Public sector reform and
complex adaptive systems
- an analysis of the
Problem Driven Iterative Adaptation model

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Declaration

By submitting this thesis electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the owner of the copyright thereof (unless to the extent explicitly or otherwise stated) and that I have not previously in its entirety or in part submitted it for obtaining any qualification

Date: April 2022

Opsomming

Hierdie tesis behels 'n gevallestudie in die praktyk van internasionale ontwikkelingshulp wat afgewyk het van die tradisionele meganistiese benadering tot projekbestuur. Die gevallestudie, gebaseer in Liberië het die Problem Driven Iterative Adaptation (PDIA) benadering gevolg om die Liberiese regering te help om Informasietegnologie kapasiteit te versterk. Die PDIA is poging tot aanpasbare bestuur. Dit is gemik op die operasionalisering van 'n nuwe model van kapasiteitsbou in state te ontwikkel.

Die tesis oorweeg dit of die PDIA benadering 'n sensitiwiteit ten opsigte van en waardering vir 'complex adaptive systems' (CAS) teorie vertoon.

Die tesis bevind dat die PDIA benadering tot projekbestuur in hierdie geval in baie gevalle konformeer met die perspektiewe wat deur CAS gebied word. Die benadering was effektief in die ondersteuning van die Liberiese regering om die vaardighede en praktyke te ontwikkel, wat deur CAS teoretici voorgestel word om ekologieë van innovasie te ontwikkel, wat nodig is in komplekse omstandighede.

Die bevindinge valideer die effektiwiteit van die PDIA benadering. Die tesis identifiseer sekere innovasies in die gevallestudie wat toekomstige gebruik van die PDIA model kan verbeter.

Summary

This study examines a case-study in the practice of international development assistance that deviated from the traditional mechanistic approach to project management. The case-study, based in Liberia, used a Problem Driven Iterative Adaptation (PDIA) approach to project management in assisting the Liberian government to build its ICT reform capabilities. PDIA is a form of adaptive management, and an approach for operationalising a new model of building state capability that attempts to overcome the limits of historical methods.

This study considers whether the PDIA approach showed sensitivity for and appreciation of complex adaptive systems theory and the insights it offers into the challenge of reforming state institutions in developing country contexts.

The study finds that the PDIA project management approach deployed in the case-study conformed to many of the insights gleaned from complex adaptive systems theory. The approach was effective in assisting GOL to develop competencies and practices that are recommended by complexity theorists for building the ecologies of innovation necessary to operate and thrive in complex environments.

The findings validate the effectiveness of the PDIA approach in this context. The study identifies innovations in the case-study's manifestation of the PDIA approach that harness the benefits of complexity, and which may improve the practice of PDIA project management in similar contexts.

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Table of contents

Abbreviations / tables / figures

CAS	Complex Adaptive Systems
CAST	Complex Adaptive Systems Theory
DLEG	USAID Digital Liberia and eGovernance Project (Component 1)
EGOV	E-government
GIS	Geographic Information Systems
GOL	Government of Liberia
LIBTELCO	Liberia Telecommunications Authority
LRA	Liberia Revenue Authority
MAC	Ministry, Agency or Commission
MIS	Management Information Systems
MOPT	Ministry of Posts and Telecommunication
PAC	Project Advisory Council
PDIA	Problem Driven Iterative Adaptation
PIT	Project Implementation Team
PMU	Project Management Unit
PMO	Project Management Office
TWG	Technical Working Group
UN	United Nations
UNDP	United Nations Development Programme
USAID	Unites States Agency for International Development
WHO	World Health Organisation

Chapter 1.

Public sector reform models in developing countries

1.1 The research question

It is generally expected of a public sector to deliver goods, programmes and services to citizens. Factors such as changing needs and expectations of citizens (such as in the case of this study, the response to a deadly virus outbreak), new technologies or techniques, and changes in regulations, necessitate ongoing public sector reform. However, reform efforts in many developing countries historically do not achieve or sustain effective outcomes. Reforms are bedevilled by seemingly intractable problems, opaque influences, indeterminate causes and consequences, and unexpected outcomes. Traditional reform strategies and tools just do not seem to match the realities of the context that the reform efforts have to be embedded in.

