he explains that his goal now is to use insights from the field of complexity to improve the effectiveness of development:

‘Where am I on my journey to use the awareness about complex systems in my work in economic development? That is a question I have asked myself more often recently. There is an increasing awareness among the development practitioners and even donors that we need to change our strategy if we want to achieve large-scale, systemic change in the countries we work in’.

Jenal strongly believes that complexity is not going away and he wants ‘to see more of this, more concrete and practicable ideas that can be tested in projects in the field’ (Jenal 2016a).

For organisations such as Oxfam embedding systems thinking in their practice is useful as it asks staff to go beyond programmes and look at the context in which these programmes operate. It also helps their programmes to be more agile in implementation and change pathways as conditions change. Their newly published Systems thinking guide teach staff about the need to tackle systems problems rather than individual problems, and to have a more holistic view. (Bowman et al. 2015).

What do these aforementioned initiatives and many others not mentioned here, bring to systems practice? Common themes that emerged from the practice and their shortcomings when reflected from the systems thinking theoretical background, are presented in the next section, below\(^1\).

3.3. Common themes and agreements

3.3.1. Agreement on Complexity

There is wide agreement amongst practitioners that in order to address the

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\(^1\) These findings are a snapshot in time on the systems practice in MDP. The practice is evolving as practitioners learn more about systems thinking.
complex problems development practice faces, complexity thinking is an alternative to current linear thinking. However, many authors consider complexity as not being included in systems thinking.

Ramalingam’s book *Aid on the Edge of Chaos* provides a thorough critique of DAP in its second chapter and then introduces complexity as the alternative to current linear thinking and examines emergence and nonlinearity and later provides examples to show the potential for using complexity in aid and development programming, Burns and Worsley (2015) start with critiquing DAP, to then offer their solution in what complexity thinking can offer to the development aid sector. Boulton, Allen and Bowman (2015) go straight to looking in depth into the technical aspects of complexity as an alternative approach to current practice in aid. Many other practitioners, referenced already in this thesis, argue complexity thinking is the alternative to linear approaches (Cunningham & Jenal 2013, 2016; Jenal & Cummingham 2014, 2015a, 2015b; Crowford & Pollack 2004; Barder 2012a, 2012b, 2012c, 2012d, 2015, 2016; Barder & Ramalingam 2012; Burns 2013; Hummelbrunner & Jones 2013a, 2013b; Jones 2011; Ramalingam et al. 2008; Ramalingam & Frej 2011; Boulton, Allen & Bowman 2015; Snowden (cited in Jenal 2013)).

Sonja Blignaut’s view, cited in Jenal (2014), is that complexity thinking is not systems thinking but an evolved version of it:

‘Sonja [Blignaut] explained that complexity thinking is not just an evolution of systems thinking, but actually a completely new paradigm (sic!!!). And as it goes with paradigms, if you stick to the old one, you either get stuck, or more likely you lose out. So the question is how we get international development to make this paradigm shift. The problem is that most of international development has not even arrived consistently in the systems thinking paradigm’.

De Weijer (2011) seems to agree with this approach, as he separates the two, believing that ‘complexity theory and systems thinking’ may help to provide new ways of looking at the problems faced by development programmes, by providing tools to deepen the understanding of the dynamics of change.

This provides Finding 1: there is a limited view of complexity and systems thinking. This view of seeing complexity as something else, narrows down the landscape of opportunities. In addition, it contradicts the pluralistic view of systems thinking. .
Systems thinking is defined or used in many ways by development practitioners. It often refers to tools, methods or approaches. A blog by Mary Morgan (2014), an Inclusive Market development expert argues it is an ‘approach’:

‘There has been so much talk about systems thinking in the field of inclusive market development yet there has not been much in the way of illuminating how exactly we apply this approach. So I am heading to apply systems thinking to market development work’.

In the paper, ‘From best practice to best fit: understanding and navigating wicked problems in international development’ (ODI 2014), systems thinking is referred to as a tool when authors list the four systems tools they used to test new approaches: system dynamics in trade; adaptive management and theories of change in private sector development; social network analysis in an education project working on girls’ empowerment; and systems thinking in the programme management system of DFID. Finding 2 is that is therefore a lack of clarity on what systems thinking is.

Complex problems need complex solutions and approaches (Ramalingam 2013; Jenal 2018). Development is ‘...is not a machine turning out ‘ready-made’ solutions; aid needs complex solutions to respond to complex problems’ Ramalingam’s (2013, p.245). However sometimes ‘ready-made solutions’ fit development purpose. Newman (2010, 2011) for example, refers to two different types of problems associated with development: a lack of infrastructure such as schools, highways, irrigation canals, hospitals, etc.; and a lack of adequate skills and capabilities. For the first type of problem there is a wealth of ‘ready-made’ solutions that could be used. Solving the second type of problem has proven to be much more difficult, as these problems are complex (Pritchett, Woolcock & Andrews 2012).

DAP and its market systems approaches need both: ready-made solutions and more complex solutions to address simple and more complex problems. Systems thinking is balanced thinking (both holistic and reductionist, and/both not either/or); this is Cabrera’s counter-argument to one of the key misconceptions in systems thinking (Cabrera 2006, 2008, 2015). Finding 3 is that in international development there are complex problems which need complex solutions.

The focus on systems concepts brought a new language to the development aid practice. The Embracing Complexity book (Boulton, Allen & Bowman 2015) explores in depth the technical aspects of complexity reflecting the background of the
authors. However, by using systems language that may not be familiar to the intended audience, Algoso (2015), an independent consultant working on social change and development, argues it makes the book difficult to follow for non-specialists.

In a recent blog, Dave Algoso (2016), agreed that complexity thinking has put its footprint into the field but, at the same time, argued that its meaning was still ambiguous to many.

‘In the last few years, complexity thinking has found its way into general development discourse. Anyone reading this blog or others has likely encountered some of the terminology, even if the technical pieces remain elusive to you’ (Algoso 2016).

There are other think-pieces (Jenal & Cunningham 2014, 2015b; Jenal 2016a, 2016b, 2016c, 2017; Jenal & Hanchar 2016) that introduce terms such as attractors, emergence, complexity, and chaos adding another level of difficulty to practitioners’ efforts in absorbing the new field of study.

There is the danger, that the language and enthusiasm surrounding it create a mystique, making it inaccessible and daunting to many others. Finding 4 is that systems thinking language is inaccessible to many non-specialists.

3.3.2. Agreement on new tools to improve the systems practice

Tools borrowed from other disciplines, or developed by practitioners are being brought into the MSD practice with the aim of better understanding complex problems and to improve implementation. There are currently many projects, organisations and practitioners applying new tools to understand complexity of their initiatives.

The initiatives listed in Table 3.1 show new tools borrowed from complexity science have been tested. USAID continues to focus on tools too. According to Walker (2016), USAID is currently identifying and testing methods and tools with the aim of designing systems-centric projects over the longer term.

A recent report published under the ‘DDD initiative’ presents the results of 43 case studies as new approaches and tools that are emerging to address complexity (Wild, Andrews, Pett & Dempster 2016). Another report argues that these approaches generated a ‘subtle’ shift in the development community in putting DDD principles into action (ODI 2017).

A synthesis paper of the ‘Application of Complex Systems Tools to
Development’ project: ‘From best practice to best fit: understanding and navigating wicked problems in international development’ presents the results of four systems tools that have been applied in projects to tackle complex problems. The paper lists these tools: system dynamics in trade; adaptive management and theories of change in private sector development; social network analysis in an education project working on girls’ empowerment; and systems thinking in the programme management system of DFID. The recommendations include suggestions for donors to continue using these tools, and to pilot and adapt new tools, but also to make links with complexity specialists, who themselves must work to adapt tools from other sectors to better fit the development sector. There is indeed a continued focus on tools.

Mesopartner, another organisation active on building the discourse around complexity of market systems, set up the Systemic Insight Platform, which is a repository of resources on economic development, complexity, and made it available to practitioners to stimulate uptake and debate. Mesopartner developed a few think-pieces to help practitioners which enter the systems thinking world, Systemic Insight Approach (Cunningham & Jenal 2013, 2015a), Systemic Insight: An alternative to theory of change (Jenal, 2016a), A New Framework for Assessing Systemic Change (Jenal 2016b) and Explore, Scale Up, Move Out: Three Phases to Managing Change under Conditions of Uncertainty (Jenal & Cunningham 2015a). These papers critique linear thinking as failing to address the complexity of markets and propose possible new tools or approaches.

LEO developed several think-pieces on complexity, showing the need for ‘buy-in’. They also supported, sometimes with BEAM, the application of ‘complexity-aware monitoring’ tools including: Network Analysis in Sierra Leone, SenseMaker®, Outcome Harvesting, and Disruptive System Dynamics Framework (Fowler, Marker & Sparkman 2016; Fowler & Sparkman 2016). In parallel developments, BEAM also tested similar tools to LEO. Both initiatives worked in unison in terms of what they do, what tools they use – the same four mentioned above — and what they promote. Both seek to demystify systemic change.

Snowden at Cognitive Edge introduced the Cynefin framework in 2003. The framework helps practitioners differentiate amongst different types of systems (obvious, complicated, complex, and chaotic). Snowden also developed SenseMaker®, one of the few hands-on software specifically designed to look at
complex processes from different perspectives. The Cynefin framework and SenseMaker® are becoming popular in programmes using market system approaches, and are frequently mentioned or used in collecting evidence on market systems transformations. Jenal and Hanchar (2016) used it in a recent study on assessing systemic change in Katalyst project in Bangladesh to capture complexity of that market.

The three recent books on dealing with complexity, of which aid is a major focus, steer the reader to different systems approaches. In Aid on the Edge of Chaos Ramalingam 2013) the application of complexity theory is purported as an innovative approach to aid and an alternative to current linear thinking, introducing Problem Driven Iterative Adaptations (PDIA) as well as Social Network Analysis. Participatory systemic inquiry, network-building and systemic action research are offered in Burns and Worsley (2015) book Navigating Complexity in International Development: Facilitating Sustainable Change at Scale as their solution in what complexity thinking can offer to improve aid delivery. David Stroh’s (2015) guidance on how to incorporate systems thinking into solution seeking, making decisions and strategic planning by offering a number of tools the author has used to help deal with specific problem in another book on complexity: Systems Thinking for Social Change: A Practical Guide to Solving Complex Problems, Avoiding Unintended Consequences, and Achieving Lasting Results.

Marcus Jenal and Shawn Cunningham (2015a) in their ‘Explore, scale up, move out’ article published by the IDS bulletin, critique theory based approaches that dominate private sector led market based initiatives in aid, which ‘have limited success’ in complex contexts (p.81), and suggest an adapted approach and tools based on emergence that they argue is more appropriate in the development aid context.

Very recently a paper from Palladium, authored by Koleros et al. (2018), argues there is a way to address complexity of programmes in designs with the launch of their new framework ‘Actor-Based Change (ABC)’: a three-way step to developing a theory of change. The framework is based around behaviour change of market actors and how interventions should be designed around this change. The authors claim the framework is informed by literature around complexity and systems thinking.

What this abundance of examples shows is that there is no shortage of initiatives that invest on developing or testing systems tools, as an alternative to the
current linear approaches. Is this investment enough? The focus on methods, frameworks and bringing systems tools to the development practice could be necessary but may not be sufficient. The current focus of the practice on tools might be wrong or limited in scope, with practitioners, donors and implementers developing systems tools, when maybe the focus should be elsewhere. Finding 5: tools may be necessary but insufficient to in improving development practice.

3.3.3. Agreement on ‘changing internal systems’

Few donors are changing internal systems to allow for flexibility in implementation of complex market systems programmes. USAID claims, as a result of the LEO programme, there has been significant progress on understanding systemic change within the agency, and ‘more important the institutionalisation of the systems thinking across the agency’ (ACDI VOCA 2016, p.6).

One more profound example of a systems shift to embrace complexity is the ‘quiet reforms’ process that is taking place at DFID (DFID 2014). As a result, many of their programmes allow now for experimentation, adaptation and learning. Though harder to commit to upfront, they shy away from templates and formulas. Moreover, the donor is changing their own internal systems and processes following the adoption of ‘Smart Rules’ - that allow for more flexibility at a programme level to adapt to the local context and to respond to complexity and the unpredictability of development issues and to work more adaptively.

There are only a few examples. How useful they have been to completely transform the aid delivery mechanism still unknown. Finding 6: there are a few examples of flexible systems that allow for adaptation in programme delivery. They might not be enough to change the entire system.

3.3.4. Agreement on the need to develop skills in systems thinking

Training is an interesting aspect of what is happening with development practice right now. There is agreement amongst practitioners on the need for new skills on systems thinking. The ODI’s synthesis paper on complexity (Ramalingam, Laric & Orimrose 2014) recommended that the DFID needs to invest in staff capacities and skills.

Jenal (2018) refers to lack of availability of training on complexity, which
impact on effectiveness in implementation:

‘Yet development actors are still far from effective in applying complexity thinking in strategy development, operational programming and, indeed, day-to-day work. Practical experience remains limited. Besides the general lack of opportunities to build personal and organisational capacity in harnessing the power of complexity thinking, the organisational structures in both public and private development organisations often hinders the introduction of the new type of thinking’ (Jenal 2018, para. 6).

There are organisations offering training on systems approaches but with limited success. The only exception is Springfield training on its MSD approach, linked with their MSD framework that even after 10 years of delivery is still delivered and considered a success. However, this two-week intensive training makes no specific reference to broader context of systems thinking is being made. It has a number of electives, one of which is training in the DCED Standard.

With the increased agreement on complexity of market systems and the importance complexity thinking for MDP, few trainings or attempts to provide training on complexity have been occurred in recent years, though with mixed results. Ramalingam proposed a Complex Adaptive Systems for Development training programme in 2014. The five-and-a-half day course offered four methods to help practitioners deal with the challenges they face: systems dynamics, agent-based models, Social Network Analysis and non-linear dynamic modelling. It reflected the background and thought processes of trainers, whether from systems dynamics or CAS. It is not known if the training has been offered in the subsequent years.

The Inclusive Markets Institute (IMI), proposed in 2016 the Understanding Markets as Complex Systems training course. The objective of the training, as stated on their website was ‘to provide market development professionals the opportunity to learn and apply systems thinking while working in the field of inclusive market development’ (IMI 2016, Course description). This is interesting as it is the only training that referred to systems thinking and put complexity under the broader systems thinking concept. However, despite expectation to examine the vastness of systems thinking, the course curriculum is limited to topics such as markets as complex systems and uses some of the language of complexity science, which is only a small part of the concept and not enough to claim participants will apply systems thinking in the training. As with the previous example, the success of this course
seems to be limited. It was not offered in subsequent years.

The most recent attempt to provide training on complexity is with the recent offer that came from Mesopartner and Narrate. The ‘Harnessing the power of complexity’ aims to introduce a ‘new kind of thinking’, not just develop skills in complexity to address complexity in MSD. This is interesting again as it is the first time when the focus is on skills to help with thinking habits. ‘The course aims to introduce this new kind of thinking that we believe will help development practitioners become more effective in achieving systemic change’ (Jenal 2018, para. 7). This three-month programme combines theory with practice: ‘experiential parts during which the participants will be able to apply the new ideas to concrete, real-world problems taken from their own contexts’ (Jenal 2018, para. 7). It is too early to comment if it was successful or not.

![Figure 3.1. Advertisement to promote ‘Harnessing the power of complexity’ training](Source: Jenal 2018)

What these examples show is that there are organisations offering training that is related to systems approaches, but that their success is mixed. A few attempts to introduce training on complexity seemed to have failed, with training not being
offered in the subsequent years. The only successful example of training related to systems is the Springfield Center MSD training. However, this is limited in scope to the ‘framework’, tools and approaches that the Centre has developed and branded under ‘MSD’.

Questions arise as to why they have failed. Aren’t these type of skills needed? Were the courses too expensive? Was there demand when they were designed? The supply of training has increased, obviously after the DAP turning point towards systems thinking, but the only skills that practitioners seem to value now, despite the rhetoric on complexity or systems thinking, are those that give them knowledge on how to apply the MSD framework. Finding 7: *Training has focused on developing skills with a narrow focus, rather than on specific systems thinking skills.*

3.3.5. Publications to show the practice of systems approaches

There are numerous think pieces, reports, and blogs relating to MDP in recent years. For example, LEO programme reported at the end of its programme funding from USAID, 72 publications, including 53 reports and 19 briefs that have been written on systems thinking. Most of them are descriptive of a method, or a tool or an approach.

A literature search was conducted, to identify and categorise publications that focus on systems thinking in DAP that have been applied in developing countries. To be eligible, studies had to be published peer-reviewed articles, available for download, have ‘systems thinking’ in the subject and/or in the title, and have ‘developing country(ies)’ in the subject. These criteria were included in the search. Note that ‘*Systems thinking is a phrase that is rarely used without explicit reference to the idea of systems thinking*’ (Cabrera 2006, p.38).

All bibliographic databases from RMIT University up to December 2016, were searched (Cabrera 2006, p.38).

The search explained above, resulted in 39 peer-reviewed articles that used a systems

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17 For example, ‘systems thinking’ would rarely be found as a random word string in a common sentence, as it is not grammatical; even Microsoft Word’s grammar checker identifies the term as questionable. Therefore, it is likely that any publication that contains the term ‘systems thinking’ is referring to the same types of thinking that are the focus of this review. If one were to search for the terms separately, as in ‘systems’ or ‘thinking’, the resulting list of publications would be far too large for a viable literature review; the individual terms ‘systems’ and ‘thinking’ are very general, and will occur in numerous publications that have little or nothing to do with the notion of systems thinking.

18 Search conducted in December 2016
approach, systems tools or systems theory either in assessing the results of development initiatives, or discussing systems thinking in the context of a sector, country or region.

Figure 3.2. Results of the methodology used to select literature

A complete list of the publications identified that include classification, methods of research, sampling, author(s) and other information can be found in Appendix 3A.

The analysis shows that 39 research papers took a systems approach, meaning the paper used one or more of the systems approaches, including a systems method, tools, theories or idea. Of these publications, 17 were empirical studies, three used systems modelling, and the others were theoretical. Of the 39 publications, 31 used a systems approach to study a particular system (e.g., health, small and medium enterprises, agriculture), and eight focussed on systems thinking as the object of study (Figure 3.3).

Figure 3.3. Results of the methodology used to select literature (by method)

By sector, the majority were in health (22), and 17 in other sectors (Figure 3.4).

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19 For the purpose of this analysis, the term ‘empirical’ was defined very broadly to mean ‘any methodical process’ (qualitative or quantitative). This might include interviews, surveys, explorative studies, case studies, quasi-experimental designs, or experimental investigations.
The number of peer-reviewed publications that relate to MDP is very low. Fig. 3.4 showed that most articles were from health. What drove the influx of publications in health? What can the MDP practice learn from it?

The World Health Organisation (WHO) developed a Framework for Action on Health Systems Strengthening (2007). In its framework, WHO acknowledged that health systems are complex, and in fact, are CAS. The Advancing the Application of Systems Thinking in Health initiative promoted the use of systems thinking in the development of health systems in low and medium income countries (LMIC), by encouraging academics, practitioners to innovate in this space, and in providing funding. A key requirement was that these studies and their findings to be published in peer reviewed journals, to encourage debate and test the systems thinking practice and ultimately improve health system outcomes in LMIC. All of these published studies noted that health systems are complex, linear approaches do not work as health is a CAS, and that systems thinking is an alternative. These empirical studies are included in Annex 3A.

What we have seen from this analysis is that there are very few publications arising from MDP practice. The majority are think-pieces and reports that are more descriptive rather than critical, and only few have been published in peer reviewed journals to encourage debate beyond the development community. The majority of these publications (think pieces, reports) target people within the development community and authors hope their practice will be followed. A critical review of these tools or of new approaches does not seem to occur within this target audience.

What weight and credibility this new practice might give to a sceptical observer or somebody who wants to embrace the systems practice? If the publications are in peer-reviewed journals, it opens them up to new audiences, with different views and perspectives, encouraging debate from other group of readers. It can also put
more weight and credibility on the current systems thinking practice that is emerging in DAP. A short-term solution to encourage development community to be published in journals is the example of WHO. This practice could be followed by MDP. Finding 8: there are limited publications in peer reviewed journals on systems thinking in DAP. It is a nascent practice.

3.3.6. Agreement on the work through systems

There is wide agreement about the need to work through market systems. The Springfield Center developed a picturesque description of the market system when they presented their MSD approach (see Chapter 1, Figure 1.5). It is now used in all MSD programmes to describe any of the ‘systems’ or ‘markets’ of focus for the programme: the ‘maize’ market, the ‘IT market’, the access to finance market etc.

A sector analysis in programmes usually include a list of players in that particular market, following the ‘Support function’ and ‘Rules of the game’ parts of the market systems diagram. This analysis provides programmes with an understanding of where the market is at the beginning of the intervention and can help to identify ‘gaps’ in the market that a programme could then address. Programmes develop a list of interventions that they will then fund. The issue with this approach is when and how the impact is measured. Then, very often this initial picture of the market is forgotten and programmes measure only specific activities they fund in that ‘market’, and the result of each specific intervention. They then claim they changed the market system, which is incorrect (Jenal 2018).

Other issue with the Springfield description of the market system is that the relationships between parts in the market system are not ‘listed’ or explained in their description of the market, as if they do not belong there. Though a system is about both parts and relationships (Chapter 2). This is somehow omitted.

Another issue is that no ‘border’ is usually set for that market system. MSD practitioners argue that market systems are conceptual constructs …[used to engage and understand real world situations of complexity] (Reynolds & Howell 2010; Osario-Cortes 2014), though what this means is often that boundaries of the system are conceptual too:

‘...whatever boundary we draw based on the context at that moment, we must draw it with a pencil and keep our eraser ready. Through an iterative process it is modified to respond to an evolving situation’ (Osario-Cortes 2014, presentation at
SEEP Annual Conference 2014 on Scaling Impact in Inclusive Market Systems. Mike Field (the former Portfolio Director of Kenya Market Assistance Programme) supports this view: ‘The strategies we develop for the selected market system frame the boundaries, but in practice we moved and shifted the boundaries based on what we were learning from the system — what was possible, what was important, where the opportunities were for change, etc.’ (Field 2014, pers. comm., 12 December).

Borders to delimitate what is inside other than in the conceptual diagrammatic representation of a market system are omitted. There is no discussion on setting borders in the MSD framework, manuals and guidelines either. If a border is not drawn, it is difficult to know what is inside and what is left outside. Few papers from Jenal (2015, 2016a, 2016b), Fowler, Sparkman and Markel (2017), Fowler and White (2015), Fowler, Sparkman and Field (2016) which claim results in changing the markets systems, shy away from describing upfront what was the market they were referring to. This limitation continues to create challenges in the design, implementation and measurement of impact of these market system initiatives.

There is no issue with the argument that boundaries could be drawn anywhere, that they are conceptual, non-static, they evolve, shrink or expand. This is completely in like with systems thinkers view of the boundaries too. The issue is that somebody needs to draw the ‘border’ of the system at the beginning to identify the market and system.

BEAM advise practitioners on the need to delineate the border of a system: ‘In practice, you have to draw a line somewhere – and that is typically around the features that are most influential and most amenable to change’ (BEAM 2018b, para.3).

Border is the third characteristic of a system, apart from parts and relationships. It cannot be omitted. All the debate around the border of the system – the need to make ‘Distinction’ - is captured by Cabrera et al. (2008) in one sentence when he explains the interplay of the four DSRP rules:

‘...for example, we will draw a distinction between what something is and is not... but if we are unaware that these boundaries are dynamic and related to the systems and perspectives we recognise as important, then we will be unaware of our biases’ (p. 307).

Finding 9: The boundaries to a system are often not specified. It is unclear what is inside and what is left outside.
3.3.7. The sociological effect

Examples presented so far show there are calls for a paradigm shift in DAP due to the complexity lens over how market systems work. Practitioners have started to act and are introducing new approaches, tools, and frameworks in their practice.

What are the chances for a change in practice to happen, and the new wave of thinking to replace the old one?

One of the barriers to adoption that came out of the literature review in Chapter 2 is the difficulty of acceptance of the new paradigm by supporters of the old paradigm. The ease in adopting a new paradigm depends on the success the old ‘paradigm’ has had. The more successful it is, the less likely it is that people will shift to the new paradigm (Kuhn, cited in Sellers 2017). If this is true, then a key barrier to adopting systems thinking to improve the current practice of market systems approaches in DAP is the success, breadth and depth of adoption the Springfield Centre MSD approach has had.

Sellers pointed to the resistance to change comes from two groups: the successful group of those which discovered the old paradigm and understand the underlying methodologies, and the large number of organisations and trained practitioners who have learnt to implement the methodologies but never really understand the fundamentals of that paradigm. The latter, Kuhn claims is the hardest to convince. If to use this finding in the case of attempts made to offer courses in complexity, the argument made by Kuhn (cited in Sellers) seem to be confirmed. The push for complexity in thinking arose in 2013 immediately after Ramalingam published his book *Aid on the Edge of Chaos*. Training in complexity has been offered since then, or attempts made, but with limited success. However, on the other side, training on the MSD approach has continued to be offered for over ten years or so. *Finding 10: sociological barriers lead to difficulty in acceptance of the new paradigm.*

3.3.8 Everyone’s obsession with the Theory of Change

There was a lot of criticism in the previous chapters on the theory of change, pointing to the limitations a linear logic model has in lights of complexity, uncertainty, and unpredictability of market systems. However, everyone is looking into how to improve it rather than abandon it. A TOC is very popular in DAP, it is
part of any programme design, it guides implementation, and it is a key tool used in evaluation of programmes. It is widely used in MDP, not only at a programme level but for each intervention. A set of activities will be represented using diagrammatic representations, in the form of a results chain or logic model. So, can we save the TOC?

3.3.8.1. Theory of systemic change

In 2018 Jenal went on with developing an alternative to the theory of change when he designed a project working in the rubber sector in Myanmar that he argues takes into consideration the complexity of the market. He calls it ‘theory of systemic change’. His approach is based on the fact that systemic change is not the result of one intervention in the sector, but of a number of interventions and the work of others. He also argues that the effect of interventions is rarely linear and in many cases their impact will ‘lead to large-scale change’ (Jenal 2018, para. 4-6). So the old linear model of the TOC fails to represent that. However, his newly proposed diagram does not seem to be very different from what already exist. The Better Evaluation website (2017) provides links to various ways of representing programme theory, very similar to Jenal’s depiction of a TOC for systemic change.

3.3.8.2. Can we save the theory of change?²⁰

Could DSRP help to have a TOC that better represents reality? In the section below I examine a theory of change (TOC) through DSRP lenses in order to identify what is missing from this simplistic representation of reality.

Figure 3.5 presents an example of a theory of change for an intervention that plans to work through market actors to increase production of farmer through improving farmers’ practices and also making good quality seeds accessible to farmers. The diagram represents both these efforts.

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²⁰ Theory of change is used in here to include also results chain, or impact logics
If we look at Figure 3.5 using the DSRP lenses, few issues arise. The diagram depicts one type of relationship (R) and gives one perspective (P), it shows some parts but not the nested feature of each part (box in the diagram). Other relationships and perspectives are not shown, or ignored due to this simplification.

DSRP rules could bring up and elucidate hidden but important aspects of what is in this TOC and what is not but which is equally important.

Every box in a TOC is based on a ‘distinction’ we make; by distinguishing we put a boundary between what is inside the box and outside it. However, the focus in the case of a TOC has always been on what is inside the box and it has failed to recognise the ‘other’. For example, in the case of Figure 3.5, the focus is just on those farmers involved in the intervention. Those who are not involved, though there is a relationship between the two ‘groups’ are not discussed. ‘Farmers involved in the intervention’ implies there is a group ‘of farmers not involved’. A relationship of co-implication is necessary to be made explicit (Cabrera & Cabrera, 2015). A question such as: ‘What is __? What is not __?’ would help with unpicking this aspect.
The part-whole structure of the system rule helps us to see the place an idea or a thing has within the system in which it exists. In the case of the TOC in Figure 3.5, taking the box ‘farmers aware’, there are parts ‘beneath’ or ‘above’ that we do not talk about: the media used to make farmers aware, the type of seeds, the village the farmers belong to, the wider community that would help us place this activity in the context, or see relationships with ‘others’. A question such as: Does __ have parts? Can you think of __ as a part? (Organise Systems ‘part and whole’) helps unfold this aspect.

Relationships in a TOC are also simplified. It depicts only the web of direct causality. Other relationships, such as feedback loops, correlations, or direct-indirect are not considered. This model shows only the intended effect of this intervention in a linear cause-effect one-directional manner. From the bottom to the top of the diagram boxes are arranged following only this relationship rule. However, there could be other relationships between boxes, and also each box influences other box/es but is also influenced by other(s). To help with understanding relationships between activities and their results and helping to present a better picture of reality, the following questions could be used: ‘Is __ related to __? Can you think of __ as a relationship? (Identify Relationships ‘action and reaction’). If we take Figure 5, then the awareness of farmers about seeds could come from somewhere other than the association. Also, farmers could also influence the capacity of an association to advocate.

‘Systems thinkers sometimes say that cause and effect are not neighbours on a timeline. This idea tells us to look deeper and, in many cases, further back to figure out how we got here’ (Cabrera & Cabrera 2015, p. 182).

Perspectives can help enrich the TOC by pushing practitioners to take different snapshots of the same phenomenon but from different angles: ‘to walk in others’ shoes and see the world from their vantage (or disadvantage)” (Cabrera &
Cabrera 2015, p. 183). We can take Sen’s (1999) ‘capabilities approach’ to look at the problem under discussion, in this case increased productivity of farmers, or we can take the business enabling environment view to look at relevant legislation. It is also possible to take a farmers’ view, a village view, or a local government view. All of these views would give us different perspectives, and hence a different TOC or different solutions to addressing the productivity issues of farmers. Questions such as: From the perspective of __, [insert question]? Can you think about __ from a different perspective? (Take Perspectives ‘point and view’), would help.

The pathway to poverty reduction depicted in Figure 3.5, a ‘non-DSRP’ TOC looks simple: through a number of activities, farmers would increase production. But is it really so easy? The answer is often no when poverty reduction is not occurring despite all efforts to follow the TOC path. TOCs are simple only if DSRP is ignored.

‘If you want a group of people to end up in a particular location, you have to tell them where it is, motivate them to get there, and tell them the rules they should follow on the journey. What you do not want to do is micromanage the journey, because things on the ground might be difficult and complex and require adaptability and grit”. What you want to say is, “here is your destination and here are the rules for getting there…”’ (Cabrera & Cabrera 2015, p. 202-203).

What does this mean? A way to probably save the TOC is to put DSRP lenses and to keep asking questions, as exemplified above, widening the horizon of inquiry and build a diagrammatic representation – supported by additional documentation.

The basic four questions which have been used above, are listed below21:

- What is __? What is not __? (Make Distinctions ‘identity and other’)
- Does __ have parts? Can you think of __ as a part? (Organise Systems ‘part and whole’)
- Is __ related to __? Can you think of __ as a relationship? (Identify Relationships ‘action and reaction’)
- From the perspective of __, [insert question]? Can you think about __ from a different perspective? (Take Perspectives ‘point and view’).

However, at the end, by using these DSRP rules, a diagrammatic

21 These questions could be used for other purposes: other tools, in design, monitoring or impact assessment of initiatives, where to focus? What perspective(s) to take?
representation such as the TOC, results chain or logic model might not be the best way to represent the depth and breadth of an intervention, its activities, relationships or changes that it aims to produce.

A TOC might not be the best way to depict a complex problem, according to Cabrera. The paths in the case of complex problems are projected rather than definitive, they are non-linear, adaptive, account for the unknown and use a set of rules to guide the journey to a destination (Cabrera 2015; Cabrera & Cabrera 2015, Snowden 2003, Wheatley 1999).

However, practicing the DSRP rules and using them alongside any other tools would widen the horizon of inquiry. *Finding 11:* Putting everything into a TOC, might make it too complicated. However, using DSRP will widen the horizon of inquiry and provide a better picture of the reality on the ground.

### 3.5. Summary

Several themes have emerged from this analysis. Although the history of systems thinking in aid programming is relatively short, systems thinking has grown in popularity and promise, especially since the publication of Ramalingam’s (2013) book, *Aid on the Edge of Chaos.* Practitioners, implementers and funders acknowledge that problems in development aid are complex, interconnected, and interdependent, often referred to as messy. There is a feeling of optimism, hope and support for implementing a systems thinking perspective as a means of addressing these issues and changing development aid for the better. Practitioners have turned to complexity science for tools, tested them in DAP, or developed new frameworks to help understand complex development problems. Donors and organisations are hoping to institutionalise the concept within their organisations. There have been a number of publications released, but the majority are think-pieces and reports and are more descriptive rather than critical. As yet, there are only few publications relating to the use of market systems approach in peer-reviewed journals. The practice could be considered nascent with ambiguities in understanding what systems thinking is.

These findings illustrate some misconceptions and ambiguities, barriers and obstacles exist in using systems concepts in MDP which could be a reflection of the implicit challenges development practitioners may face (Cabrera 2006). A major barrier to adoption of any new practice, e.g. new training in complexity, the difficulty
in acceptance of the new paradigm will depend on what ‘the success of the old paradigm’. This could happen if it is not already happening in MDP, in this case with the success that the MSD approaches have had. The next chapter will proceed with the identification of these challenges.

This study ascertains that the limited or incorrect use of the systems practice is due to challenges that practitioners face. If challenges are addressed, funders, implementers and practitioners will be better equipped to use systems thinking in the design and implementation of market system initiatives in DAP. In this respect the new perspectives brought by this research are a significant contribution to the field of development aid. Through this endeavour, the systems thinking practice will progress, from fragmented thinking to a more consolidated systems informed practice as it happened in the USA in the public health, education, human development, climate change, management sectors, among others (Cabrera 2006).

The endeavour must first identify and understand the challenges. To unearth these challenges this study proposes in the next chapter the use of structured conceptualisation – a systems methodology. The approach is an innovative contribution to the practice of development aid. The application of the approach will involve a group of practitioners from the development field - those which have been at the forefront of applying systems thinking in MDP. It will provide the much needed empirical evidence on the challenges faced by the development practitioners.
Chapter Four: Methodology - The Identification of the Challenges of Using Systems Thinking in Programmes Using Market Systems Approaches in Development Aid Programming
This Chapter describes the methodology used in this thesis to identify challenges practitioners face in implementing systems thinking in programmes using market system approaches in DAP. It presents: the approach, the research design followed by the presentation of the selected method, concept mapping, a structured conceptualisation methodology. It concludes by presenting the six steps undertaken in the method.

4.1. The Approach: How learning and the construction of knowledge for this research are created

This research acknowledges principles from both positivist and constructivist approaches to knowledge making, where positivism assumes there is valid information only in scientific knowledge while constructivism recognises that knowledge is constructed in the human being and shaped by culture and experience (Hinchey 2010).

Positivism is the term used to describe an approach to research that relies specifically on scientific evidence, such as experiments and statistics, to reveal a true nature of how society operates. This thesis is guided by this approach which recognises and makes use of proven theories, concepts and methods on systems thinking. These include systems, definitional systems thinking and different perspectives from different schools of thoughts, typologies of systems thinking and what they mean for the evolution of the field of knowledge. Definitional ambiguities, misconceptions, and other limitations of the theoretical concepts are also exposed and accepted.

Equal consideration in this thesis is given to constructivist principles that prioritise voice and representation in research: ultimately ‘...data are constructed by human beings’ (Hinchey 2010, p.42). Embracing a constructivist approach by identifying and considering different perspectives from a group of practitioners on challenges practitioners have faced in implementing systems thinking, this research acknowledges that there is more than one perspective and that many in the development community could be the bearer of that knowledge.

‘Constructivism is the recognition that reality is a product of human intelligence interacting with experience in the real world. As soon as you include human mental activity in the process of knowing reality, you have accepted constructivism’ (Elkind 2005, p.330).
This ‘twin’ or combined approach is well justified (Creswell 2009). Having experience of using both quantitative and qualitative approaches, in my work, I believe in the possibility of drawing from both ‘paradigms’ in this research and understand that sometimes they complement each other. The desire of connecting positivism with constructivism in this study had led my way to this twin approach which also impacted on the selected method of inquiry.

The proposed method used to identify, analyse and present challenges practitioners face in implementing systems thinking is ‘concept mapping’: a ‘structured conceptualisation’ method. The approach might look constructivist as it uses a group of practitioners in conceptualising these ‘challenges’, but, as the section below will explain, concept mapping is a scientifically tested method, hence it also sits well under positivism.

4.2. The Research design

There are several steps in the design of this research.

It starts in Chapter 2 with the ‘theoretical’ perspective on systems thinking, where key systems concepts were reviewed and any definitional ambiguities, or other limitations in the use of systems concepts were highlighted. Theory is in this thesis the philosophical stance that acts as the researcher’s ‘lens’ to review the practice of market systems approaches in DAP. It guides the methodology by grounding the logic and context of the research process (Crotty 1998).

Using this ‘theoretical’ lens the MDP practice was reviewed in Chapter 3 to see if ambiguities, misconceptions or other barriers have crossed boundaries and are now grounded in the MDP practice.

The research then moves on to ascertain the degree to which ambiguities on systems thinking lead to challenges in implementing systems approaches. In order to identify if challenges exist, the research design proposes to use a systems method: concept mapping. Using this method, challenges are identified and analysis conducted and the visual representation of results, using a sophisticated software, are presented in Chapter 5. Chapter 6 includes a discussion on possible solutions to address these challenges.
4.3. The Method: Concept mapping

This section provides a discussion of the underlying method chosen for this thesis to identify challenges practitioners face in applying systems thinking in the MDP practice.

To identify these challenges, this thesis uses concept mapping, a hybrid mixed-method approach to social research, referred to as structured group conceptualisation, an integrated approach developed by William Trochim of Cornell University (Trochim & Linton 1986).

Other methods, such as surveys, key informant interviews, have been considered as they may have been appropriate to identify these implementation challenges. However, as stated above, the research seeks to identify and describe challenges from the perspectives of development practitioners. There are various ways in which people experience or understand a given concept, because different people experience it in different ways. This thesis seeks to identify these multiple conceptions on challenges faced and more importantly ‘aggregate’ and present this group thinking. The researcher considers the aggregation and depiction of development practitioners’ combined thinking on the challenges they face as being central to this research. Structured conceptualisation offers this feature.

Structured conceptualisation is particularly relevant for encouraging group thinking: whenever one wants to identify what a particular group thinks, and have the composite thinking of the group, the structured conceptualisation method has proven to be a useful method (Cabrera 2006; Kane & Goldman 2014; Kane & Rosas 2011; Novak & Canas 2006; Trochim 2017; Trochim 1989a, 1989b, 1989c, 1989d; Trochim et al. 2006a; Trochim et al. 2006b). This makes Trochim’s structured conceptualisation a good fit for this research and was selected amongst other possible methods.

Structured conceptualisation also strengthens the ‘conceptualisation’ process by offering an empirical study. Often conceptualisation of a problem, theory, or phenomenon is based on theoretical perspectives, experience or views of the researcher, and less on empirical studies. Structured conceptualisation addresses this issue.

There are many other advantages using this method. The group generates ideas, and participants are personally involved in providing not only the options for a
stated problem, but also in the interpretation of the resulting maps, and in providing
the solution. Concept mapping is suitable to solve complex conceptualisation topics,
phenomenon. Through a rigorous process, it generates empirical data that then guides
implementation and action. The representation of results using visual maps makes
them easy to digest, and these can be easily understood by both experts, who have
been involved in the research or the systems thinking practice, and non-experts. It
could involve a diverse group of people from different backgrounds to solve a
particularly complex issue. All these features make structured conceptualisation a
good fit for this research.

A recent study conducted by Trochim (2017) shows the breadth and depth of
concept mapping to date. It spread across continents but also sectors. Out of over 478
publications in Scopus that cited Trochim’s original 1989 article on concept mapping,
over 240 are from the US. Though generated in the US in late 1990s, other countries
are also using concept mapping, with the Netherlands, Canada and Australia as
second, third and fourth on the list, respectively. Concept mapping is used in several
fields. The Concept Systems Incorporated website lists: evaluation, social work and
human services; mental health; health, public health and healthcare; patient reported
outcomes and nursing, as areas of application (Concept Systems Inc. n.d.).

4.4. The software: Concept System® Global MAX™

There are many methodologies and approaches in the social sciences that have
been termed ‘concept mapping’, such as ‘idea mapping’, ‘mind mapping’, ‘causal
mapping’ or ‘cognitive mapping’. They all describe a process that leads to visual
representation of ideas in maps or pictures. In general, they are used by individuals to
generate ideas and enhance understanding and thinking about a problem or to
structure their thoughts. To generate these ideas, informal processes are often used
where participants brainstorm statements and where responses are arranged causally
using cards or ‘post-it’ notes (Novak & Cañas 2006). Alternatively, practitioners use
more sophisticated statistical techniques, such as multidimensional scaling (MDS)
(Kruskal & Wish 1978). The software selected to be used in this study has this MDS
feature.

22 Concept mapping analysis and results conducted using The Concept System® Global MAX™
software: Concept Systems, Inc. Copyright 2004-2016; all rights reserved.
This research used the Concept System® Global MAX™ software for its structured conceptualisation methodology to engage and collect views from practitioners. Apart from features to ensure validity and robustness of the analysis, the software combines the concept mapping methodology with a web-based interface, making it a powerful online tool to accommodate and reach the practitioners targeted by this study, who were at the time of this research geographically distributed throughout the world, from USA to Europe, Asia and Australia.

The data collection using this software was implemented from December 2015 to beginning of February 2016, with some refinements made in March-April 2017. This chapter presents details of the first four steps in the methodology: preparation, generation, structuring and the analysis. The last two will be described in next chapter.

4.5. The process

In structured conceptualisation, a group of participants follows six steps that lead first to the generation of ideas, helping to form the conceptual domain of the study, and then, using these ideas, a series of maps are developed that visually depict the composite thinking of the group. These maps are then used for discussion and action by the group. Because it integrates brainstorming and unstructured sorting with MDS, many define concept mapping as a mixed methods approach to research inquiry (Kane & Trochim 2007).

The six steps of the process are detailed below (Figure 4.1):

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23 Concept mapping analysis and results conducted using The Concept System® Global MAX™ software: Concept Systems, Inc. Copyright 2004-2016; all rights reserved.
First, the focus of the research is defined and participants are selected. Then participants brainstorm using a focus prompt and create a series of statements. Responses are then individually grouped into piles based on conceptual similarities (Weller & Romney 1988). The analysis includes an MDS of the similarity piles obtained by aggregating the sort data. Further analysis is then applied, a hierarchical cluster analysis (HCA), which assists with the representation of the ideas in concept maps. These resulting maps represent a ‘structured conceptualisation’ or a multidimensional graphic representation of the ideas. Within these maps, dots represent each idea from the statement set (conceptual domain). Ideas that are more similar are located proximally and are represented in the point map. These ideas are then clustered statistically into larger categories that are overlaid on the cluster maps, which are the visual representation of the domains of ideas.

‘Together the point map and cluster map represent the conceptual framework generated for the study’ (Kane & Trochim 2007, p. 18).

These maps are then used by participants in the utilisation phase to address the purposes of the research project.

**4.6. Steps in developing concept maps**

**4.6.1. Step 1: Preparation**

In the preparation step, two main activities were undertaken: the development
of the focus prompt for brainstorming and the selection of the participants.

4.6.1.1. Development of the focus prompt

Developing the focus prompt is one of the most important steps in the process. The focus was worded in a complete-the-sentence format, to enable brainstorming and the generation of multiple ideas. The focus prompt for this study was: “One specific challenge that needs to be addressed to encourage systems thinking in (market) development aid programming is...”

4.6.1.2. Selecting the participants

Experience shows that concept mapping is more effective when the selected participants are familiar with the topic because they have had experience and/or knowledge of it. The focus prompt was based on ‘use of systems thinking’ in MDP. Therefore practitioners who have experienced systems thinking in their work or/and published research or studies on systems thinking topics were the target of this research. However, as explained in the previous chapters, the use of systems thinking in DAP is nascent and only a handful of practitioners have started using it. The researcher expanded the boundaries of selecting the sample to also include a few non-development practitioners who have applied systems thinking in other fields and know of the challenges they or others had. In so doing, views from other fields of study would guide this process of conceptualisation of systems thinking in MDP. Therefore, the target sample consisted of both practitioners from development aid and from outside the practice.

The selection was made based on the following criteria: (1) involvement with systems thinking, (2) knowledge about systems thinking, (3) have had contributed with pieces of research, think pieces or thinking to the systems thinking, or (4) be part of platforms or groups who are involved in the systems thinking debate, (5) involvement in development aid programming, preferably MDP. Another criterion – (6) availability for the duration of the study - was also a factor to select or not to select a participant.

To select potential participants and include them in the list was not difficult: many participants were known to the researcher due to them having worked together in the past in programmes where systems thinking was applied to a degree, or are currently working together; other participants have been referred to the researcher by the first group; another group consisted of those which have published papers, books on the topic or made known their opinions by publishing think pieces including on
various market system development platforms such as BEAM Exchange, LEO, MaFI, SEEP Network, DCED, International Labour Organisation (ILO) Lab, various programmes’ websites or blogs, or other means. This made up a list of 57 in total.

Potential participants were invited to participate in two phases: Phase 1 – brainstorming, and Phase 2 – sorting and rating. A website was set up for Phase 1, as the Concept Systems® Global MAX™ software – that was later used in this study - was not available at that time. Fifty-seven emails were sent, one turned back as ‘undelivered’ so the researcher started with a list of 56, and 26 participants accepted. Some of those who declined to participate could not commit to the timeframe, some did not respond even after several follow up emails. However the majority of those who were not available at the time of this study said they would be happy to be part of the process if the research is repeated at a later date.

These emails led to 26 participants agreeing to participate, but 23 visitors accessed the brainstorming website and provided responses by email (41 per cent of deliverable emails). A login during the brainstorming phase (Phase 1) was required. The ratio between ‘Visitors Phase 1’ and ‘total emails’ sent is 41.07 per cent (as Table 4.1 below presents). This ratio was compared to a similar study done at Cornell University and the same ratio was 37.05 per cent (Cabrera 2006). It was not unexpected that some of those selected, decided not to participate in the research.

The sample of 23 that participated in the study was a good representation of the original list. It included representatives from all market systems platforms mentioned earlier: BEAM Exchange, LEO, MaFI, SEEP Network, ILO Lab; it included DCED standard auditors and senior managers or senior staff from major programmes and organisations working on market systems development: Katalyst, Kenya Market Trust, Samarth-NMDP, Musika, the Springfield Centre, Market Development Facility (MDF), Palladium, Coffey, Swisscontact, Mesopartner amongst others. Many of these have been mentioned or their work have been referred to in previous chapters of this thesis.

There were also others not involved in DAP, but known to the researcher through their work that addresses systems issues, or that work at the Australian Council for Educational Research (ACER) and in academia.

It was not absolutely necessary for all participants to be involved in every step; even though all had the opportunity to do so. Brainstorming was completed by all but, in the next phase (sorting and rating), some participants dropped out due to
other commitments.

Table 4.1 shows the response rate for each step in the process, generated by 56 emails (the steps will be discussed later in this chapter). One email was undeliverable and is not included in the statistics. Of the 23 visitors, 65 per cent, or 15 participants, logged into Phase 2. These 15 participants represent 27 per cent of the deliverable emails. The similar study mentioned above, for the same phase had 22.01 per cent of the deliverable emails. Of these 15 participants, 14 completed the first stage of Phase 2 - the sorting, which represented 25 per cent of the deliverable emails. Similar study had 15.60 per cent. Finally, 13 participants completed the ratings. This represented 23 per cent of delivered emails. Similar study had 15.04 per cent of delivered emails. Response rates for this research were higher.

Table 4.1: Participation rates

<table>
<thead>
<tr>
<th>Response Rates</th>
<th>Total Emails</th>
<th>Visitors Phase 1</th>
<th>Logins Phase 2</th>
<th>Sort Completed</th>
<th>Rate Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total emails</td>
<td>56</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visitors Phase 1</td>
<td>41.07%</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Logins Phase 2</td>
<td>27%</td>
<td>65%</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sort Completed</td>
<td>25%</td>
<td>60.87%</td>
<td>93.33%</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Rate Completed</td>
<td>23%</td>
<td>56.52%</td>
<td>86.67%</td>
<td>92.86%</td>
<td>13</td>
</tr>
</tbody>
</table>

4.6.2 Step 2: Generation of ideas

After the preparation phase, the next step was the generation of ideas. This phase had two steps: brainstorming of ideas and idea synthesis in which the ideas generated were synthesised, reduced and edited.

4.6.2.1. Brainstorming phase

The brainstorming phase provided participants with two options: a website, created especially for this project, which was user friendly and readily accessible at
any time by participants. Using the website, participants could enter their own idea statements in response to the focus prompt. The second option was where participants could send statements directly using email.

The brainstorming phase began by informing participants about the research with the invitation email (see Appendix 4A). For those who accepted, a second email was sent providing them with a link to a webpage, if they chose to use this option (see Appendix 4B). Participants could submit, one at a time, as many statements as they wanted. They could see their entry(ies), as well as the entries of others, once they pressed the ‘Submit’ button. The participant was given the option to add another entry or to quit. In this way, participants could submit multiple entries and, as in group brainstorming, they were aware of the responses of others. Diversity and the number of opinions were critical, hence several reminders were sent to participants who accepted the offer to participate but then did not submit any entries. Those who used email, included the statements in the email body sent back to the researcher.

During the six-week brainstorming phase, 176 original statements were generated. After the specified period, the brainstorming phase was closed.

4.6.2.2. Idea synthesis/reduction and editing of statements

The clarity of statements was important and was a key factor that contributed to the success of the next steps of the concept mapping. An activity took place to synthesise and reduce the number of statements into a representative set of statements to prepare for sorting and rating. The purpose of this phase was fivefold: (1) to ensure that only one idea was in each statement; (2) to combine redundant or highly similar statements; (3) to reduce the entities to a manageable number and increase the probability of participation in the next steps (100 or less); (4) to ensure each statement was relevant to the focus of the research; (5) to edit statements for clarity and comprehension. This process ensures that a pertinent, clear, manageable and grammatically correct set of synthesis statements was ready for the next steps. The researcher then randomised the order of the final statements to ensure that they were not ordered in a manner that would influence the sorting and rating by participants.

An Excel spreadsheet was used as a tracking mechanism but also to ensure that there was an audit trail for all reduction/synthesis activities. The master list of 176 statements was first read for content clarity to ensure that each statement could be understood by anybody reading it. Then a simple coding process was used to find
commonalities and similarities between statements: key words were highlighted in the recorded ideas and put in an adjacent column. This was followed by a secondary word or phrase in the next column. Then, statements were sorted by similar words or phrases and subsequently moved to categorical tabs — ‘Coding’ and ‘Final’ — in the spreadsheet. This process led to smaller but related sets that were more manageable. Several subcategories were created where similar statements were put together and the numbers reduced for synthesis to fewer statements.

The process that led to the final statements could be tracked using the Excel file. The finalised statements were then randomised using a function in Excel that would ensure that similar statements were not lumped together and were therefore sorted together by participants in the sort and rate phase of this research. Each statement was given an identification number (ID). This ID was used in the other steps, in the resulting maps, in subsequent discussions and in analysis. It constituted the conceptual domain for the process and the basis for the next step, structuring. A list of the original statements and their paths can be found in Appendix 4E.

4.6.3. Step 3: Structuring the conceptual domain

In this phase, participants provided their perceptions on the similarities between the statements (sorting); in addition, they also rated each statement on one variable of interest – in this case, its relative importance. In addition, participants contributed basic information about their knowledge and experience with systems thinking (demographics). The following steps were followed:

4.6.3.1. Participant demographics

This phase involved the researcher gathering the participants’ demographic variables of interest for later use in pattern matching analysis, go-zones and comparing concept mapping results across key characteristics.

The researcher selected three variables for analysis into demographics: formal training in systems thinking; practical experience in systems thinking; and professional affiliation. The first two questions were related to the level of knowledge and understanding participants had on systems thinking, which could come from formal training that respondents had received in systems thinking and from practical applied experience. Both could influence the sophistication with which respondents sorted or rated the statements. For the first characteristic, academic degree (with
subjects) in systems thinking (e.g. biology, environment etc.) were held by four participants. 14 participants of the 23 that participated in the study had taken courses on systems thinking; while only five had no formal training on systems thinking. For the second variable, almost all participants 98 per cent had been part of initiatives that use systems thinking. The third variable, professional affiliation was important to determine if there was any difference in sorting and rating the statements based on the type of organisation in which participants worked. In this case, ten participants affiliated with business; two participants were from education; and six participants were from the NGO sector. Five participants had ‘other’ affiliations.

4.6.3.2. Developing the rating for the statements

The only criterion that was chosen in order to rate the focus prompt was ‘importance’. This was measured using a Likert scale of 1 to 5:

1 = relatively unimportant compared to the rest

2 = somewhat important compared to the rest

3 = moderately important compared to the rest

4 = very important compared to the rest

5 = extremely important compared to the rest

4.6.3.3. Developing website and email option

The sorting phase asked participants to sort statements into piles and to provide a name for each pile, according to the common theme or factor.

This second phase took place over the Internet, with a few exceptions where results were sent by email using an Excel template. The email option utilised the same process as described above. The email content to let participants know about the sorting and rating phase is presented in Appendix 6C. For snapshots of the various webpages on the systems4development webpage and the Concept System® Global MAX™ software or Excel spreadsheet that participants used, see Appendix 4D.

4.6.4. Step 4: Analysis

4.6.4.1 Review participant responses
After Phase 2 was completed, data were downloaded for analysis using the Concept System® Global MAX™ software. A flowchart of the analysis process is presented in Figure 4.2.

Before running the analysis, the researcher reviewed each participant’s response and checked it for completeness. One incomplete record (where sorting and/or rating were not completed) was not used. The software itself did not consider responses that covered less than 75 per cent of the statements. There was no miscellaneous or ‘other’ sort pile; as the software does not allow that. Once data were ready for analysis, the researcher undertook the generation of concept maps.

4.7. Generation of concept maps

The representation of the ideas in maps is accomplished through a sequence of multivariate statistical analyses in the Concept System® Global MAX™ software. Various maps are generated. The analysis begins with a similarity matrix being performed by counting the number of times two statements have been sorted together. MDS is then used to transform the similarity matrix into a distance matrix, which results in the first map — the point map — being produced. Ideas that are more closely related are represented closer on the map. A goodness-of-fit statistic is the stress value and is one measurement of the reliability of the concept map. The stress value is determined by calculating the similarity between the distance matrix and the
similarity matrix. A lower value indicates a much better fit as it shows greater similarity between the initial raw data and the final processed results (Davidson 1983; Kruscal 1964). Trochim (1993), Kane and Trochim (2007) and Kane and Rosas (2011) reported average values of 0.285 for 33 studies, and 0.28 for 69 studies that have used concept mapping, respectively. The final stress value for this research was 0.2845 after 13 iterations.

The second map that is generated is a point rating map, which adds the relative rating of each statement as shown by stacked points. HCA is then performed, which groups individual dots from the first analysis (MDS) into clusters that reflect similar concepts. A cluster map is then produced. Initially, an eight-cluster map was chosen but, because of the similarities between some clusters, successively lower level solutions were examined. Table 4.2 presents the initial eight clusters.

Table 4.2: Initial eight clusters

<table>
<thead>
<tr>
<th>Cluster #</th>
<th>Name of the Cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Funding</td>
</tr>
<tr>
<td>2</td>
<td>Performance management</td>
</tr>
<tr>
<td>3</td>
<td>Changing mindsets/promotion</td>
</tr>
<tr>
<td>4</td>
<td>Implementing systems thinking</td>
</tr>
<tr>
<td>5</td>
<td>Tools, techniques and approaches</td>
</tr>
<tr>
<td>6</td>
<td>Skills and capacity for systems thinking</td>
</tr>
<tr>
<td>7</td>
<td>Information on systems thinking</td>
</tr>
<tr>
<td>8</td>
<td>Education and training</td>
</tr>
</tbody>
</table>

The researcher found that a six-cluster solution is the best representation of the conceptualisation domain. It must be noted that there is no mathematical or statistical criterion by which the clusters are selected. After the MDS and cluster analysis was completed, and maps generated, the next step was to give appropriate names to clusters in the map. The software has built-in algorithms that identify the closest labels for any clusters and generate automatic names for these (see in Table 4.3 below).
Table 4.3: Initial cluster names

<table>
<thead>
<tr>
<th>Cluster #</th>
<th>Cluster Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Funding</td>
</tr>
<tr>
<td>2</td>
<td>Changing systems and processes</td>
</tr>
<tr>
<td>3</td>
<td>Address existing mental models</td>
</tr>
<tr>
<td>4</td>
<td>Tools techniques and approaches</td>
</tr>
<tr>
<td>5</td>
<td>Skills and capacity for systems thinking</td>
</tr>
<tr>
<td>6</td>
<td>Promotion of systems thinking.</td>
</tr>
</tbody>
</table>

The researcher decided to rephrase a number of them for two reasons: (1) for better representation of the statements within the cluster; (2) the need for the name of the cluster to include an action verb. The final list is presented below in Table 4.4.

Table 4.4: Final cluster names

<table>
<thead>
<tr>
<th>Cluster #</th>
<th>Name of Cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Support funding of systems approaches</td>
</tr>
<tr>
<td>2</td>
<td>Change existing systems and processes</td>
</tr>
<tr>
<td>3</td>
<td>Address existing mental models</td>
</tr>
<tr>
<td>4</td>
<td>Use systems tools, techniques and approaches</td>
</tr>
<tr>
<td>5</td>
<td>Develop skills and capacity for systems thinking</td>
</tr>
<tr>
<td>6</td>
<td>Show the potential of systems thinking.</td>
</tr>
</tbody>
</table>

A cluster rating map was also generated, which included the clusters as well as the average ratings for each cluster in the map. Other maps were also computed. These are all presented in Chapter Seven, where the interpretation of the maps – another step in the concept mapping process – is presented.

4.8. Limitations of the methodology

This methodology has limitations. This study did not use random sampling, but included practitioners who were known for their work in systems thinking from publications, networks or platforms, or were known by the researcher as practitioners, funders or implementers working in the same field as the researcher, DAP; this could mean that the results are only specific to this study and may not be generalised to other practitioners, who work in other fields. In addition, this research used a
relatively small sample, which makes it subject to the limitation of small sample sizes. It is also important to note that the results are only a ‘snapshot’ in time of challenges. The practice continues to evolve as understanding deepens over time.

While it is important to raise these limitations, they are not different from the limitations stated in other similar concept mapping studies. Of course, these limitations could be addressed by replication and using the focus prompt in other settings and with another group of practitioners, or by using alternative ways of collecting data. More importantly, the question is whether the results using this methodology confirm some existing findings discussed in Chapters One, Two and Three. And the answer is, yes, as the following chapters will show.
Chapter Five: Concept Mapping - Results and Interpretation
This chapter discusses the results of the structured conceptualisation methodology to identify the challenges faced by practitioners in using systems thinking in MDP. A number of documents were generated using Concept Systems® Global MAX™ that helped with the interpretation of the results in this chapter. First was the final list of 100 statements with ratings across clusters for the entire group or subgroups based on specific demographics. Second was the visual representation of the rating and sorting process reflected in the four kinds of maps that Concept Systems® Global MAX™ generated for this study: (1) a point map and point rating map; (2) a cluster map and cluster rating map; (3) pattern matching maps, used to identify correlations between variables, such as participants’ different demographics; and (4) go-zone maps which zoom in on a particular cluster.

Reliability of the analysis is also presented throughout this chapter in the form of statistical testing: the stress test, mentioned also in the previous chapter as a goodness-of-fit test, Pearson’s correlation (‘r’) test and t-tests to measure the strength of associations.

Overall, the discussion in this chapter will frame the key recommendations for the next chapter relating to recommendations.

5.1. The conceptualisation framework

The first product that resulted from the structured conceptualisation process was the list of 100 rated and sorted statements, with average importance ratings on a scale of 1 to 5, and with bridging values\(^{24}\) ranging between 0 and 1. The full list of statements is presented in Appendix 4E. This list enabled the generation of a number of maps – the second product of this process – first through MDS and then through HCA, using the Concept Systems® Global MAX™ analytical package.