In its broadest scope, what drives this thesis is the question whether in developing countries public sector reforms that are based on models which show a sensitivity for and appreciation of complex adaptive systems theory are more effective than traditional models. Recent literature certainly raises such a prospect.[1] So does work done in the field of complexity in a range of other fields.[2]

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[1] Ben Ramalingam, *Aid on Edge of Chaos: Rethinking International Cooperation in a Complex World*, 1st ed. (Oxford: Oxford University Press, 2013); Ben Ramalingam, Miguel Laric, and John Primrose, "From Best Practice to Best Fit: Understanding and Navigating Wicked Problems in International Development," 2014, https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/9159.pdf; Ian Scoones et al., "Dynamic Systems and the Challenge of Sustainability," *STEPS Working Paper 1*, 2007.

[2] A few examples include explaining the spontaneous emergence of order that is widely observed throughout nature, Stuart A. Kauffman, "Origins of Order in Evolution: Self-Organization and Selection," in *Understanding Origins* (Dordrecht: Springer Netherlands, 1992), 153–81, https://doi.org/10.1007/978-94-015-8054-0_8., predicting and preventing ethnic violence, Yaneer Bar-Yam, "Solving Ethnic Violence," 2017, https://necsi.edu/solving-ethnic-violence., fixing economic inequality with benefits for economic growth, Yaneer Bar-Yam et al., "Preliminary Steps toward a Universal Economic Dynamics for Monetary and Fiscal Policy," October 17, 2017, http://arxiv.org/abs/1710.06285., determining the implications of

The Harvard School of Government in 2012 published a public sector reform intervention model which promises more positive outcomes. Known as the Problem Driven Iterative Adaptation model (PDIA) it is "an attempt at a pragmatic and operational synthesis of related arguments articulated in recent years by an array of scholars and practitioners of development working in different sectors and disciplines".[3] PDIA promises an operational framework which on the surface of it seems to be informed by an understanding of complex adaptive systems. The PDIA approach was utilised in Liberia in the recovery efforts following the recent Ebola crisis between October 2016 and December 2019. As a public sector reforms model it is not merely a theoretical construct, but comes with a well-documented track record in a crisis context.

To concretise the broad question, this thesis zooms in on the PDIA and its implementation in Liberia during the recovery phase of the Ebola outbreak. The purpose of this case analysis is to answer the following questions:

a) To what extent does the PDIA model embody the principles of complex adaptive systems theory, and

b) How did the PDIA project management approach, if evaluated from a complex adaptive systems theory perspective, perform during the Liberian implementation

1.2 Methodological considerations

The substance of this study is a descriptive-interpretive case study[4] that relies predominantly on Document and Textual Analysis methods.

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policies intended to alleviate world hunger, Marco Lagi et al., "Accurate Market Price Formation Model with Both Supply-Demand and Trend-Following for Global Food Prices Providing Policy Recommendations," *Proceedings of the National Academy of Sciences* 112, no. 45 (November 10, 2015): E6119–28, https://doi.org/10.1073/pnas.1413108112., inheritance of inequality, Samuel Bowles and Herbert Gintis, "Schooling in Capitalist America Revisited," *Sociology of Education* 75, no. 1 (January 2002): 1, https://doi.org/10.2307/3090251.

[3] Matt Andrews, Lant Pritchett, and Michael Woolcock, *UNU-WIDER Working Paper No. 2012/64 Escaping Capability Traps Through Problem Driven Iterative Adaptation (PDIA)*, n.d., www.wider.unu.edu.

[4] Robert E Stake, *The Art of Case Study Research* (SAGE Publications, Inc, 1995), describes a case as "an integrated system", with a "boundary and working parts" that is "likely to be purposive". It is "one among others", similar yet unique. Researchers are interested in them for "both their uniqueness and commonality" (Pg 2). A qualitative case study focuses on the "particularity and complexity of a single case, coming to understand its activity within important circumstances" (Pg xi).

On top of the usual advantages of Document and Textual Analyses,[5] there is the particular advantage that the analysis of periodic reports allows for a means of tracking change and development over time.[6]

However, a document-based analysis also comes with inherent constraints. Bowen notes the following: [7]

a) Not all documents are of the same nature, and most are not compiled for research purposes

b) Access to some documentation may be blocked on purpose, thereby creating a skewed picture

c) Collections of documents may reflect a "biased selectivity" where documents that reflect only a particular interest are made available

This study attempts to address these disadvantages by identify a diversity of documentation that collectively provides the required detail. While there were documents that were not available because of confidentiality requirements, the thesis relies on a sufficient number of verifiably authentic and credible (public) records. In addition, an interpretive research paradigm in general, and Document and Textual Analysis in particular, intrinsically recognize the partisan nature of documents. [8]

1.3   Delimitations and Limitations

The reduction of the broad field of interest in this thesis to the two questions above is a necessary delimitation to ensure a feasible focus of the thesis. However, further delimitations are required.

The national and international response to the Ebola crisis generated large scale interventions in several areas. It is not practically feasible to analyse any use of the PDIA

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[5] Glenn A. Bowen, "Document Analysis as a Qualitative Research Method," *Qualitative Research Journal* 9, no. 2 (August 3, 2009): 27–40, https://doi.org/10.3316/QRJ0902027. gives the advantages of being an efficient method, the availability of public documents, cost effectiveness of the approach, lack of obtrusiveness and reactivity to the research process, stability of the data, and its exactness.

[6] Bowen.....

[7] Bowen….

[8] "Interpretivism," in *The SAGE Encyclopedia of Social Science Research Methods* (2455 Teller Road, Thousand Oaks California 91320 United States of America: Sage Publications, Inc., n.d.), https://doi.org/10.4135/9781412950589.n442; Zina O'Leary, *The Essential Guide to Doing Research*, 1st ed. (SAGE Publications, Inc, 2004), 179.

model across all areas. The thesis, therefore, restricts its analytical scope to the PDIA application in a component of the USAID Digital Liberia and eGovernance activity (DLEG). This choice is made because a PDIA approach was explicitly required, and the researcher was contracted to deliver support to the Ebola DLEG response interventions and has, therefore, personal insight in the evolution of the project.

In addition to the delimitation of scope, the thesis is also delimited methodologically by its choice of empirical basis. The primary basis for the analysis offered, is a trove of documents generated during the DLEG project. These are all widely accessible in the public domain.

The problem of bias is a given in any analysis which is interpretive by nature. In this case, where the researcher has an insight in the DLEG project beyond what can be derived at on the basis of documentary analysis only (due to his involvement in the project) special care must be taken not to see in the documents what one wants to see. Unacceptable bias is mitigated in this case through the awareness by the researcher of the danger of self-fulfilling analyses, by anchoring the analysis in publicly accessible documentation, and adhering to the fundamental principle of textual and document analysis of applying an external frame of analysis.

## 1.4	Chapter layout

The thesis is set out in the following chapters:

Chapter 2 presents a selective discussion of the notion of complexity and derivatives such as complex adaptive systems.

Chapter 3 provides a descriptive overview of the PDIA approach to project management.

Chapter 4 provides a descriptive overview of the DLEG project.

Chapter 5 determines if DLEG is suitable as the case for this research study. Instruments of interpretation are identified, and then used, to analyse whether the DLEG case study operates in a CAS, and whether its project management implementation conforms to the PDIA approach.

Chapter 6 offers an analysis of the PDIA and its application in DLEG's project management from the perspectives on CAS by Jeffrey Goldstein et al.

Chapter 7 extrapolates from the analysis in this thesis general conclusions with respect to public sector reform in developing countries.

Chapter 2.

Complex adaptive systems

2.1   Introduction

This research uses the lens of complex adaptive systems theory, which shows us that knowledge is fragile and contingent.[9] The vast complexity of our world eludes human comprehension; perfect knowledge of this complexity is impossible. Confronting this ineffable whole, our strategy to pursue knowledge is to make normative decisions that impose boundaries on the full complexity. These limiting constraints then enable the creation of knowledge, but only within these limits. Knowledge emerges, but it is conditional and contextual. This knowledge is socially constructed, being brought to life by our choices and their application.