The first map generated was the point map, where the 100 statements were mapped into two-dimensional (x,y) coordinates. Figure 5.1 illustrates this map, where each statement is identified by its corresponding number – its ID. This is an important map, as it was the first to go beyond listing statements and shows the proximity and relationship between two or more statements (points) on the map. Statements that are

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\(^{24}\) These values show similarities between statements. The bridging/anchoring value is between 0 and 1. A low bridging/anchoring value means that more people have grouped the statement together with others in its vicinity. Statements with low bridging/anchoring value better represent the meaning of a particular cluster's content than those with a higher value.
in the same vicinity are more similar in meaning than those farther apart. For example, points 96, 18, 16 and 19 – on the bottom-right-hand side of the map – are in the same proximity because participants sorted them together more frequently. In contrast, points 96 and 35, which are farther apart on the map, were sorted together less frequently. MDS plots statements together in the map but no demarcation through clustering is made at this stage.
Figure 5.1. Two-dimensional Point Map for the Study (generated using Concept Systems® Global MAX™)
During the concept mapping process, participants sorted these statements into piles. The individual groupings were combined and the software generated a second map through HCA. Figure 5.2 illustrates this cluster map, which constitutes the conceptual framework for the study and provides the most cohesive, meaningful and consistent solution of how to address challenges in using systems thinking in DAP. The map depicts six non-overlapping labelled domains (clusters) underlying 100 statements for action:

1. Support funding of systems approaches
2. Change existing systems and processes
3. Address existing mental models
4. Use systems tools, techniques and approaches
5. Develop skills and capacity for systems thinking
6. Show the potential of systems thinking

Each domain, shaded in yellow on the map, was labelled to reflect the conceptual content of the individual statements and consisted of a number of challenges or factors that needed to be addressed. These statements defined each domain’s boundaries. Their number varied in each cluster, ranging in this case from a maximum of 25 items to a minimum of 11. Statements were part of that domain because they were more similar to each other than to statements from other clusters.

The robustness of these maps was checked using the stress value calculated by the software. The stress value represented how well the map and the distances between points reflected data from the similarity matrix, with lower values representing a better fit. This stress value – or goodness of fit – was 0.28 and was within the range of ‘a good fit’ in the literature for structuring conceptualisation, which authors recognised to be between 0.21 and 0.37 (Rosas & Kane 2012; Trochim 2007, 1993).

These maps are critical for understanding the interrelationships within a cluster but also amongst clusters, highlighting the key themes and concepts that, in
combination, provide a solution to the issues to be solved. In this case, the research question is ‘what are the challenges that practitioners face in implementing systems thinking in DAP?’ Challenges that have been viewed by participants as being most related to each other are located closer together, while challenges viewed as distinct conceptually are located farther apart. Clusters that are in the same vicinity, such as ‘Address existing mental models’ and ‘Changing existing systems and process’ reflect the similarity of statements in these two domains, as illustrated in Figure 5.2. The expansion of the ‘Address existing mental models’ domain into the middle of the map shows its potentially ‘stronger’ relationship with other domains through similarities of statements or ‘challenges’, which makes it appear more like a cross cutting or ‘bridging’ cluster. This is an important consideration for the recommendation section, and will be discussed later in this research.
Figure 5.2. Cluster map for the study (generated by and using Concept Systems® Global MAX™)
The third map generated was the point rating map (Figure 5.3). It was constructed by adding the ‘value dimension’ (Trochim & Kane 2007, p. 123) to the two-dimensional point map. This new map graphically displays the rating of each point by showing the stacked point height next to the ID of the statement. Values for importance ranged from 1 to 5, and for this study were between 2.08, the lowest, to a high of 4.69. There were several places where statements were highly rated: the tight cluster on the top, the tight cluster on the lower-right quadrant; and a few in the middle. The highest rated statement was #12 ‘Develop organisations in which learning is encouraged, being wrong is OK and taking a risk is rewarded’ – placed in the lower level quadrant – with an average rating of 4.69.

The low ratings seem to crowd in the middle and top-left quadrants.
Figure 5.3. Point Rating Map for the Study (generated by and using Concept Systems® Global MAX™)

<table>
<thead>
<tr>
<th>Layer</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.08 to 2.60</td>
</tr>
<tr>
<td>2</td>
<td>2.60 to 3.12</td>
</tr>
<tr>
<td>3</td>
<td>3.12 to 3.65</td>
</tr>
<tr>
<td>4</td>
<td>3.65 to 4.17</td>
</tr>
<tr>
<td>5</td>
<td>4.17 to 4.69</td>
</tr>
</tbody>
</table>
A cluster rating map was also generated where average ratings for each cluster were displayed by adding layers (Figure 5.4). Mean importance ratings for each domain ranged between 2.99 and 3.45. ‘Development skills’ was rated the highest in terms of importance, with an average of 3.45. At the other end, ‘Show the potential of systems thinking’ had an average importance rating of 2.99. This analysis showed that some domains were considered more important than others, as participants were asked to rate each statement based on its importance compared to the rest of the statements, which could also inform the urgency in addressing some of them. However, this did not mean that in the lower rated clusters there were only low value rating statements. The ‘Show the potential of systems thinking’ domain had a few statements which were highly rated, as the two listings below demonstrate, but there were also many statements that had lower ratings which dragged the mean rating down for the cluster.

- Build the evidence of benefits and costs of systems thinking: average rating for the statement was 4;
- Identify and disseminate examples of 'best practices' or 'what works' in systems thinking inside and outside aid: average rating was 3.85.

This means that a solution could come from either addressing statements from multiple domains or from all domains and have a ‘portfolio’ of statements that cut across the entire or most of the map, or by addressing only a few domains. The maps offer enough information from which to choose regarding what to do in the short term as a matter of urgency, or in the medium and long term.
Figure 5.4. Cluster Ratings Map for the Study (generated by and using Concept Systems® Global MAX™)

Cluster Legend

<table>
<thead>
<tr>
<th>Layer</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.99 to 3.08</td>
</tr>
<tr>
<td>2</td>
<td>3.08 to 3.17</td>
</tr>
<tr>
<td>3</td>
<td>3.17 to 3.26</td>
</tr>
<tr>
<td>4</td>
<td>3.26 to 3.35</td>
</tr>
<tr>
<td>5</td>
<td>3.35 to 3.45</td>
</tr>
</tbody>
</table>

1. Support funding of systems approaches
2. Change existing systems and processes
3. Address existing mental models
4. Use systems tools, techniques and approaches
5. Develop skills and capacity for systems thinking
6. Show the potential of systems thinking
Another level of analysis is related to the distances between statements or between clusters, which reflected similarities between the statements or clusters. Relatedness refers to the relative strength of a relationship amongst ideas in a particular cluster. There were some statements that were sorted many times with the others adjacent to them. These were the ‘anchor’ statements and they best represented the ‘core theme’ of that area of the map. There were also other types of statements in the map that played a bridging role. They belonged to a cluster but they were sorted with statements that were distant on one side and on the other. These ‘bridging statements’ were thus in an intermediate position. The software generated point bridging maps and calculated bridging values for statements (with a range between 0 and 1 and lower values representing a tighter relationship with other statements in the area). Figure 5.5 presents the point bridging map.

This map provides examples of anchors, such as #15 and #66 in the bottom-left quadrants; their bridging value was 0.13 and 0.20 respectively. Another example is #15, which was rated by 13 participants with statement #46 and by 12 participants with #49, whereas 12 participants rated #66 with statement #56.
Figure 5.5. Point Bridging Map for the Study (generated by and using Concept Systems® Global MAX™)
Figure 5.6 illustrates the cluster bridging map. This cumulated and averaged the bridging value for all statements within each domain. Cluster 5 was the only cluster that had very low bridging values (0.27). Two other clusters, 2 and 4, were in the middle, average a bit less than 0.50 (0.41 and 0.43 respectively). The remaining three clusters had the highest bridging values, with clusters 3 and 6 highest (0.52 and 0.71 respectively), showing their role as connectors, influencers, enablers, and bridging between and amongst clusters. It is important to be aware of the bridging values to stimulate understanding and discussion of relationships between statements and clusters and interpret the meaning of these relationships. This helps with going beyond ‘cluster-focussed analysis’ and concentrating on understanding the dynamic of the maps. For example the type of relationships – whether tight clusters indicate dependency among clusters, causality, inputs or outputs, or no relatedness; and whether tight clusters with low bridging represent independence or anchoring (Kane & Goldman 2014).

Further insights came when comparing point rating and bridging maps to identify areas with high ratings and low bridging values for statements. In this case, two areas, the lower-right or upper quadrants had these characteristics (clusters 1 and 5). These tight clusters contained statements highly rated by participants with little uncertainty about putting them together. In contrast, the upper-left quadrant – cluster 6 – was a loose area of statements of low-rated and high bridging values. This was reflected in the height of the stack in the bridging map and in the distance between dots. A high-rated statement with relatively high bridging values such as ‘Address mental models’ in cluster 3, showed its importance in addressing this and hence a priority for action and it also showed its potential to bridge other clusters or statements. It was also interesting to see that the largest cluster represented 25 per cent of the total of 100 statements. Positioned in the lower right quadrant with the ‘tail’ towards the middle-left of the diagram, this cluster had statements bridging to all the neighbouring clusters: e.g. 60 to 29; 19 to 21; 100 to 29; 25 to 21; 38 to 70; 38 to 85; 38 to 81; 45 to 81, 75 and 67; 24 to 99; and 45 to 90. Figure 5.7 shows the web of relationships that the ‘Address mental models’ cluster has in the map.

The highest rated statement was #12 (Figure 5.5) and was also in the ‘Mental models’ cluster, as were five of the nine statements rated above 4 in terms of importance.
Figure 5.6. Cluster Bridging Map for the Study (generated by and using Concept Systems® Global MAX™)
Figure 5.7. ‘Address existing mental models’ cluster bridging role (generated by and using Concept Systems® Global MAX™)
Tables 5.1 and 5.2 below show the summary statistics for the clusters ratings and bridging values.

Table 5.1: Clusters ratings

<table>
<thead>
<tr>
<th>Cluster # and Definition</th>
<th>Average Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Develop skills and capacity for systems thinking</td>
<td>3.45</td>
</tr>
<tr>
<td>3. Address existing mental models</td>
<td>3.34</td>
</tr>
<tr>
<td>1. Support funding of systems approaches</td>
<td>3.33</td>
</tr>
<tr>
<td>4. Use systems tools, techniques and approaches</td>
<td>3.29</td>
</tr>
<tr>
<td>2. Change existing systems and processes</td>
<td>3.08</td>
</tr>
<tr>
<td>6. Show the potential of systems thinking</td>
<td>2.99</td>
</tr>
</tbody>
</table>

Table 5.2: Clusters bridging values

<table>
<thead>
<tr>
<th>Cluster # and Definition</th>
<th>Bridging</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Develop skills and capacity for systems thinking</td>
<td>0.27</td>
</tr>
<tr>
<td>2. Change existing systems and processes</td>
<td>0.41</td>
</tr>
<tr>
<td>4. Use systems tools, techniques and approaches</td>
<td>0.43</td>
</tr>
<tr>
<td>1. Support funding of systems approaches</td>
<td>0.45</td>
</tr>
<tr>
<td>3. Address existing mental models</td>
<td>0.52</td>
</tr>
<tr>
<td>6. Show the potential of systems thinking</td>
<td>0.71</td>
</tr>
</tbody>
</table>

The ‘Show the potential of systems thinking’ cluster was second in terms of the number of statements, (22). This cluster had the lowest average importance rating amongst clusters (2.99), but was also last in terms of bridging value (0.71). Many of its statements bridged areas of the map, which could be interpreted as either the participants’ uncertainty about sorting these statements, or the cross disciplinary role of the theme. If the latter is the case, then the conceptualisation framework for this study could have almost half of the statements (22 from this cluster + 25 from ‘Address existing mental models’ cluster) sitting in two clusters that are cross cutting in themes. The other 53 statements in the remaining four clusters are on the operational side and focus on thematics: funding, systems, skills and tools. Hence to develop further and take a different perspective, the conceptualisation framework of the study could be split only in two domains: a crosscutting domain (with two clusters) and a thematic domain (with four clusters). More about different interpretations if we continue to cluster is presented in Chapter 6.
The ‘Change existing systems and processes’ cluster was also interestingly placed in that it intermingled with ‘Address existing mental models’ (Figures 5.5 and 5.6). As the bridging analysis shows, with relatively high bridging values (average 0.41), statements of this cluster bridged across to the ‘Address existing mental models’ cluster. Statements such as those that were contained in the ‘Address existing mental models’ cluster and some from the ‘Change systems and processes’ cluster pointed to the need to change the way practitioners think, which was one of the conclusions that came out of Chapters One, Two, and Three. A few examples of statements from these clusters that pointed to action in this direction are:

- Develop organisations in which learning is encouraged and taking risks is rewarded
- Encourage new mindsets of project leaders and practitioners, enabling them to deal with uncertainty and the risk inherent in working in complex systems
- Move from patched approaches to systemic approaches to introduce systems thinking in aid programming
- Ensure programmes have the best fit of staff skills to use systems lenses
- Recognise the importance of a systems paradigm to DAP
- Change the way data are reported to encourage and reinforce paradigm shifts toward systems modes of thinking.

The top ranked cluster for importance ratings and bridging values was ‘Developing skills and capacity for systems thinking’. Examples of actions (statements) that show the need for education and training programmes in systems thinking in MDP practice include:

- Develop project leaders who value systems thinking
- Train practitioners in the facilitation skills that are needed to employ many systems approaches
- Provide training and education in systems research techniques for development practitioners
- Develop and deliver a ‘Systems Thinking’ course for aid professionals
• Achieve a critical mass of practitioners who are able to approach development aid programming from a non-mechanistic, non-linear perspective
• Train donors and decision makers to manage and advocate for systems rather than programmes.

Interestingly, the cluster ‘Use systems tools’ came third in terms of importance, in contradiction to the current priority of the MDP practice - donors, implementers and practitioners - on developing or adapting systems tools, as evidenced by the literature review in Chapters One and Three.

Table 5.3 presents each generated cluster’s key statistics, including standard deviation, variance, minimum rating, maximum rating, average, and median rating. In the subsequent table, Table 5.4, statistics for cluster bridging values are presented.

The full list of statements by cluster with ratings and bridges by statement and by cluster is presented in Appendix 5C and 5D.
Table 5.3: Cluster rating summary statistics for the study

<table>
<thead>
<tr>
<th>Cluster Name</th>
<th>Statement Count</th>
<th>Standard Deviation</th>
<th>Variance</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Average</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support Funding of Systems Approaches</td>
<td>11</td>
<td>0.43</td>
<td>0.18</td>
<td>2.69</td>
<td>4.15</td>
<td>3.33</td>
<td>3.38</td>
</tr>
<tr>
<td>Change Existing Systems and Processes</td>
<td>11</td>
<td>0.49</td>
<td>0.24</td>
<td>2.08</td>
<td>3.69</td>
<td>3.08</td>
<td>3.08</td>
</tr>
<tr>
<td>Address Existing Mental Models</td>
<td>25</td>
<td>0.61</td>
<td>0.37</td>
<td>2.23</td>
<td>4.69</td>
<td>3.34</td>
<td>3.31</td>
</tr>
<tr>
<td>Use Systems Tools, Techniques and Approaches</td>
<td>15</td>
<td>0.45</td>
<td>0.21</td>
<td>2.38</td>
<td>4.00</td>
<td>3.29</td>
<td>3.38</td>
</tr>
<tr>
<td>Develop Skills and Capacity for Systems Thinking</td>
<td>16</td>
<td>0.45</td>
<td>0.20</td>
<td>2.62</td>
<td>4.38</td>
<td>3.45</td>
<td>3.50</td>
</tr>
<tr>
<td>Show Potential of Systems Thinking</td>
<td>22</td>
<td>0.37</td>
<td>0.14</td>
<td>2.31</td>
<td>4.00</td>
<td>2.99</td>
<td>3.00</td>
</tr>
</tbody>
</table>
Table 5.4: Cluster bridging values summary statistics for the study

<table>
<thead>
<tr>
<th>Cluster Name</th>
<th>Statement Count</th>
<th>Standard Deviation</th>
<th>Variance</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Average</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support Funding of Systems Approaches</td>
<td>11</td>
<td>0.26</td>
<td>0.07</td>
<td>0.13</td>
<td>1.00</td>
<td>0.45</td>
<td>0.39</td>
</tr>
<tr>
<td>Change Existing Systems and Processes</td>
<td>11</td>
<td>0.13</td>
<td>0.02</td>
<td>0.24</td>
<td>0.70</td>
<td>0.41</td>
<td>0.37</td>
</tr>
<tr>
<td>Address Existing Mental Models</td>
<td>25</td>
<td>0.13</td>
<td>0.02</td>
<td>0.33</td>
<td>0.79</td>
<td>0.52</td>
<td>0.51</td>
</tr>
<tr>
<td>Use Systems Tools, Techniques and Approaches</td>
<td>15</td>
<td>0.09</td>
<td>0.01</td>
<td>0.25</td>
<td>0.59</td>
<td>0.43</td>
<td>0.44</td>
</tr>
<tr>
<td>Develop Skills and Capacity for Systems Thinking</td>
<td>16</td>
<td>0.24</td>
<td>0.06</td>
<td>0.00</td>
<td>0.63</td>
<td>0.27</td>
<td>0.18</td>
</tr>
<tr>
<td>Show Potential of Systems Thinking</td>
<td>22</td>
<td>0.20</td>
<td>0.04</td>
<td>0.30</td>
<td>1.00</td>
<td>0.71</td>
<td>0.76</td>
</tr>
</tbody>
</table>
5.2. Setting up priorities

The analysis conducted to this point produced a number of priorities based on the cluster maps, point maps and sorting and rating of statement lists. However, among these 100 statements and six domains (clusters), questions still remain as to which were most likely to better address the challenges that have impeded the use of systems thinking in MDP, and how could they be reduced to a smaller number that could be set as priorities? Were there any differences amongst practitioners on agreeing on these priorities? Two more analyses were generated in order to respond to these critical questions – pattern matching and go-zone displays.

Pattern Match Analysis

Pattern matching compared ratings that came from two different variables to display the consistency or discordance in thinking or compare two different ratings of the same variable. Pattern matching displayed results using a ‘ladder graph’ (Trochim, Kane 2007 p.126) with lines connecting rating values of the selected variables from both sides of the ladder. This study used importance rating and participants’ demographics to display each pattern match. Chapter Six (Table 6.2) presented the profile of participants in terms of ‘formal training’, ‘practical applied experience’, and ‘professional affiliation’. The first two variables, ‘formal training’ and ‘practical experience’, were used for the pattern matching analysis, as they related to the level of knowledge and understanding participants had on systems thinking, which might have influenced the way they sorted or rated statements. The third variable, ‘professional affiliation’, was also important to determine whether there were any differences in sorting and rating based on the type of organisation participants came from. This will be considered later in the Recommendations section of this thesis.

The strength of correlation between variables ratings is shown in the diagrams that follow by using Pearson’s correlation $r$. This metric uses a range between (1) and (-1), where (1) is a positive correlation, (0) is no correlation and (-1) is a negative correlation.

The ‘formal training’ variable had three options: ‘academic’, ‘occasional training’ and ‘no training’. The first pattern match compared participants with ‘occasional training’ and ‘no training’ (Figure 5.8). The second compared the ‘academic’ with ‘no training’ (Figure 5.9), and the third, participants with ‘occasional training’ with ‘academic training’ (Figure 5.10)
‘Occasional training’ participants correlated better with ‘no training’ participants than they did with those with ‘academic training’ (Figure 5.8 and Figure 5.10).
Figure 5.8. Pattern match for importance (correlation coefficient) ‘occasional training’ vs. ‘no training’ participants. Relative importance: 1= relatively unimportant (compared with the rest of the statements) to 5= extremely important (compared with the rest of the statements). (generated using Concept Systems® Global MAX™)
Figure 5.9. Pattern match for importance (correlation coefficient) ‘academic degree’ vs. ‘no degree’ participants. Relative importance: 1= relatively unimportant (compared with the rest of the statements) to 5= extremely important (compared with the rest of the statements). (generated using Concept Systems® Global MAX™)
The cluster ‘Develop skills’ had the highest rating for importance. The pattern match showed that the ‘Develop skills and capacity for systems thinking’ cluster was rated as highly important by all participants, irrespective of training, but was rated the highest (#1) by those with an academic degree. This was surprising, as the literature review showed that the focus of MDP practice seemed to be on developing tools rather than developing skills. In general, the correlation factor was higher between those with ‘academic degree’ and ‘no degree’ $r=0.56$, than ‘no degree’ and ‘occasional training’. The $r$ was only 0.14 for the latter comparison.
Figure 5.10. Pattern match for importance (correlation coefficient) ‘occasional training’ vs. ‘academic degree’. Relative importance: 1 = relatively unimportant (compared with the rest of the statements) to 5 = extremely important (compared with the rest of the statements). (generated using Concept Systems® Global MAX™)
‘Academic degree’ importance ratings did not match the ‘occasional training’ participants in either of the domains; $r$, the correlation coefficient, was in fact negative (-0.06) (Figure 5.10). Priorities seemed to be farther apart for these two groups. The ‘Develop skills and capacity for systems thinking’ cluster seemed to be the only one rated quite similarly, with both groups rating it at #1 or #2.

This was confirmed even further when the average ratings for the entire group were compared with participants with degrees (Figure 5.11). There was very little correlation between groups, as those with degrees had different priorities than the other two groups. The most intriguing set of findings came from how the academic degree participants rated the ‘Address the mental models’ domain with the lowest level of importance (#5), whereas the other two groups rated it much higher, either #1 or #3.
Figure 5.11. Pattern match for importance (correlation coefficient) ‘sample participants’ vs. participants with academic degree. Relative importance: 1 = relatively unimportant (compared with the rest of the statements) to 5 = extremely important (compared with the rest of the statements). (generated using Concept Systems® Global MAX™)
Table 5.5 below presents the comparison in average importance rating using ‘formal training’ as a variable and discrepancies between participants’ ratings.

Table 5.5: Comparison in average importance rating for clusters across the training level of participants

<table>
<thead>
<tr>
<th></th>
<th>Occasional training in ST</th>
<th>No training in ST</th>
<th>Academic degree in ST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop skills and capacity</td>
<td>#2</td>
<td>#2</td>
<td>#1</td>
</tr>
<tr>
<td>Address mental models</td>
<td>#1</td>
<td>#3</td>
<td>#5</td>
</tr>
<tr>
<td>Using tools</td>
<td>#3</td>
<td>#1</td>
<td>#4</td>
</tr>
<tr>
<td>Funding</td>
<td>#4</td>
<td>#5</td>
<td>#2</td>
</tr>
<tr>
<td>Show potential</td>
<td>#6</td>
<td>#4</td>
<td>#3</td>
</tr>
<tr>
<td>Change existing systems and processes</td>
<td>#5</td>
<td>#6</td>
<td>#6</td>
</tr>
</tbody>
</table>

The results by the second demographic variable for participants, the project experience variable (for either involvement in one or more projects or no projects in systems thinking), showed some correlation for domains such as ‘Develop skills and capacity for systems thinking’, and ‘Address mental models’. There was less correlation for ‘Use systems tools, techniques and approaches’, where those with ‘no project experience’ saw it as a high priority but other participants’ average ratings put it at #3 (Figure 5.12). However, overall the correlation was quite high between the two groups.

There are more similarities between those who had no training and occasional training than the academic group.
Figure 5.12. Pattern match for importance (correlation coefficient) ‘one or more project on ST’ vs. ‘no project experience on ST’. Relative importance: 1= relatively unimportant (compared with the rest of the statements) to 5= extremely important (compared with the rest of the statements). (generated using Concept Systems® Global MAX™)
5.3. Go-zone analysis

Go-zone displays were used to understand the relative importance rating within each domain. They are X-Y graphs that, for each chosen domain, display statements below or above the mean. The graph had four quadrants and the most actionable priorities were usually listed in the upper right and only statements that were above the mean for each group were listed.

The first analysis looked at the ‘Development of skills and capacity for systems thinking’ domain because of its high importance rating, which made it a priority in terms of action. Individual statements were examined using a go-zone assessment (Figure 5.13). The variable used was the participants’ ‘formal training’. The decision to group ‘occasional training’ with ‘no training’ participants was made because the average ratings between the two groups compared to ‘academics’ were close enough. In this case, the statements that were above the mean for both groups and were included in the upper right quadrant were: #36, #73, #75, #57, #7, #82 and #47. Hence the list of go-zone statements for ‘Development of skills and capacity for systems thinking’ domain and possible actionable items are:

- Develop project leaders that value systems thinking
- Train practitioners in the facilitation skills that are needed to employ many systems approaches
- Provide training and education in systems research techniques for development practitioners
- Develop and deliver a 'Systems Thinking' course for aid professionals
- Develop skills and become more comfortable in integrating simulation and modelling approaches into research
- Achieve a critical mass of practitioners who are able to approach development aid programming from a non-mechanistic, non-linear perspective.

Correlation value for this report was: $r = 0.49$ (Figure 5.13).

---

25 A Go-zone report graphically displays which ideas are above or below the mean across two separate rating criteria or participant groups, within a specific cluster of ideas (The Concept System® Global MAX™ _Software Guide page 8)_.
Figure 5.13. Go-zone from the ‘Develop skills’ domain importance rating for ‘occasional training’ and ‘no training’ participants vs. ‘academic degree’ participants. (generated using Concept Systems® Global MAX™)
A similar analysis of the ‘Addressing mental models’ domain revealed that it was second in importance and the creation of a ‘go-zone’ in the top right quadrant of the graph listed statements #11, #12, #14, #18, #28, #36, #78, #87, #96 and #100 as actionable items (Figure 5.14), which are:

- Develop organisations in which learning is encouraged, being wrong is okay and taking risks is rewarded
- Encourage new mindsets of project leaders and practitioners able to deal with uncertainty and risk inherent in working in complex systems
- Move from patched approaches to systemic approaches to introduce systems thinking in aid programming
- Ensure that programmes have the best fit of staff skills to use systems lenses
- Enable continual monitoring and evaluation to determine if interventions are working in concert to change the system in the chosen direction
- Integrate project planning and evaluation functions around a systems approach
- Recognise the importance of a systems paradigm to DAP (e.g., ecological, systemic, holistic, participatory, multi-dimensional, adaptive, complex and nonlinear frameworks)
- Change the way data are reported to encourage and reinforce paradigm shifts toward systems modes of thinking
- Incorporate a flexible programme approach to respond quickly to opportunities and amend interventions
- Institute reflective time for people and teams to think about systems

Correlation was high in this case at $r=0.70$. The decision was taken to group ‘occasional training’ with ‘academic degree’ participants because the average ratings between these two groups were close enough when compared to those with ‘no training’.
Figure 5.14. Go-zone from the ‘Addressing mental models’ domain importance rating for ‘academics’ and ‘occasional training’ vs. ‘no training’ participants. (generated using Concept Systems® Global MAX™)
These priorities and how they fit with wider recommendations for MDP will be discussed further in the recommendations section of the thesis in Chapter Eight.

5.4. Reliability of the concept map

In addressing whether the participant sorting and rating aggregates were reliable, three metrics were used: correlation analysis (r), stress value, and t-tests. The r has already been discussed during the analysis in this chapter.

Stress value

The stress value was found to be 0.2845 which is within the range of a good fit for structuring conceptualisation (Rosas & Kane 2012; Trochim, 1993, 2007).

T-tests

The second metric was the t-test. The software produced several reports on the statistical significance across clusters and importance ratings. The t-test, also known as Welch’s t-test, used in the CS Global MAX™ assumed unequal sample sizes and unequal variance. The t statistic was used to test whether the group means were different. Although the sample sizes were often small, given that they were based on the number of items within a cluster, the cluster means represented a double average (first by participants, then again by items in the cluster) and the variability in the data set was greatly reduced. Therefore, concerns of heterogeneity in the data across the cluster were minimised, even with small numbers of items.

In this study, a t-test was used to test the null-hypothesis of equivalence between clusters. Differences between mean cluster ratings were calculated to see if statements in the cluster received statistically different importance ratings based on participants’ characteristics. One important cluster to note in this analysis was ‘Address existing mental models’, as it was not a priority for those with an academic degree, but it was a priority for those with ‘occasional training’ or ‘no training’ (Figure 5.7, 5.8, Table 5.5). The t-test showed that although there was not a significant difference, (p>.05), in rating between groups – the academics’ average was 3.45 and the ‘occasional training’ group was 3.35 (Table 5.6) — a similar result was found when compared to participants with ‘no training’ (Table 5.7).
Table 5.6: t-test for ‘Address mental models’ cluster ‘academic degree’ vs. ‘occasional training’

<table>
<thead>
<tr>
<th>Selected cluster</th>
<th>First Cluster</th>
<th>Second Cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address existing mental models</td>
<td>Address existing mental models</td>
<td></td>
</tr>
<tr>
<td>Selected rating</td>
<td>Rating #1</td>
<td>Rating #1</td>
</tr>
<tr>
<td>Used Condition(s)</td>
<td>Question 1= Academic degree</td>
<td>Question 1=Occasional course or workshop</td>
</tr>
<tr>
<td>Selected Users</td>
<td>3 of 13</td>
<td>7 of 13</td>
</tr>
<tr>
<td>Rating Average</td>
<td>3.4533</td>
<td>3.3543</td>
</tr>
<tr>
<td>Rating Variance</td>
<td>0.3278</td>
<td>0.4688</td>
</tr>
<tr>
<td>Number of statements (n)</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>t-Value</td>
<td>0.5546</td>
<td></td>
</tr>
<tr>
<td>Degrees of Freedom</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>Level of Significance</td>
<td>&gt;0.05 (Not significant)</td>
<td></td>
</tr>
</tbody>
</table>
Table 5.7: t-test for ‘Address mental models’ cluster ‘academic degree’ vs. ‘no training’

<table>
<thead>
<tr>
<th>Selected cluster</th>
<th>First Cluster</th>
<th>Second Cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Address existing mental models</td>
<td>Address existing mental models</td>
</tr>
<tr>
<td>Selected rating</td>
<td>Rating #1</td>
<td>Rating #1</td>
</tr>
<tr>
<td>Used Condition(s)</td>
<td>Question 1= Academic degree</td>
<td>Question 1=No training</td>
</tr>
<tr>
<td>Selected Users</td>
<td>3 of 13</td>
<td>2 of 13</td>
</tr>
<tr>
<td>Rating Average</td>
<td>3.4533</td>
<td>3.04</td>
</tr>
<tr>
<td>Rating Variance</td>
<td>0.3278</td>
<td>0.9984</td>
</tr>
<tr>
<td>Number of statements (n)</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>t-Value</td>
<td>1.7944</td>
<td></td>
</tr>
<tr>
<td>Degrees of Freedom</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>Level of Significance</td>
<td>&gt;0.05 (Not significant)</td>
<td></td>
</tr>
</tbody>
</table>

All groups had similar ratings but different rankings, due to higher ratings given by academic degree participants for the statements than by other groups. This is an important result to be considered when actionable items are proposed in Chapter Eight.