Historically, international funder-driven efforts at supporting development have often demanded "fixed methods in fixed sequences", including attempts to import best-practices from other countries and encourage their local adoption.[10]

This research project challenges that paradigm. It recognises that many of the challenges facing developing countries are wicked, and difficult to solve. The study recognises that system theory provides a theoretical and operational framework to understand and develop agency in working with these challenges. The varied approaches of systems theory are categorised, with functional and interpretive approaches perhaps best explaining historical development efforts, and with complex adaptive systems (CAS) being identified as the "third wave" appropriate to many complex environments. A CAS is where people act in a large network, dynamically being affected by and influencing each other and in turn adapting behaviours, outcomes and the network as a whole.

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[9] Paul Cilliers, "Complexity, Deconstruction and Relativism," *Theory, Culture and Society* 22, no. 5 (October 2005), https://doi.org/10.1177/0263276405058052.

[10] Robert Chambers, *Can We Know Better?* (The Schumacher Centre, Bourton on Dunsmore, Rugby, Warwickshire, CV23 9QZ, UK: Practical Action Publishing Ltd, 2017), 67, https://doi.org/10.3362/9781780449449.

2.2   Wicked problems

In contrast to how historical donor methods have visualised development challenges, many of these should instead be recognised as "wicked problems".[11] Ramalingam states the "majority" are wicked, where they exist on a continuum from "Tame" challenges, which are "static, bounded, controllable and therefore optimally suited to the identification and rollout of 'best practices'", to "Wicked", which are "difficult to solve because of incomplete, contradictory, and changing requirements that are often difficult to recognise and resist resolution" . Navigating effective responses to wicked problems requires a different approach to tame problems. Increasingly accepted principles in approaching wicked problems are:

a) Encouraging a diversity of perspectives

b) Find many intervention points and "mov[e] among them dynamically"

c) Use participative, iterative, group design

d) Ensure local ownership with customers, front-line staff and other stakeholders participating in problem formulation and efforts towards their resolution

e) Enable collective exploration of the problem and the solution space through techniques such as visualisation

f) Encouraging flexibility and reflexivity in the course of developing solutions. [12]

These principles to engaging with wicked problems are accommodated in the PDIA approach, and have common roots with engaging with CAS, both of which are explored in this case study.

2.3   Systems Theory

Systems Theory encompasses a body of theoretical work and practical approaches that can guide practitioners to navigate these complex environments. Practitioners are asked to see the field of study as a system, being a "set of elements or parts that is coherently organized and interconnected in a pattern or structure that produces a characteristic set of behaviours, often classified as its 'function' or 'purpose'").[13] Jackson describes a system

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[11] Chambers, *Can We Know Better?*; Scoones et al., "Dynamic Systems and the Challenge of Sustainability"; Ramalingam, Laric, and Primrose, "From Best Practice to Best Fit: Understanding and Navigating Wicked Problems in International Development."

[12] Scoones et al., "Dynamic Systems and the Challenge of Sustainability."

[13] Donella Meadows, *Thinking in Systems: A Primer*, ed. Diana Wright (Vermont: Chelsea Green Publishing,

as a "complex whole, the functioning of which depends in its parts and the interactions between those parts".[14]

Porta and Cordoba, in studying a systems approach to sustainability pedagogy, categorise three "non-exhaustive" broad approaches to systems thinking[15]:

a) Functionalist, also termed "linear, and mechanistic", where the "whole is the sum of its parts, no more and no less, and the macrostructure of systems is hierarchical and decomposable"[16] [17]. These comprise two "traditions", being Frederick Taylors scientific management together with the "hard systems approach in operations research", and general systems theory together with structural functionalism

b) Interpretive, where holism is preeminent with the "whole [being] greater than the sum of its parts" and where reductive thinking cannot fully explain the system. Here there is also recognition that systems do not have an "objective existence", and are rather the "mental constructs of observers"[18]. This approach includes two social science traditions, being "symbolic interactionism and the Frankfurt tradition of critical social theory" , and two operations research theoretical traditions, being soft systems methodology and critical systems thinking

c) CAS, a "third wave" of systems theory where systems are characterised by self-organisation of its dense number of elements, the emergence of higher order from "copious internal variety" leading to "aggregate shifts in social behaviour" that increase chances of survival, and where change occurs bottom-up

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2008), 188.