The highest rated cluster was ‘Developing skills and capacity for systems thinking’. A t-test was run to see if the level of training variable had an influence on the rating of this domain. ‘Developing skills’ was significantly more important to those with an academic degree (Table 5.8). Similar results were obtained when comparing academics to participants with occasional training (Table 5.9).
Table 5.8: t-test for ‘Developing skills and capacity for systems thinking’ cluster ‘academic degree’ vs. ‘no training’

<table>
<thead>
<tr>
<th>Selected cluster</th>
<th>First Cluster</th>
<th>Second Cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Develop skills and capacity for systems thinking</td>
<td>Develop skills and capacity for systems thinking</td>
</tr>
<tr>
<td>Selected rating</td>
<td>Rating #1</td>
<td>Rating #1</td>
</tr>
<tr>
<td>Used Condition(s)</td>
<td>question 1 = Academic degree</td>
<td>question 1 = No training</td>
</tr>
<tr>
<td>Selected Users</td>
<td>3 of 13</td>
<td>2 of 13</td>
</tr>
<tr>
<td>Rating Average</td>
<td>4</td>
<td>3.125</td>
</tr>
<tr>
<td>Rating Variance</td>
<td>0.3056</td>
<td>1.0469</td>
</tr>
<tr>
<td>Number of statements (n)</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>t-Value</td>
<td>3.0096</td>
<td></td>
</tr>
<tr>
<td>Degrees of Freedom</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Level of Significance</td>
<td>P&lt;0.01</td>
<td></td>
</tr>
</tbody>
</table>
Table 5.9: t-test for ‘Developing skills’ cluster ‘academic degree’ vs. ‘occasional training’

<table>
<thead>
<tr>
<th>Selected cluster</th>
<th>First Cluster</th>
<th>Second Cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Develop skills and capacity for systems thinking</td>
<td>Develop skills and capacity for systems thinking</td>
</tr>
<tr>
<td>Selected rating</td>
<td>Rating #1</td>
<td>Rating #1</td>
</tr>
<tr>
<td>Used Condition(s)</td>
<td>question 1 = Academic degree</td>
<td>question 1 = Occasional course or workshop</td>
</tr>
<tr>
<td>Selected Users</td>
<td>3 of 13</td>
<td>7 of 13</td>
</tr>
<tr>
<td>Rating Average</td>
<td>4</td>
<td>3.3661</td>
</tr>
<tr>
<td>Rating Variance</td>
<td>0.3056</td>
<td>0.1887</td>
</tr>
<tr>
<td>Number of statements (n)</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>t-Value</td>
<td>3.6067</td>
<td></td>
</tr>
<tr>
<td>Degrees of Freedom</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Level of Significance</td>
<td>P&lt;0.002</td>
<td></td>
</tr>
</tbody>
</table>

‘Support funding of systems approaches’ was also a cluster where there was discordance between ratings between academics and the other two groups. When academics were compared to those with ‘occasional training’ and ‘no training’ (Table 5.10 and 5.11)
Table 5.10: t-test for ‘Support funding of systems approaches’ cluster ‘academic degree’ vs. ‘occasional training’

<table>
<thead>
<tr>
<th></th>
<th>First Cluster</th>
<th>Second Cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selected cluster</td>
<td>Support funding of systems approaches</td>
<td>Support funding of systems approaches</td>
</tr>
<tr>
<td>Selected rating</td>
<td>Rating #1</td>
<td>Rating #1</td>
</tr>
<tr>
<td>Used Condition(s)</td>
<td>question 1 = Academic degree</td>
<td>question 1 = Occasional course or workshop</td>
</tr>
<tr>
<td>Selected Users</td>
<td>3 of 13</td>
<td>7 of 13</td>
</tr>
<tr>
<td>Rating Average</td>
<td>3.9697</td>
<td>3.2208</td>
</tr>
<tr>
<td>Rating Variance</td>
<td>0.3122</td>
<td>0.4206</td>
</tr>
<tr>
<td>Number of statements (n)</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>t-Value</td>
<td>2.9014</td>
<td></td>
</tr>
<tr>
<td>Degrees of Freedom</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Level of Significance</td>
<td>P&lt;0.01</td>
<td></td>
</tr>
</tbody>
</table>
Table 5.11: t-test for ‘Support funding of systems approaches’ cluster ‘academic degree’ vs. ‘no training’

<table>
<thead>
<tr>
<th>Selected cluster</th>
<th>First Cluster</th>
<th>Second Cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Support funding of systems approaches</td>
<td>Support funding of systems approaches</td>
</tr>
<tr>
<td>Selected rating</td>
<td>Rating #1</td>
<td>Rating #1</td>
</tr>
<tr>
<td>Used Condition(s)</td>
<td>question 1 = Academic degree</td>
<td>question 1 = No training</td>
</tr>
<tr>
<td>Selected Users</td>
<td>3 of 13</td>
<td>2 of 13</td>
</tr>
<tr>
<td>Rating Average</td>
<td>3.9697</td>
<td>2.8182</td>
</tr>
<tr>
<td>Rating Variance</td>
<td>0.3122</td>
<td>0.376</td>
</tr>
<tr>
<td>Number of statements (n)</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>t-Value</td>
<td>4.6034</td>
<td></td>
</tr>
<tr>
<td>Degrees of Freedom</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Level of Significance</td>
<td>P&lt;0.001</td>
<td></td>
</tr>
</tbody>
</table>

Discordance between groups also occurred between academics and other groups for the ‘Showing the potential of systems thinking’ cluster (Table 5.12)
Table 5.12: t-test for ‘Showing the potential’ cluster ‘academic degree’ vs. ‘no
training’ or ‘occasional training’

<table>
<thead>
<tr>
<th>Selected cluster</th>
<th>First Cluster</th>
<th>Second Cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>Show the potential of systems thinking</td>
<td>Show the potential of systems thinking</td>
<td></td>
</tr>
<tr>
<td>Selected rating</td>
<td>Rating #1</td>
<td>Rating #1</td>
</tr>
<tr>
<td>Used Condition(s)</td>
<td>question 1 = Academic degree</td>
<td>question 1 = No training OR question 1 = Occasional course or workshop</td>
</tr>
<tr>
<td>Selected Users</td>
<td>3 of 13</td>
<td>9 of 13</td>
</tr>
<tr>
<td>Rating Average</td>
<td>3.7879</td>
<td>2.7525</td>
</tr>
<tr>
<td>Rating Variance</td>
<td>0.2176</td>
<td>0.1918</td>
</tr>
<tr>
<td>Number of statements (n)</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>t-Value</td>
<td>7.5895</td>
<td></td>
</tr>
<tr>
<td>Degrees of Freedom</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>Level of Significance</td>
<td>P&lt;0.001</td>
<td></td>
</tr>
</tbody>
</table>

In addition, other t-test analyses were conducted to assess pairs of clusters for all six domains. The results showed little discordance in ratings. For the two highest importance rating clusters, ‘Address mental models’ and ‘Develop skills and capacity for systems thinking,’ there was no significant difference in rating; this was expected as the difference between the two clusters was only 0.11 points (Table 5.13).
There was no significant difference in rating for ‘Develop skills and capacity’ and ‘Support funding’ or ‘Use systems tools, techniques and approaches’ or ‘Change systems and processes’ cluster ratings. Analysis is not shown here.

There was only one cluster, ‘Show the potential of systems thinking’, for which the t-test showed significant differences in answers when compared to the other four clusters of the importance ratings. Only the comparison with ‘Develop skills and capacity’ is shown here (Table 5.14).
Table 5.14: t-test for ‘Showing the potential’ and ‘Develop skills and capacity’

<table>
<thead>
<tr>
<th>Selected cluster</th>
<th>First Cluster</th>
<th>Second Cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Show the potential of systems thinking</td>
<td>Develop skills and capacity for systems thinking</td>
</tr>
<tr>
<td>Selected rating</td>
<td>Rating #1</td>
<td>Rating #1</td>
</tr>
<tr>
<td>Used Condition(s)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selected Users</td>
<td>13 of 13</td>
<td>13 of 13</td>
</tr>
<tr>
<td>Rating Average</td>
<td>2.986</td>
<td>3.4471</td>
</tr>
<tr>
<td>Rating Variance</td>
<td>0.1381</td>
<td>0.1999</td>
</tr>
<tr>
<td>Number of statements (n)</td>
<td>22</td>
<td>16</td>
</tr>
<tr>
<td>t-Value</td>
<td>-3.3659</td>
<td></td>
</tr>
<tr>
<td>Degrees of Freedom</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Level of Significance</td>
<td>P&lt;0.002</td>
<td></td>
</tr>
</tbody>
</table>

This analysis showed that participants differentiated to some degree in statements in terms of importance. This may have been because participants felt that almost all statements, hence challenges they faced in implementing systems thinking in their practice, were important. Because MDP practice is in its early stages of embracing systems thinking and many misconceptions exist in practice, this interpretation is possible. Any measure could now be seen as helping the practice move forward.

5.5. Summary

This chapter outlined the way a group of development aid practitioners conceptualised challenges in implementing systems thinking in MDP. From 100 sorted and rated statements, there are six domains of focus that form the conceptual framework for this study. They are: ‘Develop skills and capacity for systems thinking’, ‘Address existing mental models’, ‘Change existing systems and processes’, ‘Use systems tools’, ‘Support funding of systems approaches’, and ‘Show potential of systems thinking’. The first two highest rated domains in terms of
importance were: ‘Develop skills and capacity in systems thinking’, and ‘Address existing mental models’.

Domains’ average importance ratings were relatively homogenous and showed statistical significance in only a few cases. The domain ‘Show potential of systems thinking’ was significantly different from the other domains and had the lowest average importance rating. This may have been because people felt that promotions and awareness, key areas for this domain, which comprised most of the statements, would become a priority only after other issues were addressed. That is, one would start with ‘Developing skills and capacity’ or with ‘Address existing mental models’ – changing mindsets - cluster. Alternately, participants may have felt that there was already a lot of activity happening in the area of promotion and awareness raising, as examples in Chapter Three have demonstrated.

Several assessments have been conducted in this study for statistical significance of the results. Many of these interpretations were statistically conclusive, but those that were not, show results that did not contradict previous interpretations or findings.

Through ‘go-zone displays’, a number of priority actions for each domain were identified. The upper right quadrant of each graph generated present the most actionable priorities for each cluster. These could become the starting point for a discussion on an action agenda that practitioners, donors and implementers could use to move the practice forward; or some tactics to start with immediately.

In the next chapter, Chapter Six, recommendations for action are presented. The results generated in this chapter will be examined again in light of the findings of the other chapters, and will assist in leading to a number of solutions, tactics and actions to be proposed.
Chapter Six: Recommendations
This chapter discusses the future of systems thinking in MDP by offering various solutions that may be drawn from the results of the concept mapping process (Chapters Four and Five) and the review of the literature on the application of systems thinking, including in DAP (Chapters Two and Three). From these, a more systemic approach is suggested if the use of systems thinking in MDP is to be successful.

6.1. Summary of key findings

On one side, there is a need for systems thinking in MDP, and this is being recognised by practitioners, donors and implementers. A response to this need is practitioners using systems tools or developing their ‘own’ tools. However to date, there is limited evidence on the impact of systems thinking; existing papers are descriptive, not analytical or critical. There is commitment from organisations and donors to embed systems thinking in their work and this is encouraging.

On the other side, the literature review on systems thinking showed that the concept has evolved but this is not reflected yet in the development aid programming field. Practitioners face challenges in embracing systems thinking, with the most important ones being ‘Mental models’ related challenges, which means the way they think. Based on ratings domains of challenges, in order of importance, are: #1 Develop skills, #2 Address mental models, #3 Support funding, #4 Use systems thinking tools; #5 Change existing systems; #6 Show potential of systems thinking. There are a number of actionable items that could help with that, and Cabrera’s DSRP provides a clear pathway on that. Specific findings are summarised in Tables 6.1 and 6.2.

6.2. What does this mean?

This research has furthered the understanding of the strategies that could become the focus of a systems thinking shift in MDP. It shows that the current focus of the practice might be wrong or limited in scope, with practitioners, donors and implementers developing systems tools, when evidence provided by this thesis shows that the focus should be elsewhere.

The findings of the literature review in Chapters Two and Three, and of the concept mapping process in Chapters Four and Five, showed two contrasting systems
‘worlds’. Firstly the MDP ‘world’ that focuses on methods, frameworks and bringing systems tools to the practice, which is necessary but may not be sufficient. Secondly, this research ‘world’ that highlights the need for six domains of focus of which only one is ‘Use systems tools’. The importance that practitioners give to these domains also conflicts with the current practice. They do not see ‘Use systems tools’ as a priority, with the importance rating only at #4 in the list of the six priority domains.
Table 6.1: Summary of findings from the analysis of systems thinking

<table>
<thead>
<tr>
<th>Analysis</th>
<th>Key findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>History and literature on MDP (Chapter Three)</td>
<td>There is a need for improved systems practices in MDP; recognised by practitioners, donors and implementers. There is commitment from donors, practitioners, organisations to embed systems thinking in their work. A response to improve practice is practitioners using systems tools or developing their ‘own’ tools. There are four or five tools that practitioners consent to use; some donors are supporting their application in initiatives. Few attempts from donors to change internal systems to respond to the need for more flexible approach to implementation. There is an afflux of think pieces, programme reports on systems practice; they are descriptive, not analytical or critical. The majority of papers in peer-reviewed journals come from other sectors in aid, e.g., health, agriculture, not MDP. Few trainings related to MSD and recently complexity; too early to know if successful; they follow a particular stream in ST. Misconceptions, ambiguities that systems thinking carries with it have crossed boundaries and are now embedded in MDP work. These limitations could lead to challenges in implementing systems thinking in practice. There are other ‘barriers’ to adoption of better systems thinking practice: resistance from ‘old school’, existing mental models. The use of tools may be necessary but not sufficient to address the challenges practitioners face.</td>
</tr>
</tbody>
</table>

| History and literature on systems thinking (Chapter Two) | Systems thinking carries misconceptions and definitional ambiguities; these have been seen in many fields of study. There are counterarguments to these misconceptions and the practice has acknowledged them. Systems thinking has evolved as a concept. The latest wave of systems thinking attempts to unify the field and address these misconceptions. Systems thinking is CAS, and has a number of rules that agents follow. DRSP theory proposes four simple rules that underlie systems thinking ‘(1) distinctions; (2) the systems rule; (3) the relationship rule; and (4) the perspectives rule’ that people could practice to become better systems thinkers. |
Table 6.2: Summary of findings to identify the challenges practitioners face in implementing systems thinking

<table>
<thead>
<tr>
<th>Analysis</th>
<th>Key findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification of challenges</td>
<td>There are challenges in implementing systems thinking; over 150 statements were generated through a group structured conceptualisation process and 100 final statements included in the analysis. These challenges are across six domains.</td>
</tr>
<tr>
<td>(Chapter Three, Four &amp; Five)</td>
<td>Some domains are considered more important than others, based on ratings: #1 is ‘Develop skills’, #2 ‘Address mental models’, #3 ‘Support funding’, #4 ‘Use systems thinking tools’, #5 ‘Change existing systems’, #6 ‘Show potential of systems thinking’.</td>
</tr>
<tr>
<td></td>
<td>Some statements, domains are bridging to others and cross cutting enablers for others to take off, e.g., ‘Address existing mental models’. Some statements are anchors such as many statements from the ‘Support funding of systems approaches’ domain. In a cluster or domain both these typologies exist: anchors and bridging statements.</td>
</tr>
<tr>
<td></td>
<td>‘Developing skills’ is highly rated (#1) and has low bridging values implying it is a tight cluster.</td>
</tr>
<tr>
<td></td>
<td>‘Addressing existing mental models’ had bridged to statements of other clusters, being sorted together many times. They are in-betweeners, as if mindsets are addressed then others will follow. Sorting out these statements would set the ground for other challenges to be sorted out, or other solutions to be implemented.</td>
</tr>
<tr>
<td></td>
<td>Priority clusters are ‘Developing skills’ and ‘Addressing mental models’.</td>
</tr>
<tr>
<td></td>
<td>Two clusters and their statements point to the need to change the way we think. ‘Address existing mental models’ and ‘Develop skills in systems thinking’ speaks to the need for more capacity development programmes.</td>
</tr>
<tr>
<td></td>
<td>‘Develop skills in systems thinking’ is only #3 in terms of importance, and is therefore not a high priority.</td>
</tr>
<tr>
<td></td>
<td>There is a high correlation between various demographics on ‘Addressing existing mental models’.</td>
</tr>
<tr>
<td></td>
<td>Academics view ‘Support funding’ important and rated it relatively higher than other groups.</td>
</tr>
<tr>
<td></td>
<td>In ‘Using tools’ there is no significant difference in ratings amongst demographics.</td>
</tr>
<tr>
<td></td>
<td>Only on cluster is significantly different in terms of ratings when compared to the other four, which points to the importance of all.</td>
</tr>
<tr>
<td></td>
<td>There is a set of actionable items for each cluster that could be a starting point to improve use of systems thinking in MDP.</td>
</tr>
</tbody>
</table>
Further, the evidence shows the highest priority should be given to ‘Develop skills and capacity for systems thinking’ to enable use of systems thinking in MDP. However, as Chapter Three showed, there have only been a few attempts to introduce systems thinking or complexity thinking into training, with no clear follow up after those attempts. Moreover, the concept mapping process indicated ‘Addressing mental models’ as second highest in importance, highlighting the need for changing mindsets and pointing to existing and outdated mental models.

These mental models are becoming less and less accurate representations of how the real world actually works, hence practitioners are pointing to ‘Encourage new mindsets of project leaders and practitioners, enabling them to deal with uncertainty and the risk inherent in working in complex systems’ (statement #14) or to ‘Move from patched approaches to systemic approaches to introduce systems thinking in aid programming’ (statement #100). In a complex and unpredictable world, these mental models are so often a poor approximation of what is really needed, so that when practitioners rate these statements highly, they are pointing to the need to change the way we think.

Addressing mental models is an interesting domain. There is high correlation between participants’ ratings, which is promising. The way it is placed on the map and its relatively high bridging value (0.52) make it a cross cutting domain, bridging across other domains in neighbouring or much farther regions of the map. This domain is also unifying by bridging back and forth like a web, with many of the statements sorted many times with statements from other domains. ‘Addressing mental models’ is at the core of this study’s conceptualisation framework.

The resultant conceptual framework represents an empirically derived consensus of a panel of practitioners on six domains for action and a guide for the subsequent development of MDP in using systems thinking. Clusters could be used as a basis for decision-making and strategic planning. However, it is not simple. This analysis offers many options for practitioners, donors and implementers. There are solutions to address challenges in implementing systems thinking in MDP based on 100 statements, some rated higher than others. There are also highly rated statements in low rated domains. What does this mean for planning? What about strengths and directionality of relationships between domains, which is also important? There are
many answers and hence many more ways to analyse what the map reveals about possible planning and action. There is no doubt that by looking at this map from different angles one could come up with very different solutions; there is also no doubt that whatever solutions are chosen, they seem to be far apart and much more complex than current practice. Some possible interpretations are presented below.

6.3. Solution seeking

Solution type 1: Focus on the highest rated domains as a priority for action.

The top two clusters are: ‘Develop skills and capacity for systems thinking’ (3.45 average rating) and ‘Address mental models’ (3.34 average rating) – Clusters 3 and 5 in Figure 6.1 below.
Figure 6.1. Solution 1 of focus (clusters 3 and 5)
The concept mapping with priority ratings of importance provides a high level strategic view of the tactics and priorities within each cluster. However, it is important to build on a consensus between demographics, hence the recommendation to start with the tactics included in the fourth quadrant of the go-zone map.

What would the solution look like? A series of highly rated tactics for both domains are listed in Table 6.3.

Each tactic could become a project in itself, by developing actionable points and activities, with timetables and resources allocated and metrics to measure performance.
Table 6.3: Key tactics for Solution type 1

<table>
<thead>
<tr>
<th>Develop skills and capacity</th>
<th>Address mental models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop project leaders that value systems thinking.</td>
<td>Develop organisations in which learning is encouraged, being wrong is okay and taking risks is rewarded.</td>
</tr>
<tr>
<td>Train practitioners in the facilitation skills that are needed to employ many systems approaches.</td>
<td>Encourage new mindsets of project leaders and practitioners able to deal with uncertainty and risk inherent in working in complex systems.</td>
</tr>
<tr>
<td>Implement training and education in research techniques for development practitioners.</td>
<td>Move from patched approaches to systemic approaches to introduce systems thinking into aid programming.</td>
</tr>
<tr>
<td>Develop and deliver a 'Systems Thinking' course for aid professionals.</td>
<td>Ensure that programmes have the best fit of staff skills to use systems lenses.</td>
</tr>
<tr>
<td>Develop skills and become more comfortable in integrating simulation and modelling approaches into research.</td>
<td>Integrate organisational and project planning and evaluation functions around a systems approach.</td>
</tr>
<tr>
<td>Achieve a critical mass of practitioners who are able to approach DAP from a non-mechanistic, non-linear perspective.</td>
<td>Enable continual monitoring and evaluation to determine if interventions are working in concert to change the system in the chosen direction.</td>
</tr>
<tr>
<td></td>
<td>Integrate project planning and evaluation functions around a systems approach.</td>
</tr>
<tr>
<td></td>
<td>Recognise the importance of a systems paradigm to DAP (e.g., ecological, systemic, holistic, participatory, multi-dimensional, adaptive, complex and nonlinear frameworks).</td>
</tr>
<tr>
<td></td>
<td>Change the way data are reported to encourage and reinforce paradigm shifts toward systems modes of thinking.</td>
</tr>
</tbody>
</table>
Solution type 2: Start with key priorities from all six domains

The cluster map depicts six distinct domains of practical challenges that need to be addressed to encourage the use of systems thinking in MDP. They represent the priorities participants gave to addressing the challenge of using systems thinking in MDP. One scenario could be that all six are equally addressed with high priority tactics as action items (Figure 6.2).

The solution would take the top priorities from each domain where demographics intersect to populate the key tactics table (Table 6.4). A series of tactics for each domain is proposed.
Figure 6.2. Solution type 2 of focus (all clusters)
Table 6.4: Key tactics for Solution type 2

<table>
<thead>
<tr>
<th>Support funding of systems approaches (Domain 1)</th>
<th>Change existing systems and processes (Domain 2)</th>
<th>Address existing mental models (Domain 3)</th>
<th>Use systems tools, techniques and approaches (Domain 4)</th>
<th>Develop skills and capacity for systems thinking (Domain 5)</th>
<th>Show the potential of systems thinking (Domain 6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remove funding constraints that cause fragmentation</td>
<td>Reduce the overemphasis on immediate positive programme impacts by taking a longer-term view</td>
<td>Develop organisations in which learning is encouraged, being wrong is okay and taking risks is rewarded</td>
<td>Develop new evaluation approaches that will help demonstrate the value of systems approaches in development aid programming</td>
<td>Develop project leaders that value systems thinking</td>
<td>Build the evidence of benefits and costs of systems thinking</td>
</tr>
<tr>
<td>Identify and develop funding sources that will encourage systems approaches to aid programming</td>
<td>Donors to provide incentives that encourage systems thinking</td>
<td>Encourage new mindsets of project leaders and practitioners able to deal with uncertainty and risk inherent in working in complex systems</td>
<td>Develop effective, accessible and affordable tools for practitioner research</td>
<td>Train practitioners in the facilitation skills that are needed to employ many systems approaches</td>
<td>Identify and disseminate examples of 'best practices' or 'what works' in systems thinking inside and outside aid</td>
</tr>
<tr>
<td>Develop consistent (multi-year) funding streams that encourage long-term systemic research and programmes</td>
<td>Ensure realistic timeframes as systemic results take time to occur</td>
<td>Move from patched approaches to systemic approaches to introduce systems thinking in aid programming</td>
<td>Develop instruments that measure and/or evaluate systems thinking</td>
<td>Implement training and education in systems research techniques for development practitioners</td>
<td>Show how systems thinking can suggest actions that would not have been taken otherwise</td>
</tr>
</tbody>
</table>
Solution type 3: Use in measuring achievements

The cluster map-conceptual framework could be used as a basis for development of an index regarding implementing systems thinking in MDP tactics. This would require that each of the clusters to be operationalised. The statements in each cluster suggest potential elements that might be measured as part of the index. For instance, one statement in the cluster ‘Skills development’ is ‘Develop project leaders that value systems thinking’. This could be operationalised by developing training for team leaders in systems thinking. This activity could be tracked. Similarly for other measures and tactics that could then be cumulated at the domain level, and then aggregated across all six domains at the practice level in an overarching index (Trochim 2005).

Solution type 4: Start with ‘Address mental models’ as a bridging, unifying domain

This solution builds on the high importance rating that ‘Address mental models’ has but also its position in the cluster map. ‘Address mental models’ is located right in the centre of the map. With relatively high bridging values, as many of its statements bridge to neighbouring clusters (the other five clusters), ‘Address mental models’ can be considered at the centre of this framework, both conceptually and diagrammatically. The domain has two functions: a divergent and a convergent function. By webbing and bridging to other clusters ‘Address mental models’ could be thought of as an enabler or influencer spreading to the other domains (divergent function). By acting like an attractor to the other themes from its middle position of the concept map, ‘Address mental models’ could be seen as a unifying cluster, converging domains and keeping them tight around a ‘common theme’.
Figure 6.3. Solution 4 of focus (central role of ‘Address mental models’: convergent and divergent function of ‘Address mental models’)

1. Support funding of systems approaches
2. Change existing systems and processes
3. Address existing mental models
4. Use systems tools, techniques and approaches
5. Develop skills and capacity for systems thinking
6. Show the potential of systems thinking
The map in Figure 6.3 shows the key role this cluster plays in the conceptualisation framework and how the ‘Address existing mental models’ content in turn stimulates new activity in the exterior circle of the map where other domains are placed. The identification of this cluster occupying important positions in the concept map structure, is crucial for an understanding of the relationships between domains, and strategic measures to affect not only all the domains’ ‘system’ but also beyond that, to associated real-world systems.

Tactics in this case include priority statements in the fourth quadrant of the go-zone of the ‘Address mental models’ listed in Chapter Five, and presented below:

- Develop organisations in which learning is encouraged, being wrong is okay and taking risks is rewarded
- Encourage new mindsets of project leaders and practitioners able to deal with uncertainty and risk inherent in working in complex systems
- Move from patched approaches to systemic approaches to introduce systems thinking in aid programming
- Ensure that programmes have the best fit of staff skills to use systems lenses
- Enable continual monitoring and evaluation to determine if interventions are working in concert to change the system in the chosen direction
- Integrate project planning and evaluation functions around a systems approach
- Recognise the importance of a systems paradigm to DAP (e.g., ecological, systemic, holistic, participatory, multi-dimensional, adaptive, complex and nonlinear frameworks)
- Change the way data are reported to encourage and reinforce paradigm shifts toward systems modes of thinking
- Incorporate a flexible programme approach to respond quickly to opportunities and amend interventions
- Institute reflective time for people and teams to think about systems, but also the statements that bridge to other clusters to stimulate trickle down changes in the other parts of the map. For example, statement #60 ‘Use an adaptive agile approach’ of ‘Address mental models’ reaching #29 ‘Use participatory bottom up action approaches to co-define problems’ or statement #19 ‘Encourage people to be open and non-territorial’ of the ‘Address mental models’ to #21 ‘Reduce the
overemphasis on immediate programme impacts by taking a longer-term view’ and reaching domain #2 ‘Change existing systems and processes’; or through #38 ‘Ensure systems thinking methods and results are quality checked’ to #33 ‘develop instruments that measure and evaluate systems thinking’ or #85 ‘Increase efficacy of evaluation methods’ or #76 ‘Understanding whether systems at different levels can be approached using same tools’ in cluster #4 ‘Use systems tools, techniques and approaches’, through #45 ‘Address the notion that systems concepts are sometimes difficult’ to #81 ‘Demystify words such as systems, systems thinking’, #75 ‘Train donors, decision makers to manage advocate systems rather than programmes’ or #67 ‘Rigorous research that demonstrates the value of systems thinking’ in cluster #5 ‘Develop skills and capacity for systems thinking’.

Solution type 5: Concept map as a complex adaptive system, clusters as agents – the next level in thinking

An even more interesting interpretation can be made if the concept map is viewed from the perspective of the theory of CAS (Trochim et al. 2006), where the six domains are seen as rules that agents as practitioners need to follow to generate systems thinking in MDP. Figure 6.4 presents this view.

Each domain is worded as a simple action e.g., ‘Use systems tools and approaches’ or ‘Address existing mental models’, a ‘rule’ that can be used by practitioners to manage a CAS. Each domain represents a practical challenge theme and each individual statement represents a challenge to be addressed. If multiple independent practitioners follow the six ‘rules’ represented by the domain names and receive appropriate feedback from the field about what is occurring as a result, dynamic and systems focussed organisations (donors, implementing organisations, etc.), or groups (of practitioners), or networks (of systems thinkers), or more systemic initiatives, or better designs, or new thinking (‘systems thinking’) will emerge in the MDP (Figure 6.4).
Second, from this dynamism and complexity view of the map, many interpretations and solutions could occur. Agents in a dynamic system are not static; they interact with each other and affect each other’s behaviour. Their interaction and combination would lead to different interpretations, solutions and solution meaning, for example when two domains in the conceptual map are interacting. When interacting with ‘Support funding of systems approaches’, the ‘Address existing mental models’ domain has a different meaning than when it is considered in combination with ‘Change existing systems and processes’. In the first case, ‘Address existing mental models’ is centred on how various types of funding could be channelled to change mindsets — existing mental models. In the second case, the focus is on how changing systems and processes can address existing mental models. Other solutions are required in each case. Another example is when two domains are combined, but each takes turns in becoming the lead cluster. For example, combining ‘Support funding for systems approaches’ with ‘Address mental models’ could generate a question for seeking solutions like this: ‘how could more support through funding address existing mental models?’. In contrast, if ‘Address existing mental models’ is the lead domain, then the question: ‘how can addressing mental models be used to expand funding for systems approaches?’ has a totally different interpretation. For the latter, the focus is on finding solutions for funding, the former is on
addressing mental models.

This view of seeing these six domains as individual conceptual agents, in a systems’ interpretation would ultimately generate 30 possible ‘questions-to-solution seeking’ through these pairings. These combinations can be expanded to include even more groupings, any combination of two or more would generate different questions, hence a different and wider variety of solutions. Table 6.5 illustrates how such an interpretation provides a snapshot of the 30 possible ‘questions-to-solution seeking’ when pairs are used.

This innovative perspective on the concept mapping methodology in which domains are viewed as independent conceptual agents is not new. This idea is born of the CAS literature and was first introduced by Trochim (2005a, 1993, 2005b, 2006), and more recently by Cabrera (2015, 2017) and Cabrera & Cabrera (2015, 2017). What is new is its implementation, operationalisation, and application in MDP. By viewing the clusters as conceptual agents interacting with each other, practitioners in DAP can use this map as a simple rule set for managing systems thinking initiatives in aid. At the same time, each question in the table generates possible solution(s); through this combination there are 30 possible ‘questions-to-solution seeking’ presented in Table 6.5.
<table>
<thead>
<tr>
<th>Support Funding of Systems Approaches</th>
<th>Change Existing Systems and Processes</th>
<th>Address Existing Mental Models</th>
<th>Use Systems Tools, Techniques and Approaches</th>
<th>Develop Skills and Capacity for Systems Thinking</th>
<th>Show Potential of Systems Thinking</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Support Funding of Systems Approaches</strong></td>
<td><strong>How can changing systems support expand funding for SA?</strong></td>
<td><strong>How can addressing mental models be used to expand funding for SA?</strong></td>
<td><strong>How can using systems tools lead to increase in funding?</strong></td>
<td><strong>How can skills and capacity in ST expand funding for SA domain?</strong></td>
<td><strong>How can showing potential of systems thinking increase funding?</strong></td>
</tr>
<tr>
<td><strong>Change Existing Systems and Processes</strong></td>
<td><strong>How can funding support changing existing systems and processes?</strong></td>
<td><strong>How can addressing mental models be used to change existing systems and processes?</strong></td>
<td><strong>How can using systems tools support changing existing systems and processes?</strong></td>
<td><strong>How can skills and capacity in ST help changing existing systems?</strong></td>
<td><strong>How can showing potential of systems thinking change existing systems and processes?</strong></td>
</tr>
<tr>
<td><strong>Address Existing Mental Models</strong></td>
<td><strong>How can more funding change existing mental models?</strong></td>
<td><strong>How can changing systems support addressing mental models?</strong></td>
<td><strong>How can using systems tools support addressing mental models?</strong></td>
<td><strong>How can skills and capacity in ST support addressing mental models?</strong></td>
<td><strong>How can showing potential of systems thinking address mental models?</strong></td>
</tr>
<tr>
<td><strong>Use Systems Tools, Techniques and Approaches</strong></td>
<td><strong>How can funding inspire the use and development of systemic tools?</strong></td>
<td><strong>How can changing systems support use of new tools processes?</strong></td>
<td><strong>How can addressing mental models be used to develop and use ST tools and approaches?</strong></td>
<td><strong>How can skills and capacity in ST support use of systems tools?</strong></td>
<td><strong>How can showing potential of systems thinking support using tools in Systems Thinking?</strong></td>
</tr>
<tr>
<td>Develop Skills and Capacity for Systems Thinking</td>
<td>How can funding support development of skills and capacity in ST?</td>
<td>How can changing systems support development of new skills in ST?</td>
<td>How can addressing mental models support development of skills in ST?</td>
<td>How can using systems tools support development of new skills?</td>
<td>How can showing potential of systems thinking develop skills in ST?</td>
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<td>---------------------------------------------------------------</td>
<td>---------------------------------------------------------------</td>
<td>---------------------------------------------------------------</td>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>Show potential of Systems Thinking</td>
<td>How does cross-category funding show the potential of systems approaches?</td>
<td>How can changing systems support showing potential for ST?</td>
<td>How can addressing mental models be used to show potential for ST?</td>
<td>How can using systems tools show potential for ST?</td>
<td>How can skills and capacity in ST show potential for ST approaches?</td>
</tr>
</tbody>
</table>
6.4. Summary

There are many solutions coming from this review.

First, it is clear that the concept map results provide a basis for subsequent action by various actors from MDP and beyond. Any individual, group or organisation can examine the clusters, or the statements contained within them and determine the degree to which they constitute or suggest actions that might be taken to address challenges to systems thinking in MDP. Second, the results clearly point to the need to shift away from current practice to a more comprehensive and evidence-based view of actions to bring systems thinking into MDP. For example, there is a need for building skills and capacity in systems thinking, as it was the highest rated variable, agreed upon by participants, with its top tactics:

- Train practitioners in the facilitation skills that are needed to employ many systems approaches (statement #7, rating 3.92).
- Training and education in systems research techniques for development of practitioners (statement #6, rating 3.92).
- Develop and deliver a 'Systems Thinking' course for aid professionals (statement #73, rating 3.69).
- Develop skills and become more comfortable in integrating simulation and modelling approaches into research (statement #2, rating 3.69).

It is also clear that there is a need to ‘Address existing mental models’ and mindsets by looking into the following tactics, and taking action:

- Develop organisations in which learning is encouraged, being wrong is okay and taking risks is rewarded (statement #12, rating 4.69).
- Encourage new mindsets of project leaders and practitioners able to deal with uncertainty and risk inherent in working in complex systems (statement #14, rating 4.15).
- Move from patched approaches to systemic approaches to introduce systems thinking in aid programming (statement #100, rating 4.15).
- Ensure programmes have the best fit of staff skills to use systems lenses (statement #28, rating 4.15).
- Integrate organisational and project planning and evaluation functions around a systems approach (statement #16, rating 4.15).
• Recognise the importance of a systems paradigm to development aid programming (e.g., ecological, systemic, holistic, participatory, multi-dimensional, adaptive, complex and nonlinear frameworks) (statement #18, rating 3.62).

• Change the way data are reported to encourage and reinforce paradigm shifts toward systems modes of thinking (statement #78, rating 3.54).

• Incorporate a flexible programme approach to respond quickly to opportunities and amend interventions (statement #96, rating 3.54).

• Allow reflective time for people and teams to think about systems (statement #11, rating 3.46).

The map provides a conceptual model that serves as a basis for funders, implementers and practitioners to try out different actions and explore how their adoption could potentially change the practice and hence outcomes of their development efforts. What this analysis conveys is intriguing and somehow futuristic thinking that the map is dynamic and complex and comprises a set of rules that different agents can follow for emergent systems thinking to become an agreed practice in MDP. Only such a dynamic, complex and perhaps futuristic view would make it possible for the practice to learn about what is needed to affect its efforts in bringing systems thinking into MDP. This would mean a move away from developing tools — its current focus — to a systemic approach by looking at the five possible types of solutions proposed and more than 30 paired project ideas (‘questions to solution seeking’) framed in Table 6.5.

Equipped with the results of this research and delving deeply into some possible solutions, one can now embark on a more comprehensive dialogue to policy makers, practitioners, donors or implementers to think together about what is needed if an authentic systems orientation is to drive and thrive in MDP. Having the political endorsement on this kind of journey is critical. A study conducted in 2014 across six Eastern Mediterranean countries that was trying to identify constraints of applying systems thinking in health systems has emphasized the importance of political endorsement and adoption of systems thinking at the leadership levels as critical to the success of their initiative (El-Jardali et al., 2014).

This study provides a full package of empirical evidence to start the debate: the initial identification of 100 challenges that the practitioners face, a map that can be
used to navigate them, a set of six simple rules to follow to face these challenges, and
at least 30 possible solutions to move towards effective planning and implementation
of systems thinking in MDP.

This research did not generate only one unique solution. It is not that simple. There is no single solution, and it was not the intention to be one solution. It was not about finding the causes and drawing a ‘cause/effect’ simplistic results chain as the solution for a project. Findings confirmed that there are, in fact, multiple solutions. The pairing of domains in this study concept map offer a very large number of possible combinations and hence solutions. The thesis is not meant to offer all these solutions, as explained in the previous chapter; this would be impossible as there are various ways to combine these domains, not only pairing two, but combining perhaps three or four. The thesis and this research is to incite further solution seeking, encourage dialogue and change existing mindsets. The way forward is about generating options by following this set of six simple rules generated through structured conceptualisation: ‘Use systems tools and approaches’, ‘Address existing mental models’, ‘Show the potential of systems thinking’, ‘Develop skills and capacity in systems thinking’, ‘Change existing systems and processes’ and/or ‘Support funding of systems approaches’.

The message this research sends to practitioners, funders and implementers is to shy away from using only tools and embrace a comprehensive solution to the challenge of using systems thinking in MDP. This research brings the empirical evidence that is currently missing and that is, in fact, needed – a move to a more systemic solution that considers many aspects that need to be addressed as they are reflected by the six domains. This provocation might challenge many, provide a relief to others, confuse few and give a direction to many others.

Changing the way practitioners think is an important topic of this thesis. It has come up again and again throughout the research, in almost every chapter. The last chapter of this thesis, Chapter Seven, is about how MDP can do that and what it might take. It offers a solution — the four rules represented by ‘DSRP’. By practising these rules, the complex problems faced in MDP could be addressed, as it closes the gap between our mental models, on how we think the world works, and the reality on the ground. By practicing these rules we could ultimately, Cabrera says, become systems thinkers (Cabrera & Cabrera 2015).

The last chapter of this thesis, Chapter Seven: Conclusion is the end of the
journey, and the unifying chapter as the researcher brings back key messages from Chapters One to Six. It is in fact both the end of this research and a new beginning, as it will point back to where we started long ago with the research in this way…closing the cycle.
Chapter Seven: Conclusion
This chapter brings together various conclusions that have been drawn during this research, from the literature review to the results of the structured conceptualisation process - the challenges development practitioners face in using systems thinking, and possible solutions. There is one theme that has continued to emerge throughout the thesis that points to addressing existing mental models and the need to change the way practitioners think and, although it looks complicated and far-reaching to unlearn thinking habits, this final chapter concludes that there is hope with Cabrera’s DSRP and the fourth wave of systems thinking (Cabrera 2006, 2015a, 2015b, 2016, 2017; Cabrera & Cabrera 2015; Midgley 2015a, 2015b; Emerson 2015; Solin 2017; Rubin 2017). By following DSRP, development practitioners will probably do better at approximating reality, by closing the gap between how real-world systems work and how our mental models reflect how we think they work, and find or innovate solutions that make it much easier to sort out complex problems on the ground. Ultimately, by practising DSRP, practitioners become systems thinkers (Cabrera, Colosi & Lobdell 2008; Cabrera & Colosi 2012; Cabrera & Cabrera 2015; Cornell University 2016; 2017; Thinkwater n.d.(a); Thinkwater n.d.(b); Thinkwater n.d.(c); Thinkwater n.d.(d); Thinkwater n.d.(e); Thinkwater n.d.(f)).

7.1. The journey

A clear message is that systems thinking is needed in programmes that use market system approaches in DAP. There was a broad consensus in findings from Chapters One, Two and Three that this is the way to respond to so many limitations of existing approaches to addressing complexity. The world is too complex to be dealt with by linear and predictable solutions and development problems are now understood to be complex. A typical approach in the past has been to act as if they can be simplified, that every problem has an observable cause and then these causes are made amenable by quick fixes. But the evidence suggests that problems remain unsolved, they generate even more problems, pushing programmes to change strategies and adding to implementation challenges and programme costs. Even with donors’ well-intentioned efforts over the years, it has become clear that it was assumed too readily that progress would be linear and predictable. When it was realised that it was not, practitioners were not prepared for, nor did they have the skills to deal with, these problems.
The ‘complexity crisis’ that businesses were talking about in the 2012 is now realised by development practitioners: they have to deal with complexity in development programmes. How prepared is the MDP and broader the DAP sector for that? If linearity and predictability do not work, are there other tools or approaches or thinking to respond to the challenges faced? Against this backdrop, ‘systems thinking’ has grown in currency as a shift to models based on non-linearity, adaptability and uncertainty, as Chapter 3 demonstrated. Promising initiatives have emerged - Doing Development Differently (DDD 2014; Wild, Booth & Valter 2017), BEAM, LEO, MaFI, SEEP, individual practitioners, organisations such as Mesopartner, Oxfam, Practical Action among others - taking new tools in the field and testing them. The ODI’s Doing Development Differently initiative asked the development community to start to engage with complex systems instead of ignoring complexity (DDD 2014). OECD (2017) has just recently published a book on Complexity and Policy making. They promote new testing, learning and adaptation, admitting that there is no blueprint to follow (Harford 2012; ODI 2016; OECD 2017; Wild, Booth & Valter 2017). Tools or approaches such as network analysis, causal loop diagrams, Sensemaker® or outcome mapping have been introduced from other sectors and are now repeatedly promoted and trialled in projects. What is the result? In 2017 ODI concludes that they can see there is a ‘subtle shift’ to put the new principles into action. There are also issues to overcome, e.g., strict reporting requirements, the enabling environment, difficult to do it in practice, or simply ‘people are not yet sold to the idea’ (ODI 2017). These findings resonate well with what this research demonstrated - that MDP, as a field, is still in its infancy.

This research reviewed the theories underpinning systems thinking - in Chapter Two. This endeavour pointed to the evolving nature of systems thinking with four waves thus far. The fourth wave takes a unique and, for many, intriguing view of systems thinking, being seen a ‘cognitive endeavour’, a cognitive act - and not a ‘practice’ (Silverman 2012; Cabrera & Colosi 2012). The authors describe it as an emergent property of four simple patterns (DSRP rules), when it was published in Evaluation and Planning journal in 2008 (Colossi & Lobdell 2008) and in the later papers and books Cabrera and Cabrera authored (2012, 2015). Systems thinking is useful in solving problems by following these four simple rules; in doing so it addresses the gap that exists between ‘how we think the world works’, and the reality
What the comparison between theory and the market system practice in DAP shows (in Chapters Two and Three), is that the two are out of sync: that theory forged ahead, boosted by other disciplines where it first developed, but it turns out that the market systems practice in DAP practice is still nascent, with definitional ambiguities and misconceptions and is trying to find its way in understanding one side of systems thinking -‘systems’, apparently not knowing or considering that the field has evolved. The practice response is limited to a few cases of developing new approaches or applying tools or frameworks borrowed from other sectors rather than taking a broader view by understanding what other fields did or do and what problems they faced, and systematically addressing the full spectrum of challenges that come with applying systems thinking to a new field, such as the market systems practice of DAP.

There is also the danger, particularly when a new approach emerges, that the language and enthusiasm surrounding it create a mystique, making it inaccessible and daunting to many who seek lasting change. It can become the preserve of a small elite, rather than owned by all, and these few would dictate what it is. There are already think-pieces (Jenal & Cunningham 2014, 2015b; Jenal 2016a, 2016b, 2016c, 2017; Jenal & Hanchar 2016) that introduce terms such as attractors, emergence, complexity, and chaos adding another level of difficulty to practitioners’ efforts in absorbing the new field of study. With the enthusiasm and hope that characterise the practice now, there is limited criticism of the new concept or the few tools applied. There is instead wide consensus on these tools, on describing markets as CAS, proving again the infancy of the practice where everything that is being offered is absorbed. The conclusion of Chapter Three is that MDP is nascent in applying systems thinking, with misconceptions absorbed into the practice, a lot of consensus on a few tools and minimal empirical evidence. Based on other empirical studies (Cabrera 2006; Sellers 2017) these ambiguities and misconceptions or barriers that exist in the practice will lead to challenges in implementation. Hence, understanding and addressing these challenges become a critical part for the practice to improve.

To see identify these challenges, a structured conceptualisation methodology was used (explained in Chapter Four). To brainstorm these challenges, the researcher used a focus prompt that a group of development practitioners who were part of this
study had to address:

*One specific challenge that needs to be addressed to encourage systems thinking in (market) development aid programming is...*

The process generated 176 statements and, after editing and reduction, 100 final statements moved to a sorting and rating phase (on a scale 1 Min to 5 Max). The Concept System® Global MAX™ software was used for uploading data and for analysis and generation of concept maps. Eight clusters were initially generated, but the researcher combined them and six domains were selected at the end to form the conceptualisation framework for this study: ‘Develop skills and capacity for systems thinking’; ‘Address existing mental models’; ‘Change existing systems and processes’; ‘Use systems tools’; ‘Support funding of systems approaches’; and ‘Show potential of systems thinking’. This research demonstrated that there is an issue here, as the current focus of the development practice is on developing systems tools. However developing tools is one amongst the 100 statements of challenges brainstormed, and is part of only one of the six identified domains and it is not perceived as highly important. The conceptual framework showed that the immediate work in systems thinking should not focus on tools but on other areas, with some being more important than others.

It is significant that ‘Develop skills and capacity’ was rated highest. All statements (n=16) contained in this cluster highlight the need for a better understanding of what systems thinking is and what it entails, a step forward from the existing focus on tools. Equally, and perhaps more importantly, was that ‘Address existing mental models’ was ranked second, and that this cluster contained the highest number of statements (n=25), but also 60 per cent of the study’s highest rated statements – five of the nine statements rated over ‘4’ (on a scale running from a minimum of 1 to a maximum of 5) were in this cluster. Practitioners realise that addressing mental models is critical. Representing almost half (41%) of the total statements, these two clusters, rated the highest in terms of importance, are concerned with ‘changing mindsets through learning more about systems thinking’. What this research demonstrates is that this theme – ‘changing mindsets through learning’ - is at the core of the conceptualisation framework and at the core of solution seeking to address challenges DAP faces in encouraging systems thinking.

Solutions proposed in this research (in Chapter Six) acknowledge the complexity of systems thinking, but also the complexity of these findings, and offer...
five types of solutions each leading to different strategies, including one on how to measure progress across the six domains of challenges. The most intriguing solution types are numbers 4 and 5. Solution 4 - Starts with ‘Address existing mental models’ as a bridging, unifying domain. The reason for that is because the ‘Addressing existing mental models’ cluster is strategically located on the map, not only in terms of concept rating (second to the top of importance rating), but also graphically placed in a central position on the map. It is strongly related to other clusters and acts like an attractor to the other domains by pulling them together and keeping them tight around a core theme. Starting with it to reach other domains makes sense.

The concept map generated by this study is to be looked at as a CAS with clusters as interacting agents (Solution 5). This solution is, in a way, the next level in thinking, as what it means is, through this interaction between agents (read ‘clusters’) and following a set of rules, systems thinking in DAP could emerge. By combining and pairing domains, Solution 5 generated at least 30 ‘questions-to-solution seeking’, and each could be considered as a separate project. Through this process, at least 30 new projects could be generated that would lead to systems thinking emerging in DAP practice. However, if to prioritise, by seeing the importance that mental models have conceptually and graphically on the map, one could suggest that from the 30+ projects, start with ‘Addressing existing mental models’ question-to-solution first, as changing existing mental models is critical to any action put forward by the practice.

The results of this research show that the priority for the DAP community of practice is about changing mindsets, addressing mental models, and learning and building skills. The weight practitioners put on changing the way we think brings us back to where this thesis started with its introduction. The examples referenced throughout chapter 3 pointed that project failure to have long-lasting pro-poor impact was due to an apparent mismatch between how the team viewed sorting out problems (the habits of mind) and the reality on the ground (the real world). The plea moving forward is for practitioners to change the way they think - ‘changing mindsets through learning’. The review of the market systems approaches in DAP in the later chapters and, most importantly, the empirical research that came out of the concept mapping process pointed to the same action. In this way, the cycle of inquiry, evidence, interpretation and solution seeking that this thesis was built on is closed. Theoretically, if ‘mental models’ (amongst five other domains from the conceptualisation framework) are addressed and in so doing practitioners are better at
constructing mental models that align better with reality on the ground, then many
programmes, like these referenced in this thesis, are more likely to have long-lasting
success.

The final question that remains is how can mental models — the entrenched
habits of mind — be constructed or old ones de-constructed to better match reality?
Sellers (2017) argues this is the most difficult part to implementing systems thinking.
To support his statement he points to the ‘convenience’ the traditional thinking brings
to people: ‘the most difficult aspect of learning systems thinking is the requirement
for a new perspective or paradigm. The most difficult barrier to implementing systems
thinking is the easy, practiced, repeatable, easily duplicated, effective short-term
successes of traditional thinking’ (p.2). He argues traditional thinking is now part of
our ‘modern culture’, a big barrier to make the shift. The transition we need to make
from traditional thinking to systems thinking is not simple and is not by adding new
tools: ‘The transition from traditional thinking to systems thinking is not trivial. It is
not simply the addition of new tools or methods to traditional thinking; it requires a
fundamental shift in our underlying paradigms and beliefs’ (Sellers 2017, p.3). It is
not that simple, he concludes.

7.2. How to go about addressing mental models

The motivation to implement systems thinking exists because practitioners
believe that there is a need to think differently about problems or challenges in MDP.
This research demonstrated that practitioners are not seeking new methods, or tools,
new ideas or concepts, nor are they seeking new systems theories. What these
practitioners see as important is new thinking. They may want a shift to the ‘thinking’
side of the two words that comprise ‘systems thinking’. By doing so, unknowingly,
practitioners are pointing to the need for DSRP – as the solution.

7.3. DSRP – the way forward in addressing mental models

This thesis is a testimony that development practitioners want to change how
they think and how they understand the world. They need a systemic approach to use
systems thinking in tackling developing aid problems, to a much greater extent than
what is currently happening in the market systems practice of DAP. By pointing to
DSRP, these findings demonstrate that thinking (a complex adaptive system) should
not be limited to tools (including cases where four or five tools are circulated),
methods or frameworks, but guided by a set of rules.

When I first started this research, I wanted to learn and understand theories, methods, and tools of systems thinking, and even navigated a few dots in the Schwarz map… until I realised that I was falling into the same trap as others. After I dealt with the intersection of the two fields of study - market systems development and systems thinking - I abandoned the approach. This research is not about theories on systems thinking, or about how many theories, methods or tools are on the Schwarz map presented in Chapter Two. This research is concerned with how people think. The ‘what is in the Schwarz map’ could change as more of these theories, tools and methods are developed, or combined, or adapted, or abandoned. The ‘how’ we look at them, use them to understand and interpret realities and ‘how to think’ is what is important. The way we think is reflected in ‘how’ we approach solving the problems of developing countries; so, if one, or the majority of practitioners are now drawn into network analysis, Cynefin framework, or other tools or systems methods, which is what seems to be happening, that is acceptable as long as we do not replace ‘thinking’ with ‘tools’, or ‘skills’, a crucial point made by Cabrera (Cabrera 2017; Cabrera & Cabrera 2015, p.24):

‘As a field, we have missed the opportunity to educate because we confuse tools for skills. Many people have given up systems thinking because they do not understand it before being introduced to a specialised tool. To an untrained user, the failure of a method to address their problems equates to the failure of the field of systems thinking’.

Systems thinking can be viewed as a link between ‘systems’ that represent the world, and ‘thinking’ — the way we construct mental models of this world. How can we align the two? The fourth wave of systems thinking (Cabrera 2015; Cornell University 2016), is about thinking and how improving thinking by using the four DSRP rules increases the probability of getting the mental model right to better approximate the real world.

‘The better we become at both constructing and deconstructing those mental models, the better we can approximate reality and understand any problem’ (Muschett 2015).

Simple rules are given by DSRP – distinctions, systems, relationship and perspectives – each with two co-implied elements shown in Table 7.1 (Cabrera,
What the authors point to is that acknowledging and addressing all these co-implying elements in an inquiry is critical. However, it rarely happens.

Table 7.1: DSRP elements (Source: Cabrera, Cabrera & Powers 2015, p. 538)

| Simple rule                        | Element 1          | Element 2 |  |
|------------------------------------|--------------------|-----------|
| (D) Distinction (*identity and other*) | Thing/Idea         | Other     |  |
| (S) System (*part and whole*)      | Part               | Whole     |  |
| (R) Relationship (*action and reaction*) | Action            | Reaction  |  |
| (P) Perspective (*point and view*) | Point              | View      |  |

DSRP is at the heart of the Cabrera Research Lab work. It supports the education and learning of thinking skills by emphasizing the dynamic interplay between information and thought, ‘knowledge = information x thinking’ (Cabrera & Colosi 2012, Cabrera & Cabrera 2015; Cabrera & Cabrera 2017). It encourages users to recognize and explicate the distinctions, systems, relationships, and perspectives that inherently characterise and are universal to any concept or to any method or approach in the field of systems thinking. It also encourages them to mix and match these four simple rules to learn how to think and become a better thinker. DSRP is used to interrogate the mental models of the world we have and their degree of conformity with the real world, being mindful that one can only approximate the world through our understanding. (Ginger Richardson, Education and Outreach, Santa Fe Institute 2012, Re:thinking 2017; Thinkwater n.d.).

Many applications of DSRP through the Cabrera Research Lab at Cornell University are in the education sector, e.g., to construct meaning using DSRP rules by working with students and teachers in three public schools in United States (Green Hills School, Bard High School/Early College, and Lehman Alternative Community School). Others are in water through the ThinkWater initiative - a national campaign supported by the U.S. Department of Agriculture to help people think and care deeply about water which is applying systems thinking DSRP through water education and research efforts and engaging people in a new way around water issues (Thinkwater n.d.). Cabrera’s view is that in order to get seven billion systems thinkers it is important to start and educate students how to think. The impact of DSRP on these schools and students is impressive. A recent documentary ‘Re:Thinking’ produced by
PhotoSynthesis Productions (2017), is a thought-provoking movie about the above mentioned schools ‘where students were encouraged to think independently and taught to do so’, and how to be more meta-cognitive (Wilson cited in Re:Thinking 2017). At its core is the theme of how to get thinking back in classrooms, how to change the current system of learning and for students to become creators of knowledge rather than consumers of information. The introduction of how to think: DSRP – a tool for understanding – in schools, brought glowing responses from school leaders, teachers and students (Rubin 2017), as well as from reputable professors working in the education sector at all levels. “Re:Thinking offers a new hope for public education” (Re:thinking 2017). What this means for schools and teachers and the education sector overall, interviewees in the movie conclude, is to be flexible, allow collaboration, encourage experimentation in classrooms, and ‘reimagine schooling from top to bottom’ (Ayers 2017). Being good as a student is about ‘asking questions instead of memorising answers, following through until you’ve exhausted all the possibilities, understanding how you think about things and using that knowledge for the purpose of building new knowledge rather than just consuming information’ (Rubin 2017). ‘Re:thinking’ is seen by many as an ‘anti-establishment film, where ‘students are adults in-training rather than memorising machines destined to increase their school tests scores’ (Berliner 2017).

‘DSRP entails metacognition (awareness of our own thinking patterns) for users, which promotes both social and emotional intelligence’ (Metamap n.d.).

There is evidence that DSRP does improve how to think:

‘By mixing and matching these four simple rules, people can easily learn how to think in more accurate, creative, and systemic ways, thereby increasing performance in every area of life. Our research in systems thinking and metacognition has been shown to result in increases in four critical areas: content mastery or deep understanding (higher skills & scores, etc.), Lifelong learning skills (growth mindset, higher transfer, etc.), IQ-type skills (synthesis, analytics, and problem solving), and EQ-type skills (emotional intelligence, prosocial behaviour, grit, compassion)’ (Thinkwater n.d. (c)).

It comes with the promise to become a better thinker at approximating the reality:

‘This means you will make accurate yet nuanced distinctions among things
and ideas and notice what is overlooked. You will identify the parts and wholes of systems and the relationships that drive systems behaviour. You will identify the perspectives implicit in existing systems, and can apply alternative perspectives to reorganize their parts and relationships. You will identify your own perspectives that inform your mental models and then evaluate how closely they approximate reality’.

It seems that DSRP does what it promised to do (Thinkwater n.d.(e), (f), (g)). Midgley (cited in Thinkwater n.d.(f)) sees the critical role that DSRP has for the field:

‘We have had 100 years of systems research giving rise to literally hundreds of different methodologies, many, many different systems ideas. I have to ask how we can make sense of this. When I saw DSRP, I realised that it broke systems thinking down to the bare essentials: a set of thinking skills. It also occurred to me that all the various methodologies that are used in the systems field tend to prioritise one of these skills over the others, so it provides a framework for organising the field.’

If one follows DSRP rules, then they will be able to understand reality better and use tools, concepts, theories and methods differently to better depict its complexity.

‘These rules help identify the complexity of the problem as an extensively relational network and serve as a guide to detect leverage points in organising the thinking process and making it simpler and easier to comprehend’ (Muschett 2015, second paragraph).

What does this mean for development practitioners? Following the rules and applying them to any concept, e.g., tools, systems or approaches, will help practitioners understand any complex system that an initiative following market system approaches in DAP is focusing on. Anything can be viewed using each of these four rules to come up with a deeper understanding of it.

Thinkwater (2017) summarises very well what DSRP is at its core in Table 7.2 below.
Table 7.2 DSRP explained (excerpts from Thinkwater n.d. (c))

<table>
<thead>
<tr>
<th>Distinctions (Identity-Other)</th>
<th>Systems (Part-Whole)</th>
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<tbody>
<tr>
<td>‘Systems thinkers make distinctions between and among things and ideas. How we draw or define the boundaries of an idea or a system of ideas is an essential aspect of understanding’. ‘Whenever we draw a boundary to define a thing, that same boundary defines what the thing is not (the “other”).’</td>
<td>‘Systems thinkers organize things and ideas into part-whole systems to make meaning. They know that changing the way ideas are organized changes meaning itself. The act of thinking is defined by splitting things up or lumping them together’. ‘Systems thinkers constantly consider context by asking “what is this a part of?” in order to see how things fit into larger wholes than the norm’.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Relationships (Action-Reaction)</th>
<th>Perspectives (Point-View)</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Systems thinkers identify relationships between and among things and ideas. We cannot understand much about anything, including a system, without understanding how parts and wholes are related. Relationships come in all types: causal, correlation, direct/indirect, etc. Systems thinkers use relationships to show dynamic interactions between things and ideas, including feedback loops to show reciprocal relations’.</td>
<td>‘Systems thinkers look at ideas from different perspectives and understand that every time we make a distinction (including identifying relationships and systems), we are always doing so from a particular perspective. Systems thinkers use perspectives to rethink distinctions, relationships, and/or systems’.</td>
</tr>
</tbody>
</table>

7.4. Potential contribution of the research to ‘market development’ practice

Within the context of an increased appetite for using systems thinking in development aid, this research provides new knowledge on understanding what challenges practitioners face in implementing systems thinking in market systems development programmes. Second, it provides a conceptual framework that can be used to navigate these challenges, and offers more than 30 possible solutions to move towards effective planning and implementation of systems thinking in aid.

Third, the research provides direction by demonstrating that development practice should move away from focusing only on developing or using systems tools
and embrace a more systemic approach that considers six domains of action.\textsuperscript{26} (the results of this research) These domains are: ‘Developing skills and capacity in systems thinking’; ‘Addressing existing mental models’; ‘Change existing systems and processes’; ‘Use systems tools’; ‘Support funding for systems thinking’; and ‘Show the potential of systems thinking’. \textsuperscript{27}

Fourth, this research introduces a new and rigorous approach for studying complex issues and generating implementation options. This is achieved through a structured conceptualisation methodology (group concept mapping) and also, for the first time in aid sector, use of the Concept Systems® Global MAX™ software.

Fifth, the thesis sets the scene for immediate action. Equipped with the findings from this research and delving deeply into some possible solutions, it is now possible to embark on a more comprehensive dialogue with policy makers, practitioners, donors or implementers to plan together what is needed if a systems orientation is to drive and thrive in development aid programmes and possibly beyond.