[14] Michael C. Jackson, *Systems Thinking: Creative Holism for Managers* (Chichester: John Wiley and Sons, 2003), 3.

[15] Terry Porter and José Córdoba, "Journal of Management Education Volume XX Number X Month XXXX Xx-Xx Three Views of Systems Theories and Their Implications for Sustainability Education," 2008, https://doi.org/10.1177/1052562908323192.

[16] Porter and Córdoba., citing R Keith Sawyer, *Social Emergence: Societies as Complex Systems* (Cambridge, UK: Cambridge University Press, 2005).

[17] R Keith Sawyer, *Social Emergence: Societies as ComplexSystems* (Cambridge: Cambridge University Press, 2005).

[18] Porter and Córdoba, "Journal of Management Education Volume XX Number X Month XXXX Xx-Xx Three Views of Systems Theories and Their Implications for Sustainability Education."

2.4 Complexity Science

Complexity Science recognises that people can be organised in ways that defy reductionist thinking, and that will defy efforts to understand or influence that organisation unless they are adapted to this complexity. Cilliers contrasts a "complicated" system as one where it can be fully explained by "a complete description in terms of its individual constituents", against a "complex" system where it cannot be fully understood "simply by analysing its components", because of the dynamic nature of interactions between constituents and with the environment.[19]

Cilliers offers 10 characteristics of a complex system, which we adapt here to human organisation:

1) Complex systems consist of a large number of involved people
2) The constituent people need to dynamically interact,
3) Interaction should be fairly rich, and not limited to a few constituents
4) Interactions should have a non-linear effect.
5) Interactions should be primarily from local neighbours
6) Positive and negative feedback loops should be induced from the interactions
7) The system is open and interacts with its environment.
8) The system operates under conditions far from equilibrium, needing energy to maintain its organisation.
9) The system has a history, which is responsible for its behaviour
10) Constituents have limited, largely local interactions, and do not understand the behaviour of the whole system. "The complexity emerges as a result of the patterns of interaction between the elements." [20]

If the wicked problems that bedevil resource-poor countries, and efforts to provide development assistance, are entwined in complex systems, then the insights and techniques derived from complexity science will be relevant and perhaps necessary to understand and manage these challenges. Juarrero states that "The conceptual framework

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[19] Paul Cilliers, *Complexity and Postmodernism*, 經濟研究 (Routledge, 2002), https://doi.org/10.4324/9780203012253.

[20] Cilliers.

of the theory of complex adaptive systems can serve as a "theory-constitutive metaphor" that permits a reconceptualization of cause, and in consequence a rethinking of action."[21].

In CAS there will be "uncertainty, unpredictability and surprise". In a work context, beyond bounded rationality, lack of information, tight coupling between workers and interdependence of systems components, this "unknowability" is inherent in CAS, caused by the non-linearity of interdependencies between people, and by the capacity of people to learn and adapt, even if not in the manner intended by managers. McDaniel suggests that in these contexts managers should focus on "sensemaking, learning and improvisation", rather than command and control. [22]

Complexity researchers argue that the traditional approach to thinking about organisations and their performance is rooted in Newtonian mechanics where the universe operates in a mechanistic, deterministic, typically linear and clockwork manner. The whole is the sum of its parts, and by understanding the universal laws governing the parts it will be possible to fully describe the whole, and so learn to control it. This reductionist approach proved very successful in applied science and engineering, and was carried over to management science, where it still guides many managers in efforts in "predicting the future, choosing strategies, motivating individuals, measuring activities and controlling them in detailed ways".[23]

The researchers argue that the new science of complexity provides a better way to specify the nature of organisations. Instead of viewing organisations as machine-like, it is preferable to think of them as living systems interacting with each other and the larger ecosystem in a non-linear fashion, manifesting irregular behaviours that cannot be fully explained by a description of its component parts. Some researchers take this further to argue that these systems have ability to, without any plan, manifest "emergent patterns of behaviour of a coherent kind in the whole", produced by local interaction of its parts.

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[21] Alicia Juarrero, "Dynamics in Action: Intentional Behavior as a Complex System.," *Emergence: Complexity and Organization.*, no. Edition 1 (2000), https://doi.org/10.emerg/10.17357.