\textbf{7.5 Conclusion}

Findings from this thesis clearly demonstrate that there has been insufficient investment in, or sustained work on, systems thinking in DAP, particularly MDP. Moreover, the areas that are currently the focus of development practice might not be the most urgent, or that they might be necessary but not sufficient. As a result, their potential to bring rigour to design and implementation, to facilitate the shift towards better aid practice and hence better results in MDP, might not be fully realised.

Systems thinking practice in MDP is still nascent but there appears to be the will to take it further. However, systems thinking evolving theory and MDP practice are out of sync, with the latter still focussing on understanding systems. The experience of incorporating systems thinking in development aid is limited and fragmented among different donors or platforms. The relevant literature is limited and

\begin{footnotesize}
\textsuperscript{26} These six domains are listed in order of importance, from highest to the lowest, as rated by participants.
\textsuperscript{27} The researcher is now using concept mapping in another DFAT funded programme – Business Partnership Platform; and is planning to introduce it to New Zealand Ministry of Foreign Affairs and Trade, Business Link Pacific programme as well.
\end{footnotesize}
ambiguities exist on what systems thinking is or does, or how it could work for MDP. Through this research I wanted to understand why and to identify the challenges and there is still much to learn about how systems thinking can be applied to help practitioners better understand the problems developing countries face and for solutions to be devised. A literature review did not provide answers. For the first time in MDP, concept mapping and the Concept System® Global MAX™ software was applied to a group of practitioners, funders and implementers. The results from this exercise were well above my expectations.

Findings highlighted that challenges exist which limit the application, use, and understanding of systems thinking. They also demonstrated that there is not only a single solution to expand the use of systems thinking in MDP, but many. The challenges can be clustered across six domains and more than 30 solutions are identified to better enable the use of systems thinking. Amongst these, the most important identified by practitioners is to change the way the development community think. This can be achieved through DSRP. There are four rules of DSRP, which, if practiced could help practitioners think differently and better align mental models to how the world systems really work. Practicing DSRP could help with closing the ‘complexity gap’ identified by a 2012 IBM study.

This research, through its literature review, the researcher’s own experiences, the voice of a group of practitioners and the application of the fourth wave of systems thinking all led to the conclusion that practitioners need to change the way they think. ‘Changing mindsets through learning’ - is at the core of the conceptualisation framework and at the core of solution seeking that this research identified as critical to address challenges market systems practice in DAP faces in encouraging systems thinking.

There are of course limitations of this research that have been acknowledged earlier in this thesis: a relatively small sample of practitioners – mostly from MDP - could imply that the results are only specific to this study and the MDP field and can not be generalised to other practices. While it is important to raise these limitations, they are not different from the limitations stated in other similar concept mapping

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28 Concept mapping analysis and results conducted using The Concept System® Global MAX™ software: Concept Systems, Inc. Copyright 2004-2016; all rights reserved.
29 The practice of using systems thinking in DAP is nascent and mostly driven by MDP practice, as stated throughout the thesis; there is a limited number of practitioners working in applying systems thinking in DAP; this affected the sample size.
studies. In addition, these limitations could be addressed by replication in other settings and with other groups of practitioners, or by using alternative ways of collecting data. This could be one of the directions for future research, discussed further below.

7.6. Directions for future research

In terms of future research, effort from practitioners in applying the four simple rules of DSRP is critical; the better they are at packing and unpacking the mental models, the better they can be at approximating reality in their development aid work.

A second area for further research relates to the requirement of an institutional home: a place where challenges and potential solutions can be taken forward, and the practice can be developed intensively enough to evolve. This institution could drive the selection of practitioners, facilitate training, motivate and incentivise practitioners to become systems thinkers, and drive learning; popularise and explicate the simple rules through capacity building and awareness raising; and push and build a culture of systems thinkers in DAP. Although a range of practitioners work in this space, they do so in isolation.

It should not be forgotten however, that systems thinking is only one way of understanding and providing solutions to development problems. A mere change in thinking would not automatically solve the various problems facing developing countries. Even after modes of thinking have changed, much hard work remains in order to solve these problems. Systems thinking alone will not reduce poverty in these countries, but it will very likely inform and drive actions that can assist with poverty reduction.
### Appendix 2A: Sample of popular systems thinking literature

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Title</th>
<th>Topic/Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anthony J. Masys</td>
<td>2015</td>
<td><em>Applications of Systems Thinking and Soft Operations Research in Managing Complexity: From Problem Framing to Problem Solving</em></td>
<td>New ways of thinking by promoting systems thinking and soft operations research to deal with complex problems. The author mentions examples of such as humanitarian aid, organised crime and terrorism, homeland and human security, disaster management and climate change, and hunger and poverty reduction. Both systems thinking and soft operations research are considered to have had huge success in dealing with complex problems.</td>
</tr>
<tr>
<td>Derek Cabrera, Laura Cabrera</td>
<td>2015</td>
<td><em>Systems Thinking Made Simple</em></td>
<td>Distinction, System, Relationship Perspective (DSRP) rules that underpin Systems Thinking</td>
</tr>
<tr>
<td>Fritjof Capra, Pier Luigi Luisi</td>
<td>2014</td>
<td><em>The Systems View of Life: A Unifying Vision</em></td>
<td>Brings together theories, methods, tools, models and ideas into a coherent systemic framework that integrates the biological, cognitive, social, and ecological dimensions of life. The evolution of systems thinking is depicted in the book, as well as the consequences of using the systems’ holistic approach.</td>
</tr>
<tr>
<td>Author</td>
<td>Year</td>
<td>Title</td>
<td>Topic/Theme</td>
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<tr>
<td>Bob Williams, Richard Hummelbrunner</td>
<td>2010</td>
<td><em>Systems Concepts in Action: A Practitioner’s Toolkit</em></td>
<td>Provide an introductory primer to systems thinking and concepts and is structured as a reference guide to various system methods used in systems thinking.</td>
</tr>
<tr>
<td>Linda Booth Sweney, Dennis Meadows</td>
<td>2010</td>
<td><em>The Systems Thinking Playbook: Exercises to Stretch and Build Learning and Systems Thinking Capabilities</em></td>
<td>Systems concepts and tools; provides short gaming exercises to help participants instinctively comprehend the principles of systems thinking. New insights about systems concepts are made simple through games such as causal-loop diagrams, system archetypes, system boundaries or leverage points, among others. Learning comes from a variety of exercises that have been tested and retested to make it digestible for readers.</td>
</tr>
<tr>
<td>Donella Meadows</td>
<td>2008</td>
<td><em>Thinking in Systems – a Primer</em></td>
<td>Systems thinking; stating that system failures are the cause of most stringent problems that humanity faces, the author pushes systems thinking into the real world by challenging leaders to embrace systems-thinking skills that are critical for the twenty-first century.</td>
</tr>
<tr>
<td>Author</td>
<td>Year</td>
<td>Title</td>
<td>Topic/Theme</td>
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<tr>
<td>John Boardman, Brian Sauser</td>
<td>2008</td>
<td><em>Systems Thinking: Coping with 21st Century Problems</em></td>
<td>Systems thinking</td>
</tr>
<tr>
<td>Peter Senge</td>
<td>2005</td>
<td><em>Presence: Exploring Profound Change in People, Organizations, and Society</em></td>
<td>Broad new ways of thinking about change and learning</td>
</tr>
<tr>
<td>Peter Senge</td>
<td>2004</td>
<td><em>The Hidden Connections: A Science for Sustainable Living</em></td>
<td>Applying complexity theory to large-scale social interaction</td>
</tr>
<tr>
<td>Steven Strogatz</td>
<td>2003</td>
<td><em>Sync: The Emerging Science of Spontaneous Order</em></td>
<td>How things ‘sync‘ with each other and create order</td>
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<tr>
<td>Michael Jackson</td>
<td>2003</td>
<td><em>Systems Thinking: Creative Holism for Managers</em></td>
<td>Holism and chaos theory; offers a rigorous interpretation of the major developments of systems theory in systems thinking over the last 50 years. It is a recipe for managers looking for solutions to complex problems that quick fixes failed to solve because they are not holistic enough.</td>
</tr>
<tr>
<td>Linda Booth Sweeney</td>
<td>2001</td>
<td><em>When a Butterfly Sneezes: A Guide for Helping Kids Explore Interconnections in Our World through Favourite Stories</em></td>
<td>Introduces systems thinking to parents and children by Connecting various popular children’s books to their underlying systems concepts</td>
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<tr>
<td>Linda Booth Sweeney</td>
<td>2000</td>
<td><em>The Hidden Connections: Integrating the Hidden Connections among the Biological, Cognitive, and Social Dimensions of Life</em></td>
<td>New ways of perceiving informed by ecological literacy</td>
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<tr>
<td>Author</td>
<td>Year</td>
<td>Title</td>
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<tr>
<td>Malcolm Gladwell</td>
<td>2000</td>
<td><em>The Tipping Point: How Little Things Can Make a Big Difference</em></td>
<td>Building on the theories of networks and complexity, it captures the reader’s attention with social dynamics that cause rapid change. Relevant, practical, historical examples linked to chaos, complexity and nonlinearity are included.</td>
</tr>
<tr>
<td>Duncan Watts</td>
<td>1999</td>
<td><em>Small Worlds: The Dynamics of Networks Between Order and Randomness</em></td>
<td>Network theory explaining why it feels like a small world even though its big</td>
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<tr>
<td>Duncan Watts</td>
<td>1996</td>
<td><em>The Web of Life: A New Scientific Understanding of Living Systems</em></td>
<td>New ways of perceiving informed by organismic view</td>
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<tr>
<td>Murray Gell-Mann</td>
<td>1995</td>
<td><em>The Quark and the Jaguar</em></td>
<td>New ways of doing science from a complexity view</td>
</tr>
<tr>
<td>Margaret Wheatley</td>
<td>1999</td>
<td><em>Leadership and the New Science: Discovering Order in a Chaotic World</em></td>
<td>A new leadership paradigm based on the systems concepts of self-organisation, chaos, and quantum theory.</td>
</tr>
<tr>
<td>Author</td>
<td>Year</td>
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<td>Topic/Theme</td>
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<tr>
<td>Margaret Wheatley</td>
<td>1992</td>
<td><em>Leadership and the New Science: Learning About Organization from an Orderly Universe.</em></td>
<td>New ways of leading organisations informed by new systems sciences</td>
</tr>
<tr>
<td>Mitchell Waldrop</td>
<td>1992</td>
<td><em>Complexity: The Emerging Science at the Edge of Order and Chaos.</em></td>
<td>The history of Santa Fe Institute and the emergence of complexity science</td>
</tr>
<tr>
<td>Fritjof Capra</td>
<td>1990</td>
<td><em>The Turning Point: Science, Society, and the Rising Culture</em></td>
<td>New ways of perceiving informed by systems view</td>
</tr>
<tr>
<td>Peter Senge</td>
<td>1990</td>
<td><em>The Fifth Discipline: The Art and Practice of The Learning Organization</em></td>
<td>Learning organisations and systems thinking</td>
</tr>
<tr>
<td>Peter Checkland</td>
<td>1981</td>
<td><em>Systems Thinking, Systems Practice: Includes a 30-Year Retrospective</em></td>
<td>Soft System Methodology</td>
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<td>Gerald M. Weinberg</td>
<td>1975</td>
<td><em>An Introduction to General Systems Thinking</em></td>
<td>General Systems Theory</td>
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### Appendix 3A: Analysis of Systems Thinking Publications

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<thead>
<tr>
<th>Sector focus (general)</th>
<th>Donor funded research (specific)</th>
<th>Topical focus (ST or S)</th>
<th>Method (general: E, M, T)</th>
<th>Method (specific)</th>
<th>Sample</th>
<th>Author</th>
<th>Title</th>
<th>Book/Journal Info</th>
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<tr>
<td>DAP</td>
<td>N</td>
<td>ST</td>
<td>T</td>
<td>NA</td>
<td>NA</td>
<td>Burns, Danny</td>
<td>Systemic action research: Changing system dynamics to support sustainable change</td>
<td>Action Research, 2014, vol.12, no. 1, pp.3-18 [Peer-reviewed Journal]</td>
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<tr>
<td>H</td>
<td>Y</td>
<td>S</td>
<td>E</td>
<td>Document reviews and interviews</td>
<td>Health workers and key informants</td>
<td>Yaya Bocoum, Fadima; Kouanda, Seni; Kouyate, Bocar; Hounton, Sennen; Adam, Taghreed; Yaya Bocoum, Fadima (correspondence author)</td>
<td>Exploring the effects of task shifting for HIV through systems thinking lens: the case study of Burkina Faso</td>
<td>BMC Public Health, 2013, vol.13, no. 1, p.997 [Peer-reviewed Journal]</td>
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<td>Sector focus (general)</td>
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<td>Method (general: E, M, T)</td>
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<td>NA</td>
<td>NA</td>
<td>Atun, Rifat</td>
<td>Health systems, systems thinking and innovation</td>
<td>Health Policy and Planning, 2012, vol. 27(suppl4), pp.iv4-iv8 [Peer-reviewed Journal]</td>
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<td>O</td>
<td>N</td>
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<td>NA</td>
<td>NA</td>
<td>Nguyen, Nam; Bosch, Ockie; Maani, Kambiz</td>
<td>Creating 'learning laboratories' for sustainable development in biospheres: A systems thinking approach</td>
<td>Systems Research and Behavioral Science, Jan/Feb 2011, vol.28, no. 1, p.51 [Peer-reviewed Journal]</td>
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<td>Topical focus (ST or S)</td>
<td>Method (general: E, M, T)</td>
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<td>NA</td>
<td>NA</td>
<td>Swanson, R Chad; Cattaneo, Adriano; Bradley, Elizabeth; Chunharas, Somsak; Atun, Rifat; Abbas, Kaja M.; Katsaliaki, Korina; Mustafee, Navonil; Mason Meier, Benjamin; Best, Allan</td>
<td>Rethinking health systems strengthening: key systems thinking tools and strategies for transformational change</td>
<td>Health Policy and Planning, 2012, vol. 27(suppl4), pp.iv54-iv61 [Peer-reviewed Journal]</td>
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<tr>
<td>H</td>
<td>Y</td>
<td>S</td>
<td>E</td>
<td>In-depth Interviews</td>
<td>Provincial representatives from health departments, population welfare, health workers, donor agencies, NGOs</td>
<td>Saira Zafar; Babar Tasneem Shaikh</td>
<td>‘Only Systems Thinking Can Improve Family Planning Program in Pakistan’: A Descriptive Qualitative Study</td>
<td>International Journal of Health Policy and Management, 01 December 2014, vol.3, no. 7, pp.393-398 [Peer-reviewed Journal]</td>
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<tr>
<td>O</td>
<td>N</td>
<td>S</td>
<td>E</td>
<td>Surveys and interviews</td>
<td>Agriculture sector staff</td>
<td>Banson, Kwamina E.; Nguyen, Nam C.; Bosch, Ockie J. H.; Nguyen, Thich V.</td>
<td>A Systems Thinking Approach to Address the Complexity of Agribusiness for Sustainable Development in</td>
<td>Systems Research and Behavioral Science, 2015, vol.32, no. 6, pp.672-688 [Peer-reviewed Journal]</td>
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<td>Method (general: E, M, T)</td>
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<td>Surveys and interviews</td>
<td>Health workers</td>
<td>Rwashana, Agne; Nakubulwa, Sarah; Nakakeeto-Kijjambu, Margaret; Adam, Taghreed</td>
<td>Advancing the application of systems thinking in health: understanding the dynamics of neonatal mortality in Uganda</td>
<td>Health Research Policy and Systems, 2014, vol.12, p.36 [Peer-reviewed Journal]</td>
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<tr>
<td>H</td>
<td>Y</td>
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<td>Surveys and interviews</td>
<td>Health workers and households</td>
<td>Sarriot, Eric; Kouletio, Michelle; Jahan, Dr Shamim; Rasul, Izaz; Musha, Akm</td>
<td>Advancing the application of systems thinking in health: sustainability evaluation as learning and sense-</td>
<td>Health Research Policy and Systems, 2014, vol.12, p.45 [Peer-reviewed Journal]</td>
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<td>NA</td>
<td>NA</td>
<td>Thich V. Nguyen; Nam C. Nguyen; Ockie J.H. Bosch</td>
<td>Contribution of the systems thinking approach to reduce</td>
<td>Int. J. of Markets and Business Systems, 2015,</td>
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<td>NA</td>
<td>Paina, Ligia; Peters H. David</td>
<td>Understanding pathways for scaling up health services through the lens of complex adaptive systems</td>
<td>Health Policy and Planning, 2012, vol. 27, pp. 365-373 (Peer-reviewed Journal)</td>
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<td>S</td>
<td>E</td>
<td>Interviews with key informants</td>
<td>National, regional, district level key informants</td>
<td>Agyepong, A. Irene; Aryeetey, C. Geneieve; Nonvignon, Justice; Asenso-Boadi, Francis; Dzikunu, Helen; Antwi, Edward; Ankrath, Daniel; Adjei-Acquah, Charles; Esena, Reuben; Aikins, Moses; Arhinful, K. Daniel</td>
<td>Advancing the application of systems thinking in health: provider payment and service supply behaviour and incentives in Ghana National Health Insurance Scheme – a systems approach</td>
<td>Health Research Policy and Systems, 2014, vol. 12, no. 35 [Peer-reviewed Journal]</td>
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<td>Adam T, de Savigny D</td>
<td>Systems thinking for strengthening health</td>
<td>Health Policy Plan 2012,</td>
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<td>E</td>
<td>Interviews with key informants</td>
<td>Key informants</td>
<td>Paina L, Bennett S, Ssengooba F, Peters DH:</td>
<td>Advancing the application of systems thinking in health: need for a paradigm shift.</td>
<td>27(Suppl 4):1–3</td>
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<td>Andrew, T; Petkov, D</td>
<td>The need for a systems thinking approach to the planning of rural telecommunications infrastructure</td>
<td>Telecommunications Policy, Feb/Mar 2003, vol.27(1,2), pp.75-93 [Peer-reviewed Journal]</td>
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<td>Ryan, T. B.; Mothibi, J.; Ryan, Tom; Strümpfer, Johan</td>
<td>Towards a systemic framework for understanding science and technology policy formulation problems for developing countries</td>
<td>Systems Research and Behavioral Science, July 2000, vol.17, no.4, pp.375-381 [Peer-reviewed Journal]</td>
</tr>
<tr>
<td>O</td>
<td>SA</td>
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<td>NA</td>
<td>This article proposes a model for managing e-waste in India using systems thinking</td>
<td>Jayaprakash, Parvathi; Pillai, R. Radhakrishna</td>
<td>An Integrated Model for E-waste Management in India Using Systems Thinking</td>
<td>Management and Labour Studies, 2016, vol.41, no.1, pp.45-57 [Peer-reviewed Journal]</td>
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<td>Sector focus (general)</td>
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<td>This paper presents a system dynamics computer simulation model to illustrate unintended consequences of apparently rational allocations to curative and preventive services.</td>
<td>Bishai, David; Paina, Ligia; Li, Qingfeng; Peters, David; Hyder, Adnan</td>
<td>Advancing the application of systems thinking in health: why cure crowds out prevention</td>
<td>Health Research Policy and Systems, 2014, vol.12, p.28 [Peer-reviewed Journal]</td>
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<td>O</td>
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<td>M</td>
<td>System modelling</td>
<td>Uses critical systems thinking a system dynamics model, a causality diagram and a flow diagram was developed</td>
<td>Xu, Jiuping; Dai, Jiuzhou; Rao, Renqiao; Xie, Huaidong; Lu, Yi</td>
<td>Critical Systems Thinking on the Inefficiency in Post-Earthquake Relief: A Practice in Longmen Shan Fault Area</td>
<td>Systemic Practice and Action Research, Oct 2016, vol.29, no.5, pp.425-448 [Peer-reviewed Journal]</td>
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<td>O</td>
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<td>S</td>
<td>E</td>
<td>Interviews with key informants</td>
<td>Key informants government, NGO and private sector</td>
<td>Nguyen, Nga; Beeton, Robert; Halog, Anthony</td>
<td>A systems thinking approach for enhancing adaptive capacity in small- and medium-sized enterprises</td>
<td>Environment Systems and Decisions, 2015, vol.35, no. 4, pp.490-503 [Peer-reviewed Journal]</td>
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<td>Interviews using software</td>
<td>20 poor fishers from the Philippines use of CST to interrogate wicked problems, perceptions on issues</td>
<td>Cleland, Deborah; Wyborn, Carina</td>
<td>A Reflective Lens: Applying Critical Systems Thinking and Visual Methods to Ecohealth Research in Australia and the Philippines; to explore the roles, relationships, and attitudes of local fishers towards conservation and livelihoods, Cleland et al. (2010) created a computer-assisted board and role-play game “ReefGame.”</td>
<td>EcoHealth, Dec 2010, vol.7, no.4, pp.414-24 [Peer-reviewed Journal]</td>
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<td>H</td>
<td>Y</td>
<td>S</td>
<td>E</td>
<td>Participant observation document review, and semi-structured</td>
<td>District managers prior to, during, and after the intervention</td>
<td>Kwamie, Aku; Dijk, Han van; Agyepong, Irene</td>
<td>Advancing the application of systems thinking in health: realist evaluation of the Leadership Development</td>
<td>Health Research Policy and Systems, 2014, vol.12, p.29 [Peer-reviewed Journal]</td>
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<td></td>
<td>Programme for district manager decision-making in Ghana</td>
</tr>
<tr>
<td>H</td>
<td>N</td>
<td>S</td>
<td>E</td>
<td>In depth interviews</td>
<td>Key informants</td>
<td>Mutale, Wilbroad; Bond, Virginia; Mwanamwenge, Margaret Tembo; Mlewa, Susan; Balabanova, Dina; Spicer, Neil; Ayles, Helen</td>
<td>Systems thinking in practice: the current status of the six WHO building blocks for health system strengthening in three BHOMA intervention districts of Zambia: a baseline qualitative study. (World Health Organization, Better Health Outcomes through Mentoring and Assessment)(Research article)(Report)</td>
<td>BMC Health Services Research, August 1, 2013, vol.13, p.291 [Peer-reviewed Journal]</td>
</tr>
<tr>
<td>Sector focus (general)</td>
<td>Donor funded research (specific)</td>
<td>Topical focus (ST or S)</td>
<td>Method (general: E, M, T)</td>
<td>Method (specific)</td>
<td>Sample</td>
<td>Author</td>
<td>Title</td>
<td>Book/ Journal Info</td>
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<td></td>
<td></td>
<td>of hypertension in West Africa</td>
<td>Bamidele; Plange-Rhule, Jacob; Adanu, Richard; Ogedegbe, Gbenga</td>
<td>optimal hypertension control in West Africa</td>
<td>Journal</td>
</tr>
</tbody>
</table>
Appendix 4A: Email Sent to Participants for Phase 1

Dear [Name],

You are invited to participate in an effort to expand the role of systems thinking in development. Because of your work as development practitioner in market development programming but also interest and familiarity in this area, I invite you to participate in a web-based project to explore the practical challenges that need to be addressed to encourage and support effective systems thinking in development.

My project is using a quite sophisticated research methodology and will be entirely conducted over the web aiming to obtaining conceptual information from a group of participants about the topic of interest. I estimate that it will take only 15-20 minutes between now and [Date], followed by an additional 30-40 minutes between [Date]. All activities take place over the Internet at a time of your convenience. You could choose to participate in either or both phases of this project.

Phase I focuses on brainstorming a list of practical challenges. Phase II ([Date]) asks you to sort and rate those ideas. Both steps are anonymous. Data will be aggregated across participants and used to create detailed concept maps of the challenges that impede use of systems thinking in market development programmes. All results will be made available to participants. By being part of this research you will be able to influence the results of this important effort and will be informed about all outputs of this research.

To participate in this project, please do following:

1. Think of ideas to complete to the following prompt: "One specific practical challenge that needs to be addressed to encourage and support systems thinking in development work is... "
2. Submit your ideas anonymously at the following web page: [Link]
   - Go to the Home page first, and Register
   - Follow then the prompt.

I will contact you again in [Date] to give you instructions for the second and final phase of the project.

If you have any questions, please feel free to contact me directly or write to:

mihaela.balan@rmit.edu.au

Thanks in advance for your time and interest.
Welcome!

Welcome to my project on Systems Thinking in Development aid.

The purpose of this project is to identify the major challenges that need to be addressed in order to encourage and support effective use of systems thinking in development aid. From now until the beginning of March I will be gathering your ideas in this web-based brainstorming process.

During the month of March I will be asking you to organize and rate the ideas. I will then analyze your input and provide detailed maps of the challenges that need to be addressed. All results will be part of the research but also made available to participants.

Your participation in this project will be anonymous.

I hope you will enjoy this journey as much as I do!

Ready to start? GO TO –> Brainstorm
Appendix 4C: Phase 2 Email to Participants (conducted via email)

Dear xxxxx

Thanks to you and other colleagues, the brainstorming part of my research is complete. As you might recall I asked you to generate responses to the following statement: "One specific practical challenge that needs to be addressed to encourage and support systems thinking in development aid programming is….”

I received over 176 ideas. Your contribution was crucial to the successful completion of this phase of the project, and I am grateful for your time and participation. These statements have been edited and reduced and there is now a list of 100 statements that go to the next stage.

I would like now to invite you to participate in the second phase of the project. This phase, Soring and Rating of these 100 list of challenges, is one of the most critical steps in the process. I estimate that it may take you between 45-60 minutes of your time for this task.

The following is what I am asking you to do byxxxx:
1. Sorting: Sort each of the idea statements into groups that are similar in meaning. (Approximate time to complete: 30 minutes)
2. Rating: Rate each of the idea statements according to how important it is (compared to the other statements). (Approximate time to complete: 15-30 minutes)

I have attached an Excel file which has separate tabs for each phase. It is important first to do the Sorting and then the Rating. After you finish please send it back to me by email.

Please contact me if you have any questions. Thank you in advance for your participation.
Dear xxxx

Please find below the link for Sorting and Rating. Click on the link, and you will be asked to log in. Your user name is your email and your password is xxxx.

You will have the instructions for each step: sorting and then rating in the software.

There was a brainstorming activity where practitioners such as yourself came up with a list of statements on challenges faced in using systems thinking in (market) development aid programming. From that list I did further reduction and came out with 100- this final list I am now asking you to sort and then rate. Instructions are on the web.

I would like now to invite you to participate in the second phase of the project. This phase, Sorting and Rating of these 100 list of challenges, is one of the most critical steps in the process. I estimate that it may take you between 45-60 minutes of your time for this task.

The following is what I am asking you to do by xxxx:
1. Sorting: Sort each of the idea statements into groups that are similar in meaning. (Approximate time to complete: 30 minutes)
3. Rating: Rate each of the idea statements according to how important it is (compared to the other statements). (Approximate time to complete: 15-30 minutes)

Let me know if you have any questions.
If you can send it back by xxxxx.
Thanks again xxxx

PS. Let me know if the link is working

http://concepts-systems-global.com/Systems-Thinking-DA/sort/rate
Appendix 4D: Webpages Seen by Participants

Systems thinking in Development Aid Information

Welcome to this project. Click a button below to participate.

- Sorting

Sign In

Done with Preview

My Account

My Projects
Edit Profile
Change Password
Sign out

Use of this Web site constitutes acceptance of the Informed Consent agreement.
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Powered by Concept Systems, Inc.
## Appendix 4E: Original Brainstormed Statements and Final Path

<table>
<thead>
<tr>
<th>Initial Number</th>
<th>Final Number</th>
<th>Randomised Sequence of Final Statements</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>1</td>
<td>Identify and develop funding sources that will encourage systems approaches to aid programming</td>
</tr>
<tr>
<td>9,27,165</td>
<td>2</td>
<td>Develop skills and become more comfortable in integrating simulation and modelling approaches into research</td>
</tr>
<tr>
<td>161,159</td>
<td>3</td>
<td>Avoid over-promising what systems thinking can currently deliver</td>
</tr>
<tr>
<td>8</td>
<td>4</td>
<td>The traditional passive role that academia and science has played in aid policy decision-making processes needs to be more active</td>
</tr>
<tr>
<td>26</td>
<td>5</td>
<td>International, national, regional, state, and local 'Learning Collaborative' about systems thinking</td>
</tr>
<tr>
<td>6,160,162</td>
<td>6</td>
<td>Training and education in systems research techniques for development practitioners</td>
</tr>
<tr>
<td>28,163,164</td>
<td>7</td>
<td>Train practitioners in the facilitation skills that are needed to employ many systems approaches</td>
</tr>
<tr>
<td>60</td>
<td>8</td>
<td>Establish simple opportunities to 'get to know' people outside of one's traditional arena</td>
</tr>
<tr>
<td>5</td>
<td>9</td>
<td>Overcome the problem of focus on and loyalty to the goals and outcomes of donors and programmes</td>
</tr>
<tr>
<td>4</td>
<td>10</td>
<td>Include education and training in systems thinking and methods for novice and advanced individuals</td>
</tr>
<tr>
<td>11</td>
<td>11</td>
<td>Reflective time for people and teams to think about systems</td>
</tr>
<tr>
<td>1,25</td>
<td>12</td>
<td>Develop organizations in which learning is encouraged, being wrong is okay and taking risks is rewarded</td>
</tr>
<tr>
<td>158</td>
<td>13</td>
<td>Differentiating between analytic approaches that are data-based from those that are conceptual</td>
</tr>
<tr>
<td>2</td>
<td>14</td>
<td>New mindsets of project leaders, practitioners able to deal with uncertainty and risk inherent in working in complex</td>
</tr>
<tr>
<td>12,122</td>
<td>15</td>
<td>Remove funding constraints that cause fragmentation of grant proposals or programs and confine development issues to narrow interpretations, actions and thinking</td>
</tr>
<tr>
<td>10</td>
<td>16</td>
<td>Integrate organizational and project planning and evaluation functions around a systems approach</td>
</tr>
<tr>
<td>3</td>
<td>17</td>
<td>Identify new tools and techniques that can support better understanding of complex problems</td>
</tr>
<tr>
<td>15</td>
<td>18</td>
<td>Recognize the importance of a systems paradigm to development aid programming (e.g., ecological, systemic, holistic, participatory, multi-dimensional, adaptive, complex and nonlinear frameworks)</td>
</tr>
<tr>
<td>22,14</td>
<td>19</td>
<td>Encourage people and organizations to be open and non-territorial and to think in micro and macro organizational terms</td>
</tr>
<tr>
<td>157</td>
<td>20</td>
<td>Develop new evaluation approaches that will help demonstrate the value of systems approaches in development aid programming</td>
</tr>
<tr>
<td>29</td>
<td>21</td>
<td>Reduce the overemphasis on immediate positive program impacts by taking a longer-term view</td>
</tr>
<tr>
<td>13</td>
<td>22</td>
<td>Address issues of politics and bureaucracy that hinder systems thinking</td>
</tr>
<tr>
<td>24,121</td>
<td>23</td>
<td>Develop a detailed website where donors, policy makers and practitioners can access expertise and information about systems thinking in aid</td>
</tr>
<tr>
<td>156</td>
<td>24</td>
<td>Develop a unified mission-vision across donors, sectors and between layers (e.g., national, state, community) regarding the systems approach</td>
</tr>
<tr>
<td>23</td>
<td>25</td>
<td>Reward transformation of need for services rather than just growth of service delivery</td>
</tr>
<tr>
<td>18,105</td>
<td>26</td>
<td>Demote the primacy of logical framework casual model applied to aid programmes</td>
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<tr>
<td>Determine why people make decisions not to use systems thinking or approaches</td>
<td>27</td>
<td>31,166</td>
</tr>
<tr>
<td>Ensure programmes have the best fit of staff skills to use systems lenses</td>
<td>28</td>
<td>17,167,168</td>
</tr>
<tr>
<td>Use participatory bottom up action approaches to partner with communities to co-define problems, challenges, needs, assets, and resources</td>
<td>29</td>
<td>155</td>
</tr>
<tr>
<td>Show how systems thinking/modelling can suggest actions that would not have been taken otherwise</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Develop a comprehensive manual for systems thinking approaches, methodologies, and applications to development aid programming that provides guidance and definitions on the scope and practice of systems research</td>
<td>31</td>
<td>61</td>
</tr>
<tr>
<td>Acknowledge limitations of the dominant paradigm in development aid programming (e.g., linear causality, reductionism, positivism, objectivism, logic models, program-focused)</td>
<td>32</td>
<td>16,21</td>
</tr>
<tr>
<td>Develop instruments that measure and/or evaluate systems thinking</td>
<td>33</td>
<td>33</td>
</tr>
<tr>
<td>Publish more systems thinking and modelling work in mainstream journals and international development web forums</td>
<td>34</td>
<td>32</td>
</tr>
<tr>
<td>Identify and disseminate examples of 'best practices' or 'what works' in systems thinking inside and outside aid</td>
<td>35</td>
<td>35,120,154</td>
</tr>
<tr>
<td>Integrate project planning and evaluation functions around a systems approach</td>
<td>36</td>
<td>59</td>
</tr>
<tr>
<td>Remove the constraints and relax the boundaries that hinder the success of systems approaches</td>
<td>37</td>
<td>48</td>
</tr>
<tr>
<td>Ensure the systems thinking methods and results are quality checked, maybe by developing a system similar to DCED</td>
<td>38</td>
<td>81,103</td>
</tr>
<tr>
<td>Address the personal and psychological barriers people may have to systems thinking</td>
<td>39</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Encourage forums for sustained interaction between users (decision makers) and developers (analysts) of systems models</td>
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<td>Develop technology that facilitates programme analysis and implementation from a systems perspective</td>
</tr>
<tr>
<td>49</td>
<td>42</td>
<td>Set priorities by analysing system-wide issues, rather than issues in isolation</td>
</tr>
<tr>
<td>62,118</td>
<td>43</td>
<td>Sustain multi-disciplinary teams from a broad range of sectors, international aid and science backgrounds and thinking (e.g., deductive/inductive, research/practice)</td>
</tr>
<tr>
<td>64,108</td>
<td>44</td>
<td>Encourage collaborations between researchers and practitioners by clarifying the link of systems thinking to everyday practice in development aid programming</td>
</tr>
<tr>
<td>93</td>
<td>45</td>
<td>Address the notion that systems concepts are sometimes perceived as 'difficult' or 'too complex' or too expensive</td>
</tr>
<tr>
<td>102,119,123</td>
<td>46</td>
<td>Increase funding for transdisciplinary and inter-agency collaborative projects with a systems focus</td>
</tr>
<tr>
<td>34</td>
<td>47</td>
<td>A critical mass of practitioners who are able to approach development aid programming from a non-linear perspective</td>
</tr>
<tr>
<td>80,153</td>
<td>48</td>
<td>Publish in reputable peer review journals to evidence the use systems thinking in development programmes</td>
</tr>
<tr>
<td>46,106</td>
<td>49</td>
<td>Support more funding for demonstration projects that validate systems approaches to development aid programming</td>
</tr>
<tr>
<td>57</td>
<td>50</td>
<td>Incorporate training in systems thinking throughout entire educational system from elementary school through advanced graduate degrees</td>
</tr>
<tr>
<td>63,152</td>
<td>51</td>
<td>Distance learning courses, webinars, and other educational products and services about systems thinking</td>
</tr>
<tr>
<td>66,104</td>
<td>52</td>
<td>Effective M&amp;E which is respected by external stakeholders</td>
</tr>
<tr>
<td>58</td>
<td>53</td>
<td>Donors recognition and sharing of failures</td>
</tr>
<tr>
<td>Line No.</td>
<td>Page No.</td>
<td>Text</td>
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<tr>
<td>---------</td>
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</tr>
<tr>
<td>65</td>
<td>54</td>
<td>Encourage donors to recognize and cover costs of collaboration for transdisciplinary teams working together on development aid challenges</td>
</tr>
<tr>
<td>79,107</td>
<td>55</td>
<td>Effective, accessible and affordable tools for practitioner research</td>
</tr>
<tr>
<td>45,125</td>
<td>56</td>
<td>Remove funding constraints that hinder systems approaches such as 'stove pipes' that cause managers to think in silos or categories</td>
</tr>
<tr>
<td>36,117</td>
<td>57</td>
<td>Develop project leaders that value systems thinking</td>
</tr>
<tr>
<td>68</td>
<td>58</td>
<td>Address people's fears about implementing systems approaches (e.g., job loss, too difficult, change)</td>
</tr>
<tr>
<td>92,124</td>
<td>59</td>
<td>Address the Insufficient and fragmented investment in the new systems approaches</td>
</tr>
<tr>
<td>38</td>
<td>60</td>
<td>Use an adaptive agile approach to manage an evolving portfolio of activities</td>
</tr>
<tr>
<td>44,116</td>
<td>61</td>
<td>One or more systems assessment tools that can be used by projects, organisations, donors, communities, regions, that demonstrates the mix of quantitative and qualitative evaluation methods and strategies can be used.</td>
</tr>
<tr>
<td>67</td>
<td>62</td>
<td>Build linkages with complexity specialists in different sectors</td>
</tr>
<tr>
<td>70,151</td>
<td>63</td>
<td>Address the complexity gap - difference between complexity of the challenges faced and the tools and capabilities to deal with them</td>
</tr>
<tr>
<td>78</td>
<td>64</td>
<td>Develop an industry-wide sophisticated and user friendly infrastructure for systems (including networks, knowledge and data management, synthesis, interpretation and dissemination)</td>
</tr>
<tr>
<td>37</td>
<td>65</td>
<td>Ensure that internal system of donors and programmes can support new systems approaches</td>
</tr>
<tr>
<td>82,99</td>
<td>66</td>
<td>Develop consistent (multi-year) funding streams that encourage long-term systemic research and programmes</td>
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<td>Line</td>
<td>Text</td>
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<tr>
<td>91</td>
<td>67</td>
<td>Rigorous research that demonstrates the value of systems thinking, methods, approaches and research</td>
</tr>
<tr>
<td>69,109</td>
<td>68</td>
<td>Recognize that many development problems are complex and require long-term systems approaches</td>
</tr>
<tr>
<td>94</td>
<td>69</td>
<td>Align personal performance objectives for systems thinking</td>
</tr>
<tr>
<td>100,150</td>
<td>70</td>
<td>Development of methods and tools that encourage systems approaches in research and evaluation</td>
</tr>
<tr>
<td>39</td>
<td>71</td>
<td>Lack of willingness of donors to adapt design over time with programmes being stuck with rigid logframes and targets</td>
</tr>
<tr>
<td>77,111</td>
<td>72</td>
<td>Forums that facilitate collaborative learning and knowledge sharing about systems thinking and methods</td>
</tr>
<tr>
<td>56,132</td>
<td>73</td>
<td>Develop and deliver a 'Systems Thinking' course for aid professionals</td>
</tr>
<tr>
<td>71</td>
<td>74</td>
<td>Donors to provide incentives that encourage systems thinking</td>
</tr>
<tr>
<td>83,110</td>
<td>75</td>
<td>Train donors, decision makers to manage and advocate for systems rather than programs</td>
</tr>
<tr>
<td>84</td>
<td>76</td>
<td>Understanding of whether or not systems at different levels (e.g., organizational, community, regional, state, national) can be approached using the same or similar tools</td>
</tr>
<tr>
<td>43,90,149</td>
<td>77</td>
<td>A common language for systems thinking in aid (e.g., a glossary)</td>
</tr>
<tr>
<td>50</td>
<td>78</td>
<td>Change the way data are reported to encourage and reinforce paradigm shifts toward systems modes of thinking</td>
</tr>
<tr>
<td>75</td>
<td>79</td>
<td>Use real time operational research methods to understand wicked problems, gaps between design and emerging outcomes</td>
</tr>
<tr>
<td>55,112,114</td>
<td>80</td>
<td>Ensure realistic timeframes as systemic results take time to occur</td>
</tr>
<tr>
<td>Numbers</td>
<td>81</td>
<td>Demystify words such as system, systems thinking, casual loop diagrams, network analysis, systems dynamics</td>
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<td>---------</td>
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<td>------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Numbers</td>
<td>82</td>
<td>Develop curriculum modules on systems thinking that are accessible to a wide-variety of different skill sets and previous training</td>
</tr>
<tr>
<td>Numbers</td>
<td>83</td>
<td>Develop new research, educational and technical partnerships with the private sector and with existing initiatives, centres, and institutes; especially those that specialize in systems-based approaches</td>
</tr>
<tr>
<td>Numbers</td>
<td>84</td>
<td>Develop comprehensive education/training programs about systems thinking for practitioners, researchers, and communities that support learning about the language, values and norms in other parts of the system</td>
</tr>
<tr>
<td>Numbers</td>
<td>85</td>
<td>Increase the efficacy of evaluation methods that provide continuous monitoring and assessment of progress in relation to stated objectives and specified time frames</td>
</tr>
<tr>
<td>Numbers</td>
<td>86</td>
<td>Increase research funding for exploratory research, projects and model development</td>
</tr>
<tr>
<td>Numbers</td>
<td>87</td>
<td>Enable continual M&amp;E to determine if interventions are working in concert to change the system in the chosen direction</td>
</tr>
<tr>
<td>Numbers</td>
<td>88</td>
<td>Value studying parts in their natural environments rather than studying parts in isolation</td>
</tr>
<tr>
<td>Numbers</td>
<td>89</td>
<td>Demonstrate the excitement and the potential of systems thinking through education and training that is accessible to anyone</td>
</tr>
<tr>
<td>Numbers</td>
<td>90</td>
<td>Build the evidence of benefits and costs of systems thinking</td>
</tr>
<tr>
<td>Numbers</td>
<td>91</td>
<td>Build 'mindshare' within the aid field through popular books, articles, and models</td>
</tr>
<tr>
<td>Numbers</td>
<td>92</td>
<td>Change corporate systems, processes and culture in programmes, donors to support systems thinking</td>
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<td>53,135,137</td>
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<td>40,133</td>
<td>99</td>
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</table>
## Appendix 5A: Statements by Average Ratings

<table>
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<tr>
<th>Statement number</th>
<th>Statement</th>
<th>Average Rating</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Identify and develop funding sources that will encourage systems approaches to aid programming</td>
<td>3.69</td>
</tr>
<tr>
<td>2</td>
<td>Develop skills and become more comfortable in integrating simulation and modelling approaches into research</td>
<td>3.69</td>
</tr>
<tr>
<td>3</td>
<td>Avoid over-promising what systems thinking can currently deliver</td>
<td>2.92</td>
</tr>
<tr>
<td>4</td>
<td>The traditional passive role that academia and science has played in aid policy decision-making processes needs to be more active</td>
<td>2.77</td>
</tr>
<tr>
<td>5</td>
<td>International, national, regional, state, and local 'Learning Collaborative' about systems thinking</td>
<td>3.08</td>
</tr>
<tr>
<td>6</td>
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<td>Remove the constraints and relax the boundaries that hinder the success of systems approaches</td>
<td>2.38</td>
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<td>Ensure the systems thinking methods and results are</td>
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<td><strong>39</strong></td>
<td>Address the personal and psychological barriers people may have to systems thinking</td>
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<tr>
<td><strong>40</strong></td>
<td>Encourage forums for sustained interaction between users (decision makers) and developers (analysts) of systems models</td>
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<tr>
<td><strong>41</strong></td>
<td>Develop technology that facilitates programme analysis and implementation from a systems perspective</td>
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<td><strong>42</strong></td>
<td>Set priorities by analysing system-wide issues, rather than issues in isolation</td>
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<tr>
<td><strong>43</strong></td>
<td>Sustain multi-disciplinary teams from a broad range of sectors, international aid and science backgrounds and thinking- combine research practice</td>
<td></td>
</tr>
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<td><strong>44</strong></td>
<td>Encourage collaborations between researchers and practitioners by clarifying the link of systems thinking to everyday practice in development aid programming</td>
<td></td>
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<tr>
<td><strong>45</strong></td>
<td>Address the notion that systems concepts are sometimes perceived as 'difficult' or 'too complex' or too expensive</td>
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<tr>
<td><strong>46</strong></td>
<td>Increase funding for transdisciplinary and inter-agency collaborative projects with a systems focus</td>
<td></td>
</tr>
<tr>
<td><strong>47</strong></td>
<td>A critical mass of practitioners who are able to approach development aid programming from a non-mechanistic, non-linear perspective</td>
<td></td>
</tr>
<tr>
<td><strong>48</strong></td>
<td>Publish in reputable peer review journals to evidence the use systems thinking in development programmes</td>
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</tr>
<tr>
<td><strong>49</strong></td>
<td>Support more funding for demonstration projects that validate systems approaches to development aid programming</td>
<td></td>
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<tr>
<td><strong>50</strong></td>
<td>Incorporate training in systems thinking throughout entire educational system from elementary school through advanced graduate degrees</td>
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<tr>
<td><strong>51</strong></td>
<td>Distance learning courses, webinars, and other educational products and services about systems thinking</td>
<td></td>
</tr>
<tr>
<td><strong>52</strong></td>
<td>Effective evidence through monitoring and evaluation which is respected by external stakeholders</td>
<td></td>
</tr>
<tr>
<td><strong>53</strong></td>
<td>Donors recognition and sharing of failures</td>
<td></td>
</tr>
<tr>
<td><strong>54</strong></td>
<td>Encourage donors to recognize and cover costs of collaboration for transdisciplinary teams working together on development aid challenges</td>
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</tr>
<tr>
<td><strong>55</strong></td>
<td>Effective, accessible and affordable tools for practitioner research</td>
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<tr>
<td><strong>56</strong></td>
<td>Remove funding constraints that hinder systems approaches such as 'stove pipes' that cause managers to think in silos or categories</td>
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<tr>
<td><strong>57</strong></td>
<td>Develop project leaders that value systems thinking</td>
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<tr>
<td><strong>58</strong></td>
<td>Address people's fears about implementing systems approaches (e.g., job loss, too difficult, change)</td>
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<tr>
<td>59</td>
<td>Address the Insufficient and fragmented investment in the new systems approaches</td>
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<tr>
<td>60</td>
<td>Use an adaptive agile approach to manage an evolving portfolio of activities</td>
<td>3.23</td>
</tr>
<tr>
<td>61</td>
<td>One or more systems assessment tools that can be used by projects, organisations, donors,, communities, regions, that demonstrates the mix of quantitative and qualitative evaluation methods and strategies can be used.</td>
<td>3.38</td>
</tr>
<tr>
<td>62</td>
<td>Build linkages with complexity specialists in different sectors</td>
<td>2.69</td>
</tr>
<tr>
<td>63</td>
<td>Address the complexity gap - difference between complexity of the challenges faced and the tools and capabilities to deal with them</td>
<td>3.15</td>
</tr>
<tr>
<td>64</td>
<td>Develop an industry-wide sophisticated and user friendly infrastructure for systems (including networks, knowledge and data management, synthesis, interpretation and dissemination)</td>
<td>2.62</td>
</tr>
<tr>
<td>65</td>
<td>Ensure that internal system of donors and programmes can support new systems approaches</td>
<td>3.38</td>
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<tr>
<td>66</td>
<td>Develop consistent (multi-year) funding streams that encourage long-term systemic research and programmes</td>
<td>3.69</td>
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<tr>
<td>67</td>
<td>Rigorous research that demonstrates the value of systems thinking, methods, approaches and research</td>
<td>3.31</td>
</tr>
<tr>
<td>68</td>
<td>Recognize that many development problems are complex and require long-term systems approaches</td>
<td>3.31</td>
</tr>
<tr>
<td>69</td>
<td>Align personal performance objectives for systems thinking</td>
<td>2.46</td>
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<tr>
<td>70</td>
<td>Development of methods and tools that encourage systems approaches in research and evaluation</td>
<td>3.38</td>
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<tr>
<td>71</td>
<td>Lack of willingness of donors to adapt design over time with programmes being stuck with rigid logframes and targets</td>
<td>3.46</td>
</tr>
<tr>
<td>72</td>
<td>Forums that facilitate collaborative learning and knowledge sharing about systems thinking and methods</td>
<td>3.08</td>
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<tr>
<td>73</td>
<td>Develop and deliver a 'Systems Thinking' course for aid professionals</td>
<td>3.69</td>
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<tr>
<td>74</td>
<td>Donors to provide incentives that encourage systems thinking</td>
<td>3.62</td>
</tr>
<tr>
<td>75</td>
<td>Train donors, decision makers to manage and advocate for systems rather than programs</td>
<td>3.62</td>
</tr>
<tr>
<td>76</td>
<td>Understanding of whether or not systems at different levels (e.g., organizational, community, regional, state, national) can be approached using the same or similar tools</td>
<td>3</td>
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<tr>
<td>77</td>
<td>A common language for systems thinking in aid (e.g., a glossary)</td>
<td>3</td>
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<tr>
<td>78</td>
<td>Change the way data are reported to encourage and reinforce paradigm shifts toward systems modes of</td>
<td>3.54</td>
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<tr>
<td>79</td>
<td>Use real time operational research methods to understand wicked problems, gaps between design and emerging outcomes</td>
<td>3.31</td>
</tr>
<tr>
<td>80</td>
<td>Ensure realistic timeframes as systemic results take time to occur</td>
<td>3.54</td>
</tr>
<tr>
<td>81</td>
<td>Demystify words such as system, systems thinking, casual loop diagrams, network analysis, systems dynamics</td>
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<tr>
<td>82</td>
<td>Develop curriculum modules on systems thinking that are accessible to a wide-variety of different skill sets and previous training</td>
<td>3.54</td>
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<td>83</td>
<td>Develop new research, educational and technical partnerships with the private sector and with existing initiatives, centres, and institutes; especially those that specialize in systems-based approaches</td>
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<tr>
<td>84</td>
<td>Develop comprehensive education/training programs about systems thinking for practitioners, researchers, and communities that support learning about the language, values and norms in other parts of the system</td>
<td>3.46</td>
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<td>85</td>
<td>Increase the efficacy of evaluation methods that provide continuous monitoring and assessment of progress in relation to stated objectives and specified time frames</td>
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<tr>
<td>86</td>
<td>Increase research funding for exploratory research, projects and model development</td>
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<td>87</td>
<td>Enable continual monitoring and evaluation to determine if interventions are working in concert to change the system in the chosen direction</td>
<td>3.77</td>
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<td>88</td>
<td>Value studying parts in their natural environments rather than studying parts in isolation</td>
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<td>89</td>
<td>Demonstrate the excitement and the potential of systems thinking through education and training that is accessible to anyone</td>
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<tr>
<td>90</td>
<td>Build the evidence of benefits and costs of systems thinking</td>
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<td>91</td>
<td>Build 'mindshare' within the aid field through popular books, articles, and models</td>
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<td>92</td>
<td>Change corporate systems, processes and culture in programmes, donors to support systems thinking</td>
<td>3.31</td>
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<tr>
<td>93</td>
<td>Multiple, geographically dispersed, Centres of Systems Thinking excellence providing expert technical assistance</td>
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<tr>
<td>94</td>
<td>Understand that systems thinking is a paradigm and that paradigm shifts require transformational learning rather than mere content learning</td>
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<tr>
<td>95</td>
<td>Lack of structured analytical approaches and corporate processes for dealing with complexity</td>
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<tr>
<td>96</td>
<td>Incorporate a flexible programme approach to respond quickly to opportunities and amend interventions</td>
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<td>97</td>
<td>Trial and adapt new tools including from other sectors to improve analysis and programming</td>
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<td>98</td>
<td>Interactive learning opportunities for decision-makers in aid, so that they can learn to work effectively with systems academics</td>
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<tr>
<td>99</td>
<td>Engage all the different stakeholders in any given system</td>
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<td>100</td>
<td>Move from patched approaches to systemic approaches to introduce systems thinking in aid programming</td>
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</table>
## Appendix 5B: Statements by Average Ratings and Bridging Values

<table>
<thead>
<tr>
<th>Statement number</th>
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<th>Bridging Values</th>
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<tbody>
<tr>
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<td>Identify and develop funding sources that will encourage systems approaches to aid programming</td>
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<td>0.26</td>
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<tr>
<td>2</td>
<td>Develop skills and become more comfortable in integrating simulation and modelling approaches into research</td>
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<td>3</td>
<td>Avoid over-promising what systems thinking can currently deliver</td>
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<td>0.49</td>
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<tr>
<td>4</td>
<td>The traditional passive role that academia and science has played in aid policy decision-making processes needs to be more active</td>
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<tr>
<td>5</td>
<td>International, national, regional, state, and local 'Learning Collaborative' about systems thinking</td>
<td>3.08</td>
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<td>36</td>
<td>Integrate project planning and evaluation functions around a systems approach</td>
<td>3.69</td>
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</tr>
<tr>
<td>37</td>
<td>Remove the constraints and relax the boundaries that</td>
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<tr>
<td></td>
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<tr>
<td>---</td>
<td>-------------------------------------------------------------------------------------------------------</td>
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<tr>
<td>38</td>
<td>Ensure the systems thinking methods and results are quality checked, maybe by developing a system similar to DCED</td>
<td>2.77</td>
<td>0.55</td>
</tr>
<tr>
<td>39</td>
<td>Address the personal and psychological barriers people may have to systems thinking</td>
<td>2.62</td>
<td>0.63</td>
</tr>
<tr>
<td>40</td>
<td>Encourage forums for sustained interaction between users (decision makers) and developers (analysts) of systems models</td>
<td>3.08</td>
<td>0.3</td>
</tr>
<tr>
<td>41</td>
<td>Develop technology that facilitates programme analysis and implementation from a systems perspective</td>
<td>2.62</td>
<td>0.4</td>
</tr>
<tr>
<td>42</td>
<td>Set priorities by analysing system-wide issues, rather than issues in isolation</td>
<td>3.46</td>
<td>0.39</td>
</tr>
<tr>
<td>43</td>
<td>Sustain multi-disciplinary teams from a broad range of sectors, international aid and science backgrounds and thinking - combine research practice</td>
<td>3</td>
<td>0.77</td>
</tr>
<tr>
<td>44</td>
<td>Encourage collaborations between researchers and practitioners by clarifying the link of systems thinking to everyday practice in development aid programming</td>
<td>3.15</td>
<td>0.9</td>
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<tr>
<td>45</td>
<td>Address the notion that systems concepts are sometimes perceived as 'difficult' or 'too complex' or too expensive</td>
<td>2.85</td>
<td>0.58</td>
</tr>
<tr>
<td>46</td>
<td>Increase funding for transdisciplinary and inter-agency collaborative projects with a systems focus</td>
<td>2.69</td>
<td>0.27</td>
</tr>
<tr>
<td>47</td>
<td>A critical mass of practitioners who are able to approach development aid programming from a non-mechanistic, non-linear perspective</td>
<td>3.62</td>
<td>0.61</td>
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<tr>
<td>48</td>
<td>Publish in reputable peer review journals to evidence the use systems thinking in development programmes</td>
<td>2.77</td>
<td>0.42</td>
</tr>
<tr>
<td>49</td>
<td>Support more funding for demonstration projects that validate systems approaches to development aid programming</td>
<td>3.23</td>
<td>0.67</td>
</tr>
<tr>
<td>50</td>
<td>Incorporate training in systems thinking throughout entire educational system from elementary school through advanced graduate degrees</td>
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<tr>
<td>51</td>
<td>Distance learning courses, webinars, and other educational products and services about systems thinking</td>
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<tr>
<td>52</td>
<td>Effective evidence through monitoring and evaluation which is respected by external stakeholders</td>
<td>3.54</td>
<td>0.44</td>
</tr>
<tr>
<td>53</td>
<td>Donors recognition and sharing of failures</td>
<td>3.62</td>
<td>0.78</td>
</tr>
<tr>
<td>54</td>
<td>Encourage donors to recognize and cover costs of collaboration for transdisciplinary teams working together on development aid challenges</td>
<td>2.92</td>
<td>0.24</td>
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<td>55</td>
<td>Effective, accessible and affordable tools for practitioner research</td>
<td>3.92</td>
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<td>56</td>
<td>Remove funding constraints that hinder systems approaches such as 'stove pipes' that cause managers to think in silos or categories</td>
<td>3.38</td>
<td>0.39</td>
</tr>
<tr>
<td>57</td>
<td>Develop project leaders that value systems thinking</td>
<td>4.38</td>
<td>0.44</td>
</tr>
<tr>
<td>58</td>
<td>Address people's fears about implementing systems approaches (e.g., job loss, too difficult, change)</td>
<td>2.85</td>
<td>0.42</td>
</tr>
<tr>
<td>59</td>
<td>Address the Insufficient and fragmented investment in the new systems approaches</td>
<td>2.77</td>
<td>0.5</td>
</tr>
<tr>
<td>60</td>
<td>Use an adaptive agile approach to manage an evolving portfolio of activities</td>
<td>3.23</td>
<td>0.47</td>
</tr>
<tr>
<td>61</td>
<td>One or more systems assessment tools that can be used by projects, organisations, donors, communities, regions, that demonstrates the mix of quantitative and qualitative evaluation methods and strategies can be used.</td>
<td>3.38</td>
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<tr>
<td>62</td>
<td>Build linkages with complexity specialists in different sectors</td>
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<tr>
<td>63</td>
<td>Address the complexity gap - difference between complexity of the challenges faced and the tools and capabilities to deal with them</td>
<td>3.15</td>
<td>0.59</td>
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<tr>
<td>64</td>
<td>Develop an industry-wide sophisticated and user friendly infrastructure for systems (including networks, knowledge and data management, synthesis, interpretation and dissemination)</td>
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<tr>
<td>65</td>
<td>Ensure that internal system of donors and programmes can support new systems approaches</td>
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<td>0.54</td>
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<tr>
<td>66</td>
<td>Develop consistent (multi-year) funding streams that encourage long-term systemic research and programmes</td>
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<tr>
<td>67</td>
<td>Rigorous research that demonstrates the value of systems thinking, methods, approaches and research</td>
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<td>0.63</td>
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<tr>
<td>68</td>
<td>Recognize that many development problems are complex and require long-term systems approaches</td>
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<td>0.75</td>
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<td>Align personal performance objectives for systems thinking</td>
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<td>70</td>
<td>Development of methods and tools that encourage systems approaches in research and evaluation</td>
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<td>0.4</td>
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<tr>
<td>71</td>
<td>Lack of willingness of donors to adapt design over time with programmes being stuck with rigid logframes and targets</td>
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<tr>
<td>72</td>
<td>Forums that facilitate collaborative learning and knowledge sharing about systems thinking and methods</td>
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<tr>
<td>73</td>
<td>Develop and deliver a 'Systems Thinking' course for aid professionals</td>
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<tr>
<td>74</td>
<td>Donors to provide incentives that encourage systems thinking</td>
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<td>0.24</td>
</tr>
<tr>
<td>75</td>
<td>Train donors, decision makers to manage and advocate for systems rather than programs</td>
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</tr>
<tr>
<td></td>
<td>Description</td>
<td>Score</td>
<td>Weight</td>
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<td>---</td>
<td>-----------------------------------------------------------------------------</td>
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<td>--------</td>
</tr>
<tr>
<td>76</td>
<td>Understanding of whether or not systems at different levels (e.g., organizational, community, regional, state, national) can be approached using the same or similar tools</td>
<td>3</td>
<td>0.55</td>
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<tr>
<td>77</td>
<td>A common language for systems thinking in aid (e.g., a glossary)</td>
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<tr>
<td>78</td>
<td>Change the way data are reported to encourage and reinforce paradigm shifts toward systems modes of thinking</td>
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<td>0.53</td>
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<tr>
<td>79</td>
<td>Use real time operational research methods to understand wicked problems, gaps between design and emerging outcomes</td>
<td>3.31</td>
<td>0.47</td>
</tr>
<tr>
<td>80</td>
<td>Ensure realistic timeframes as systemic results take time to occur</td>
<td>3.54</td>
<td>0.37</td>
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<tr>
<td>81</td>
<td>Demystify words such as system, systems thinking, casual loop diagrams, network analysis, systems dynamics</td>
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<tr>
<td>82</td>
<td>Develop curriculum modules on systems thinking that are accessible to a wide-variety of different skill sets and previous training</td>
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<tr>
<td>83</td>
<td>Develop new research, educational and technical partnerships with the private sector and with existing initiatives, centres, and institutes; especially those that specialize in systems-based approaches</td>
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<tr>
<td>84</td>
<td>Develop comprehensive education/training programs about systems thinking for practitioners, researchers, and communities that support learning about the language, values and norms in other parts of the system</td>
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<tr>
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<td>Increase the efficacy of evaluation methods that provide continuous monitoring and assessment of progress in relation to stated objectives and specified time frames</td>
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<tr>
<td>86</td>
<td>Increase research funding for exploratory research, projects and model development</td>
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<tr>
<td>87</td>
<td>Enable continual monitoring and evaluation to determine if interventions are working in concert to change the system in the chosen direction</td>
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<td>88</td>
<td>Value studying parts in their natural environments rather than studying parts in isolation</td>
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<td>89</td>
<td>Demonstrate the excitement and the potential of systems thinking through education and training that is accessible to anyone</td>
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<tr>
<td>90</td>
<td>Build the evidence of benefits and costs of systems thinking</td>
<td>4</td>
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<tr>
<td>91</td>
<td>Build 'mindshare' within the aid field through popular books, articles, and models</td>
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<td>0.91</td>
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<tr>
<td>92</td>
<td>Change corporate systems, processes and culture in programmes, donors to support systems thinking</td>
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<td>0.57</td>
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<tr>
<td></td>
<td>Description</td>
<td>Score</td>
<td>Percentage</td>
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<td>---</td>
<td>-----------------------------------------------------------------------------</td>
<td>-------</td>
<td>------------</td>
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<tr>
<td>93</td>
<td>Multiple, geographically dispersed, Centres of Systems Thinking excellence providing expert technical assistance</td>
<td>2.31</td>
<td>0.88</td>
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<tr>
<td>94</td>
<td>Understand that systems thinking is a paradigm and that paradigm shifts require transformational learning rather than mere content learning</td>
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<td>0.46</td>
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<td>95</td>
<td>Lack of structured analytical approaches and corporate processes for dealing with complexity</td>
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<td>0.71</td>
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<tr>
<td>96</td>
<td>Incorporate a flexible programme approach to respond quickly to opportunities and amend interventions</td>
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<td>0.45</td>
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<tr>
<td>97</td>
<td>Trial and adapt new tools including from other sectors to improve analysis and programming</td>
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<tr>
<td>98</td>
<td>Interactive learning opportunities for decision-makers in aid, so that they can learn to work effectively with systems academics</td>
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<td>0.83</td>
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<tr>
<td>99</td>
<td>Engage all the different stakeholders in any given system</td>
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<tr>
<td>100</td>
<td>Move from patched approaches to systemic approaches to introduce systems thinking in aid programming</td>
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</table>
### Appendix 5C: Statements by Cluster and Average Ratings