[22] Reuben R. McDaniel, "Management Strategies for Complex Adaptive Systems Sensemaking, Learning, and Improvisation," *Performance Improvement Quarterly* 20, no. 2 (October 22, 2008): 21–41, https://doi.org/10.1111/j.1937-8327.2007.tb00438.x.

[23] Ralph D. Stacey, Douglas Griffin, and Patricia Shaw, *Complexity and Management: Fad or Radical Challenge to Systems Thinking?* (New York: Routledge, 2000), 17.

Theorists have developed varying approaches to the study of complex arrangements in social systems. Complexity science perceives organisations as CAS. This study focuses on CAS, classified with Sawyers' "Third Wave"[24] of sociological systems theory. Figure 1summarises Sawyers distinction between the three "waves", with the "Third wave" meeting all the criteria:

a) Dynamical: Focused on dynamics and change, rather than structure and stability

b) Nonlinear: A recognition that effects may not be proportionate to the cause; small changes can have big impacts and vice versa

c) Microlevel agents: Uses models that describe individual agents with goals and states, and enables them to interact over time, demonstrating how local interaction can yield emergent order

d) Agent communication: A focus on the communication and relationships between individual agents

e) Social emergence: Explains how microsocial interactions among individuals results in the emergence of collective phenomena

f) Society is unique: Recognises the unique features of human social systems in the natural world. The various concepts and components have a clear correspondence to the entities of the social world

	First Wave	Second Wave	Third Wave
Dynamical	No	Yes	Yes
Nonlinear	No	Yes	Yes
Microlevel agents	No	No	Yes
Agent communication	No	No	Yes
Social emergence	No	No	Yes
Society is unique	No	No	Yes

Figure 1 - The three waves of social system theory

This study does not attempt to diminish the importance of earlier "waves", which established significant insights including that "uncertainty becomes a basic feature of nature and the possibility of control is seriously compromised" and that "instability is shown to be fundamentally necessary for a system to change of its own accord." This challenges the established "preoccupation with equilibrium and stability" in the social

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[24] Sawyer, *Social Emergence: Societies as Complex Systems*.

sciences.[25] Organisations are beset by uncertainty, and their instability could provide a key to more effective self-organisation.

While focused on CAS in the "Third wave", this study recognizes that the distinctions between and within "waves" are not always clear, and that techniques embedded in earlier "waves" can have effective utility in certain contexts, including as a rich source of metaphor.

The study has described Cilliers definition of complexity. Stacey describes complex adaptive systems as consisting of large number of agents. [26] These agents have a set of rules that determine their behaviour. These rules require agents to interact with each other, and adapt their behaviour to create a population-wide pattern. He gives as examples a population of individual birds (agents) that create a flock (population-wide pattern). Neurons (agents) interact with each other to create patterns of brain activity across all neurons (population-wide pattern).

McDaniel describes CAS as consisting of diverse agents that learn, that interact with each other in non-linear ways, and therefore self-organise, have emergent properties and co-evolve with the environment.[27]

The common features (summarised in Figure 2) of the dynamics of such systems are explored:

Non-linearity
Systems have a history
Emergence
Self-organisation
Co-evolution
Far-from-equilibrium
Nested Systems

Figure 2 - Features of complex adaptive systems (CAS)

    a) Non-linearity

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[25] Ralph D. Stacey, *Strategic Management and Organisational Dynamics: The Challenge of Complexity to Ways of Thinking about Organisations*, 6th ed. (Essex, England: Pearson Education, 2011), 236.

[26] Stacey, *Strategic Management and Organisational Dynamics: The Challenge of Complexity to Ways of Thinking about Organisations*, 244 citing Gell-Mann, 1994; Holland. 1998; Kauffman, 1995; Langton, 1996.

[27] McDaniel, "Management Strategies for Complex Adaptive Systems Sensemaking, Learning, and Improvisation."