<table>
<thead>
<tr>
<th>Cluster (Domain)</th>
<th>Statement #</th>
<th>Statement</th>
<th>Average Rating</th>
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<tbody>
<tr>
<td>1. Support funding of systems approaches</td>
<td>15</td>
<td>Remove funding constraints that cause fragmentation of grant proposals or programs and confine development issues to narrow interpretations, actions and thinking</td>
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<tr>
<td></td>
<td>1</td>
<td>Identify and develop funding sources that will encourage systems approaches to aid programming</td>
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<td>66</td>
<td>Develop consistent (multi-year) funding streams that encourage long-term systemic research and programmes</td>
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<td></td>
<td>53</td>
<td>Donors recognition and sharing of failures</td>
<td>3.62</td>
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<tr>
<td></td>
<td>56</td>
<td>Remove funding constraints that hinder systems approaches such as 'stove pipes' that cause managers to think in silos or categories</td>
<td>3.38</td>
</tr>
<tr>
<td></td>
<td>65</td>
<td>Ensure that internal system of donors and programmes can support new systems approaches</td>
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<tr>
<td></td>
<td>49</td>
<td>Support more funding for demonstration projects that validate systems approaches to development aid programming</td>
<td>3.23</td>
</tr>
<tr>
<td></td>
<td>86</td>
<td>Increase research funding for exploratory research, projects and model development</td>
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</tr>
<tr>
<td></td>
<td>54</td>
<td>Encourage donors to recognize and cover costs of collaboration for transdisciplinary teams working together on development aid challenges</td>
<td>2.92</td>
</tr>
<tr>
<td></td>
<td>59</td>
<td>Address the Insufficient and fragmented investment in the new systems approaches</td>
<td>2.77</td>
</tr>
<tr>
<td></td>
<td>46</td>
<td>Increase funding for transdisciplinary and inter-agency collaborative projects with a systems focus</td>
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<tr>
<td>2. Change existing systems and processes</td>
<td>21</td>
<td>Reduce the overemphasis on immediate</td>
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<tr>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td></td>
<td>positive program impacts by taking a longer-term view</td>
<td></td>
<td></td>
</tr>
<tr>
<td>74</td>
<td>Donors to provide incentives that encourage systems thinking</td>
<td>3.62</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>Ensure realistic timeframes as systemic results take time to occur</td>
<td>3.54</td>
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</tr>
<tr>
<td>71</td>
<td>Lack of willingness of donors to adapt design over time with programmes being stuck with rigid logframes and targets</td>
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</tr>
<tr>
<td>92</td>
<td>Change corporate systems, processes and culture in programmes, donors to support systems thinking</td>
<td>3.31</td>
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</tr>
<tr>
<td>29</td>
<td>Use participatory bottom up action approaches to partner with communities to co-define problems, challenges, needs, assets, and resources</td>
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<tr>
<td>22</td>
<td>Address issues of politics and bureaucracy that hinder systems thinking</td>
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<tr>
<td>3</td>
<td>Avoid over-promising what systems thinking can currently deliver</td>
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<tr>
<td>9</td>
<td>Overcome the problem of focus on and loyalty to the goals and outcomes of donors and programmes</td>
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<tr>
<td>37</td>
<td>Remove the constraints and relax the boundaries that hinder the success of systems approaches</td>
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<td>24</td>
<td>Develop a unified mission-vision across donors, sectors and between layers (e.g., national, state, community) regarding the systems approach</td>
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<tr>
<td>3. Address existing mental models</td>
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<tr>
<td>12</td>
<td>Develop organizations in which learning is encouraged, being wrong is okay and taking risks is rewarded</td>
<td>3.34</td>
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<tr>
<td>14</td>
<td>New mindsets of project leaders, practitioners able to deal with uncertainty and risk inherent in working in complex systems</td>
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</tr>
<tr>
<td>100</td>
<td>Move from patched approaches to systemic approaches to introduce systems thinking in aid programming</td>
<td>4.15</td>
<td></td>
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<tr>
<td>28</td>
<td>Ensure programmes have the best fit of staff skills to use systems lenses</td>
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<tr>
<td>16</td>
<td>Integrate organisational and project planning and evaluation functions around a systems approach</td>
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</tr>
<tr>
<td>87</td>
<td>Enable continual monitoring and</td>
<td>3.77</td>
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<tr>
<td>#</td>
<td>Task Description</td>
<td>Score</td>
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<tr>
<td>36</td>
<td>Integrate project planning and evaluation functions around a systems approach</td>
<td>3.69</td>
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</tr>
<tr>
<td>18</td>
<td>Recognize the importance of a systems paradigm to development aid programming (e.g., ecological, systemic, holistic, participatory, multi-dimensional, adaptive, complex and nonlinear frameworks)</td>
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<tr>
<td>78</td>
<td>Change the way data are reported to encourage and reinforce paradigm shifts toward systems modes of thinking</td>
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</tr>
<tr>
<td>96</td>
<td>Incorporate a flexible programme approach to respond quickly to opportunities and amend interventions</td>
<td>3.54</td>
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<tr>
<td>11</td>
<td>Reflective time for people and teams to think about systems</td>
<td>3.46</td>
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<tr>
<td>42</td>
<td>Set priorities by analysing system-wide issues, rather than issues in isolation</td>
<td>3.46</td>
<td></td>
</tr>
<tr>
<td>68</td>
<td>Recognize that many development problems are complex and require long-term systems approaches</td>
<td>3.31</td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>Use an adaptive agile approach to manage an evolving portfolio of activities</td>
<td>3.23</td>
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</tr>
<tr>
<td>19</td>
<td>Encourage people and organizations to be open and non-territorial and to think in micro and macro organizational terms</td>
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<tr>
<td>32</td>
<td>Acknowledge the limitations of the dominant paradigm in development aid programming (e.g., linear causality, reductionism, positivism, objectivism, logic models, program-focused)</td>
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<tr>
<td>95</td>
<td>Lack of structured analytical approaches and corporate processes for dealing with complexity</td>
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<tr>
<td>26</td>
<td>Demote the primacy of logical framework casual model applied to aid programmes</td>
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<tr>
<td>45</td>
<td>Address the notion that systems concepts are sometimes perceived as 'difficult' or 'too complex' or too expensive</td>
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<td></td>
</tr>
<tr>
<td>58</td>
<td>Address people's fears about implementing systems approaches (e.g., job loss, too difficult, change)</td>
<td>2.85</td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>Ensure the systems thinking methods and results are quality checked, maybe by developing a system similar to DCED</td>
<td>2.77</td>
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<td></td>
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<td>-----------------------------------------------------------------</td>
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</tr>
<tr>
<td>39</td>
<td>Address the personal and psychological barriers people may have to systems thinking</td>
<td>2.62</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Determine why people make decisions not to use systems thinking or approaches</td>
<td>2.62</td>
<td></td>
</tr>
<tr>
<td>69</td>
<td>Align personal performance objectives for systems thinking</td>
<td>2.46</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Reward transformation of need for services rather than just growth of service delivery</td>
<td>2.23</td>
<td></td>
</tr>
</tbody>
</table>

4. Use systems tools, techniques and approaches

<p>| | | | |</p>
<table>
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</thead>
<tbody>
<tr>
<td>20</td>
<td>Develop new evaluation approaches that will help demonstrate the value of systems approaches in development aid programming</td>
<td>3.29</td>
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</tr>
<tr>
<td>55</td>
<td>Effective, accessible and affordable tools for practitioner research</td>
<td>4</td>
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</tr>
<tr>
<td>33</td>
<td>Develop instruments that measure and/or evaluate systems thinking</td>
<td>3.92</td>
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<tr>
<td>97</td>
<td>Trial and adapt new tools including from other sectors to improve analysis and programming</td>
<td>3.62</td>
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<tr>
<td>52</td>
<td>Effective evidence through monitoring and evaluation which is respected by external stakeholders</td>
<td>3.54</td>
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<tr>
<td>85</td>
<td>Increase the efficacy of evaluation methods that provide continuous monitoring and assessment of progress in relation to stated objectives and specified time frames</td>
<td>3.54</td>
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<tr>
<td>61</td>
<td>One or more systems assessment tools that can be used by projects, organisations, donors, communities, regions, that demonstrates the mix of quantitative and qualitative evaluation methods and strategies can be used.</td>
<td>3.38</td>
<td></td>
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<tr>
<td>70</td>
<td>Development of methods and tools that encourage systems approaches in research and evaluation</td>
<td>3.38</td>
<td></td>
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<tr>
<td>17</td>
<td>Identify new tools and techniques that can support better understanding of complex problems</td>
<td>3.31</td>
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<tr>
<td>79</td>
<td>Use real time operational research methods to understand wicked problems, gaps between design and emerging outcomes</td>
<td>3.31</td>
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<tr>
<td></td>
<td>Address the complexity gap - difference between complexity of the challenges faced and the tools and capabilities to deal with them</td>
<td>3.15</td>
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<tr>
<td>63</td>
<td>Understanding of whether or not systems at different levels (e.g., organizational, community, regional, state, national) can be approached using the same or similar tools</td>
<td>3</td>
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<tr>
<td>76</td>
<td>Develop technology that facilitates programme analysis and implementation from a systems perspective</td>
<td>2.62</td>
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<tr>
<td>41</td>
<td>Differentiating between analytic approaches that are data-based from those that are conceptual</td>
<td>2.62</td>
<td></td>
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<tr>
<td>13</td>
<td>Value studying parts in their natural environments rather than studying parts in isolation</td>
<td>2.38</td>
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<tr>
<td>88</td>
<td>5. Develop skills and capacity for systems thinking</td>
<td>3.45</td>
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</tr>
<tr>
<td>57</td>
<td>Develop project leaders that value systems thinking</td>
<td>4.38</td>
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<tr>
<td>7</td>
<td>Train practitioners in the facilitation skills that are needed to employ many systems approaches</td>
<td>3.92</td>
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<tr>
<td>6</td>
<td>Training and education in systems research techniques for development practitioners</td>
<td>3.92</td>
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</tr>
<tr>
<td>73</td>
<td>Develop and deliver a 'Systems Thinking' course for aid professionals</td>
<td>3.69</td>
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<tr>
<td>2</td>
<td>Develop skills and become more comfortable in integrating simulation and modelling approaches into research</td>
<td>3.69</td>
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</tr>
<tr>
<td>47</td>
<td>A critical mass of practitioners who are able to approach development aid programming from a non-mechanistic, non-linear perspective</td>
<td>3.62</td>
<td></td>
</tr>
<tr>
<td>75</td>
<td>Train donors, decision makers to manage and advocate for systems rather than programs</td>
<td>3.62</td>
<td></td>
</tr>
<tr>
<td>82</td>
<td>Develop curriculum modules on systems thinking that are accessible to a wide-variety of different skill sets and previous training</td>
<td>3.54</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Include conceptual education and training in systems thinking and methods for novice and advanced individuals</td>
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<td></td>
<td>Description</td>
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<tr>
<td>84</td>
<td>Develop comprehensive education/training programs about systems thinking for practitioners, researchers, and communities that support learning about the language, values and norms in other parts of the system</td>
<td>3.46</td>
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</tr>
<tr>
<td>67</td>
<td>Rigorous research that demonstrates the value of systems thinking, methods, approaches and research</td>
<td>3.31</td>
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<tr>
<td>51</td>
<td>Distance learning courses, webinars, and other educational products and services about systems thinking</td>
<td>3.23</td>
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</tr>
<tr>
<td>81</td>
<td>Demystify words such as system, systems thinking, casual loop diagrams, network analysis, systems dynamics</td>
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<tr>
<td>89</td>
<td>Demonstrate the excitement and the potential of systems thinking through education and training that is accessible to anyone</td>
<td>2.85</td>
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<tr>
<td>94</td>
<td>Understand that systems thinking is a paradigm and that paradigm shifts require transformational learning rather than mere content learning</td>
<td>2.85</td>
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<tr>
<td>50</td>
<td>Incorporate training in systems thinking throughout entire educational system from elementary school through advanced graduate degrees</td>
<td>2.62</td>
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<tr>
<td>90</td>
<td>Build the evidence of benefits and costs of systems thinking</td>
<td>2.99</td>
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</tr>
<tr>
<td>35</td>
<td>Identify and disseminate examples of 'best practices' or 'what works' in systems thinking inside and outside aid</td>
<td>3.85</td>
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<tr>
<td>30</td>
<td>Show how systems thinking can suggest actions that would not have been taken otherwise</td>
<td>3.23</td>
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<tr>
<td>44</td>
<td>Encourage collaborations between researchers and practitioners by clarifying the link of systems thinking to everyday practice in development aid programming</td>
<td>3.15</td>
<td></td>
</tr>
<tr>
<td>72</td>
<td>Forums that facilitate collaborative learning and knowledge sharing about systems thinking and methods</td>
<td>3.08</td>
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</tr>
<tr>
<td>31</td>
<td>Develop a comprehensive 'manual' for systems thinking approaches,</td>
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<tr>
<td>5</td>
<td>International, national, regional, state, and local 'Learning Collaborative' about systems thinking</td>
<td>3.08</td>
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</tr>
<tr>
<td>40</td>
<td>Encourage forums for sustained interaction between users (decision makers) and developers (analysts) of systems models</td>
<td>3.08</td>
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</tr>
<tr>
<td>83</td>
<td>Develop new research, educational and technical partnerships with the private sector and with existing initiatives, centres, and institutes; especially those that specialize in systems-based approaches</td>
<td>3.08</td>
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</tr>
<tr>
<td>43</td>
<td>Sustain multi-disciplinary teams from a broad range of sectors, international aid and science backgrounds and thinking-combine research practice</td>
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<tr>
<td>98</td>
<td>Interactive learning opportunities for decision-makers in aid, so that they can learn to work effectively with systems academics</td>
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<tr>
<td>77</td>
<td>A common language for systems thinking in aid (e.g., a glossary)</td>
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<tr>
<td>99</td>
<td>Engage all the different stakeholders in any given system</td>
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<tr>
<td>91</td>
<td>Build 'mindshare' within the aid field through popular books, articles, and models</td>
<td>2.92</td>
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<tr>
<td>34</td>
<td>Publish more systems thinking and modelling work in mainstream journals and international development web forums</td>
<td>2.85</td>
<td></td>
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<tr>
<td>4</td>
<td>The traditional passive role that academia and science has played in aid policy decision-making processes needs to be more active</td>
<td>2.77</td>
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<tr>
<td>48</td>
<td>Publish in reputable peer review journals to evidence the use systems thinking in development programmes</td>
<td>2.77</td>
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<tr>
<td>62</td>
<td>Build linkages with complexity specialists in different sectors</td>
<td>2.69</td>
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<tr>
<td>23</td>
<td>Develop a detailed website where donors, policy makers and practitioners can access expertise and information about systems thinking in aid</td>
<td>2.62</td>
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<tr>
<td>64</td>
<td>Develop an industry-wide sophisticated</td>
<td>2.62</td>
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<td>Description</td>
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<tr>
<td>8</td>
<td>Establish simple opportunities to 'get to know' people outside of one's traditional arena</td>
<td>2.54</td>
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</tr>
<tr>
<td>93</td>
<td>Multiple, geographically dispersed, Centres of Systems Thinking excellence providing expert technical assistance</td>
<td>2.31</td>
<td></td>
</tr>
</tbody>
</table>

and user friendly infrastructure for systems (including networks, knowledge and data management, synthesis, interpretation and dissemination)
## Appendix 5D: Statements by Cluster and Average Bridging Values

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Statement #</th>
<th>Statement</th>
<th>Bridging</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Support funding of systems approaches</td>
<td></td>
<td><strong>Remove funding constraints that cause fragmentation of grant proposals or programs and confine development issues to narrow interpretations, actions and thinking</strong></td>
<td>0.45</td>
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<tr>
<td></td>
<td>15</td>
<td><strong>Remove funding constraints that cause fragmentation of grant proposals or programs and confine development issues to narrow interpretations, actions and thinking</strong></td>
<td>0.13</td>
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<tr>
<td></td>
<td>66</td>
<td><strong>Develop consistent (multi-year) funding streams that encourage long-term systemic research and programmes</strong></td>
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<tr>
<td></td>
<td>54</td>
<td><strong>Encourage donors to recognize and cover costs of collaboration for transdisciplinary teams working together on development aid challenges</strong></td>
<td>0.24</td>
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<tr>
<td></td>
<td>1</td>
<td><strong>Identify and develop funding sources that will encourage systems approaches to aid programming</strong></td>
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<tr>
<td></td>
<td>46</td>
<td><strong>Increase funding for transdisciplinary and inter-agency collaborative projects with a systems focus</strong></td>
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<tr>
<td></td>
<td>56</td>
<td><strong>Remove funding constraints that hinder systems approaches such as 'stove pipes' that cause managers to think in silos or categories</strong></td>
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</tr>
<tr>
<td></td>
<td>59</td>
<td><strong>Address the Insufficient and fragmented investment in the new systems approaches</strong></td>
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<tr>
<td></td>
<td>65</td>
<td><strong>Ensure that internal system of donors and programmes can support new systems approaches</strong></td>
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<tr>
<td></td>
<td>49</td>
<td><strong>Support more funding for demonstration projects that validate systems approaches to development aid programming</strong></td>
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<tr>
<td></td>
<td>53</td>
<td><strong>Donors recognition and sharing of failures</strong></td>
<td>0.78</td>
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<tr>
<td></td>
<td>86</td>
<td><strong>Increase research funding for exploratory research, projects and model development</strong></td>
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</tr>
<tr>
<td>2. Change existing systems and processes</td>
<td></td>
<td><strong>Donors to provide incentives that encourage systems thinking</strong></td>
<td>0.41</td>
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<td></td>
<td>74</td>
<td><strong>Donors to provide incentives that encourage systems thinking</strong></td>
<td>0.24</td>
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<tr>
<td></td>
<td>71</td>
<td><strong>Lack of willingness of donors to adapt design over time with programmes being</strong></td>
<td>0.24</td>
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<td></td>
<td>Description</td>
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<tr>
<td>22</td>
<td>Address issues of politics and bureaucracy that hinder systems thinking</td>
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<tr>
<td>21</td>
<td>Reduce the overemphasis on immediate positive program impacts by taking a</td>
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<td></td>
<td>longer-term view</td>
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<tr>
<td>9</td>
<td>Overcome the problem of focus on and loyalty to the goals and outcomes of</td>
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<td></td>
<td>donors and programmes</td>
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<tr>
<td>80</td>
<td>Ensure realistic timeframes as systemic solutions take time to occur</td>
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<tr>
<td>37</td>
<td>Remove the constraints and relax the boundaries that hinder the success of</td>
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<tr>
<td></td>
<td>systems approaches</td>
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<tr>
<td>29</td>
<td>Use participatory bottom up action</td>
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<tr>
<td></td>
<td>approaches to partner with communities to co-define problems, challenges,</td>
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<td></td>
<td>needs, assets, and resources</td>
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<td>3</td>
<td>Avoid over-promising what systems thinking can currently deliver</td>
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<tr>
<td>92</td>
<td>Change corporate systems, processes and culture in programmes, donors to</td>
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<td></td>
<td>support systems thinking</td>
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<tr>
<td>24</td>
<td>Develop a unified mission-vision across donors, sectors and between layers</td>
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<tr>
<td></td>
<td>(e.g., national, state, community) regarding the systems approach</td>
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<td></td>
<td>3. Address existing mental models</td>
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<tr>
<td>19</td>
<td>Encourage people and organizations to be open and non-territorial and to</td>
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<td></td>
<td>think in micro and macro organizational terms</td>
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<tr>
<td>25</td>
<td>Reward transformation of need for services rather than just growth of service</td>
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<td></td>
<td>delivery</td>
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<tr>
<td>100</td>
<td>Move from patched approaches to systemic approaches to introduce systems</td>
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<tr>
<td></td>
<td>thinking in aid programming</td>
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<tr>
<td>42</td>
<td>Set priorities by analysing system-wide issues, rather than issues in</td>
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<tr>
<td></td>
<td>isolation</td>
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<td>69</td>
<td>Align personal performance objectives for systems thinking</td>
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<tr>
<td>16</td>
<td>Integrate organisational and project</td>
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<tr>
<td></td>
<td>planning and evaluation functions around a systems approach</td>
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<tr>
<td>18</td>
<td>Recognize the importance of a systems paradigm to development aid</td>
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<tr>
<td>58</td>
<td>Address people's fears about implementing systems approaches (e.g., job loss, too difficult, change)</td>
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<tr>
<td>12</td>
<td>Develop organizations in which learning is encouraged, being wrong is okay and taking risks is rewarded</td>
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<td>96</td>
<td>Incorporate a flexible programme approach to respond quickly to opportunities and amend interventions</td>
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<tr>
<td>60</td>
<td>Use an adaptive agile approach to manage an evolving portfolio of activities</td>
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<td>26</td>
<td>Demote the primacy of logical framework casual model applied to aid programmes</td>
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<td>27</td>
<td>Determine why people make decisions not to use systems thinking or approaches</td>
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<tr>
<td>11</td>
<td>Reflective time for people and teams to think about systems</td>
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<td>78</td>
<td>Change the way data are reported to encourage and reinforce paradigm shifts toward systems modes of thinking</td>
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<tr>
<td>38</td>
<td>Ensure the systems thinking methods and results are quality checked, maybe by developing a system similar to DCED</td>
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<tr>
<td>45</td>
<td>Address the notion that systems concepts are sometimes perceived as 'difficult' or 'too complex' or too expensive</td>
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<tr>
<td>28</td>
<td>Ensure programmes have the best fit of staff skills to use systems lenses</td>
<td>0.6</td>
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<tr>
<td>39</td>
<td>Address the personal and psychological barriers people may have to systems thinking</td>
<td>0.63</td>
<td></td>
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<tr>
<td>32</td>
<td>Acknowledge the limitations of the dominant paradigm in development aid programming (e.g., linear causality, reductionism, positivism, objectivism, logic models, program-focused)</td>
<td>0.63</td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>Integrate project planning and evaluation functions around a systems approach</td>
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<tr>
<td>87</td>
<td>Enable continual monitoring and evaluation to determine if interventions are working in concert to change the system in the chosen direction</td>
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<tr>
<td>95</td>
<td>Lack of structured analytical approaches and corporate processes for dealing with complexity</td>
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<tr>
<td>68</td>
<td>Recognize that many development problems are complex and require long-term systems approaches</td>
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<tr>
<td>14</td>
<td>New mindsets of project leaders, practitioners able to deal with uncertainty and risk inherent in working in complex systems</td>
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<td>4</td>
<td>Use systems tools, techniques and approaches</td>
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<tr>
<td>61</td>
<td>One or more systems assessment tools that can be used by projects, organisations, donors, communities, regions, that demonstrates the mix of quantitative and qualitative evaluation methods and strategies can be used.</td>
<td>0.43</td>
<td></td>
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<tr>
<td>17</td>
<td>Identify new tools and techniques that can support better understanding of complex problems</td>
<td>0.25</td>
<td></td>
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<tr>
<td>97</td>
<td>Trial and adapt new tools including from other sectors to improve analysis and programming</td>
<td>0.3</td>
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<tr>
<td>20</td>
<td>Develop new evaluation approaches that will help demonstrate the value of systems approaches in development aid programming</td>
<td>0.35</td>
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<tr>
<td>70</td>
<td>Development of methods and tools that encourage systems approaches in research and evaluation</td>
<td>0.37</td>
<td></td>
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<tr>
<td>41</td>
<td>Develop technology that facilitates programme analysis and implementation from a systems perspective</td>
<td>0.4</td>
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<td>88</td>
<td>Value studying parts in their natural environments rather than studying parts in isolation</td>
<td>0.4</td>
<td></td>
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<tr>
<td>52</td>
<td>Effective evidence through monitoring and evaluation which is respected by external stakeholders</td>
<td>0.41</td>
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<tr>
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<td>Increase the efficacy of evaluation methods that provide continuous monitoring and assessment of progress in relation to stated objectives and specified time frames</td>
<td>0.44</td>
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<td>Use real time operational research methods to understand wicked problems, gaps between design and emerging outcomes</td>
<td>0.46</td>
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<tr>
<td>33</td>
<td>Develop instruments that measure and/or</td>
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<td></td>
<td>evaluate systems thinking</td>
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<tr>
<td>55</td>
<td>Effective, accessible and affordable tools for practitioner research</td>
<td>0.5</td>
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<tr>
<td>13</td>
<td>Differentiating between analytic approaches that are data-based from those that are conceptual</td>
<td>0.51</td>
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<td>76</td>
<td>Understanding of whether or not systems at different levels (e.g., organizational, community, regional, state, national) can be approached using the same or similar tools</td>
<td>0.55</td>
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<tr>
<td>63</td>
<td>Address the complexity gap - difference between complexity of the challenges faced and the tools and capabilities to deal with them</td>
<td>0.59</td>
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5. Develop skills and capacity for systems thinking

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<tr>
<td>51</td>
<td>Distance learning courses, webinars, and other educational products and services about systems thinking</td>
<td>0.27</td>
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<tr>
<td>82</td>
<td>Develop curriculum modules on systems thinking that are accessible to a wide-variety of different skill sets and previous training</td>
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<td>6</td>
<td>Training and education in systems research techniques for development practitioners</td>
<td>0.01</td>
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<td>7</td>
<td>Train practitioners in the facilitation skills that are needed to employ many systems approaches</td>
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<td>10</td>
<td>Include conceptual education and training in systems thinking and methods for novice and advanced individuals</td>
<td>0.04</td>
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<td>84</td>
<td>Develop comprehensive education/training programs about systems thinking for practitioners, researchers, and communities that support learning about the language, values and norms in other parts of the system</td>
<td>0.1</td>
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<td>50</td>
<td>Incorporate training in systems thinking throughout entire educational system from elementary school through advanced graduate degrees</td>
<td>0.12</td>
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<td>Develop skills and become more comfortable in integrating simulation and modelling approaches into research</td>
<td>0.16</td>
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<td>73</td>
<td>Develop and deliver a 'Systems Thinking'</td>
<td>0.21</td>
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<td>89</td>
<td>Demonstrate the excitement and the potential of systems thinking through education and training that is accessible to anyone</td>
<td>0.29</td>
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<td>57</td>
<td>Develop project leaders that value systems thinking</td>
<td>0.44</td>
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<td>94</td>
<td>Understand that systems thinking is a paradigm and that paradigm shifts require transformational learning rather than mere content learning</td>
<td>0.46</td>
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<td>81</td>
<td>Demystify words such as system, systems thinking, casual loop diagrams, network analysis, systems dynamics</td>
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<td>47</td>
<td>A critical mass of practitioners who are able to approach development aid programming from a non-mechanistic, non-linear perspective</td>
<td>0.61</td>
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<td>75</td>
<td>Train donors, decision makers to manage and advocate for systems rather than programs</td>
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<td>67</td>
<td>Rigorous research that demonstrates the value of systems thinking, methods, approaches and research</td>
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<td>6. Show the potential of systems thinking</td>
<td>Encourage forums for sustained interaction between users (decision makers) and developers (analysts) of systems models</td>
<td>0.71</td>
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<td>40</td>
<td>Publish more systems thinking and modelling work in mainstream journals and international development web forums</td>
<td>0.3</td>
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<td>34</td>
<td>Identify and disseminate examples of 'best practices' or 'what works' in systems thinking inside and outside aid</td>
<td>0.38</td>
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<td>35</td>
<td>Forums that facilitate collaborative learning and knowledge sharing about systems thinking and methods</td>
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<td>Publish in reputable peer review journals to evidence the use systems thinking in development programmes</td>
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<td>83</td>
<td>Develop new research, educational and technical partnerships with the private sector and with existing initiatives, centres, and institutes; especially those that specialize in systems-based approaches</td>
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<td>5</td>
<td>International, national, regional, state, and local 'Learning Collaborative' about systems thinking</td>
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<td>23</td>
<td>Develop a detailed website where donors, policy makers and practitioners can access expertise and information about systems thinking in aid</td>
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<td>Establish simple opportunities to 'get to know' people outside of one's traditional arena</td>
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<td>30</td>
<td>Show how systems thinking can suggest actions that would not have been taken otherwise</td>
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<td>Develop a comprehensive 'manual' for systems thinking approaches, methodologies, and applications to development aid programming that provides guidance and definitions on the scope and practice of systems research</td>
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<td>Sustain multi-disciplinary teams from a broad range of sectors, international aid and science backgrounds and thinking-combine research practice</td>
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<td>Build the evidence of benefits and costs of systems thinking</td>
<td>0.79</td>
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<td>62</td>
<td>Build linkages with complexity specialists in different sectors</td>
<td>0.8</td>
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<td>A common language for systems thinking in aid (e.g., a glossary)</td>
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<td>Interactive learning opportunities for decision-makers in aid, so that they can learn to work effectively with systems academics</td>
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<td>93</td>
<td>Multiple, geographically dispersed, Centres of Systems Thinking excellence providing expert technical assistance</td>
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<td>Engage all the different stakeholders in any given system</td>
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<td>44</td>
<td>Encourage collaborations between researchers and practitioners by clarifying the link of systems thinking to everyday practice in development aid programming</td>
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<td>91</td>
<td>Build 'mindshare' within the aid field through popular books, articles, and models</td>
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<td>The traditional passive role that academia and science has played in aid policy decision-making processes needs to be more active</td>
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<td>Develop an industry-wide sophisticated and user friendly infrastructure for systems (including networks, knowledge and data management, synthesis, interpretation and dissemination)</td>
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