At least some of the interactions between elements of the system are non-linear, with inputs not proportional to outputs. Small local changes can have big impacts on the overall system, and big local changes can have small changes on the overall system. Some of the processes of interaction will provide feedback loops to amplify or dampen inputs, either directly or over a number of steps. An output could well be a function of a rich number of causal effects. Time also can elapse between the cause and its effect

    b) Systems have a history

Complex systems evolve over time, and their "past is co-responsible for their present behaviour."[28] Agents have an ability to learn from previous experiences and adapt their behaviours. This trajectory in time means that these systems cannot be reversed to previous states in their history. A process can achieve an outcome, but if it is initiated again after some time has passed, it could achieve a different outcome. It also means that the same process cannot be replicated in another context, as each context will have a unique history. Each system is thus unique.

    c) Emergence

The systems' behaviours are produced by the interactions between the agents, and not by the properties inherent in agents. These interactions can create new and coherent structures and properties at the system-level; which then in turn influence the behaviours of the agents. The emergent features cannot be traced back or explained by the properties of the agents; they are greater than the sum of these properties. Emergence is unpredictable, and a key source of novelty and surprise in CAS.[29] Examples of emergence include the emergence of the human mind, swarming behaviour in animals, and the presence of norms in a community

    d) Self-organisation

To persist a CAS has to develop a structure and adapt it to changes in the environment. This organisation does not come about as the result of some external blueprint or plan or

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[28] Cilliers, *Complexity and Postmodernism*, 4.

[29] McDaniel, "Management Strategies for Complex Adaptive Systems Sensemaking, Learning, and Improvisation."

the presence of some centralised form of internal control.[30] Instead a CAS has the capacity to self-organize internal structure, often from "fairly unstructured beginnings", on an ongoing basis into new structures, patterns and behaviours; into greater complexity. The connections and patterned interactions among agents, under the influence of the external environment and the system's history, change the relationship between the distributed agents.[31] The unpredictable demands for change require the CAS to be suitably adaptable, with an elastic rather than rigid structure.

e) Co-evolution

As a CAS adapts to its environment the environment is changed by it, requiring the CAS to adapt further in turn. In this way both the CAS and the environment co-evolve, with changes to each influencing changes in the other. This dance through time creates a mutual evolution. The environment, itself a CAS, will not be a singular or amorphous, but will encompass or comprise other CAS. Each of these CAS, as they adapt to external changes will be impacting on other CAS, who will then adapt (unless it is destroyed). "Fitness landscapes" can be used to illustrate and explain the concept. [32] A CAS has to exist in a landscape of opportunity and threat, trying to improve its place to a more favourable position on a higher plane. As it does this it affects the landscape, which changes for all CAS in the landscape, who all then need to change. Each CAS will be differently constrained by their internal dynamics and their placement on the landscape.

f) Far-from-equilibrium

A CAS exists at a critical point between rigid order and chaos. If there is too great a rigidity - meaning equilibrium, symmetry and complete stability - then the CAS will be not respond appropriately to changes in its environment and it will die. The CAS needs a constant flow of energy to fight entropy and survive.[33] This area of viability is where the system finds the necessary requisite energy, variety and creativity to sustain itself. [34] The

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[30] Cilliers, *Complexity and Postmodernism*, 9.

[31] Cilliers, 12.

[32] Stuart A Kauffman, *The Origins of Order: Self-Organization and Selection in Evolution* (Oxford University Press, 1993).

[33] Cilliers, *Complexity and Postmodernism*, 122.

[34] Also referred to as the edge-of-chaos

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natural and continuous demand for change is met by the inherent capability of the CAS to adapt to those demands.

g) Nested Systems

Each individual CAS is an integrated open system, possibly alongside a number of other competing or collaborating CAS, but at the same time is part of larger systems. A CAS is nested within other CAS, which are in turn nested within other CAS. The CAS that is the human brain is nested within the CAS that is the human, that is nested within a city that is within a nation, and so forth. There is an interdependence and interrelatedness among and through all levels.

2.5   Implications for management of organisations

This CAS view of organisations, such as public sector institutions, is very different from the traditional view which often sees them as though they were machines, and where performance improvements are often top down and seek order, predictability, control and efficiency.[35]

Goldstein et al. argue that organisations have always been complex, although we are only recently recognizing this.

They describe an organisation as composed of semi-autonomous agents (persons) who interact according to rules. Each agent gathers an understanding of the inner-workings of the organisation and the environment it operates in, based on their history and their position. Agents are diverse; having different capabilities, attitudes and resources. They learn and adapt overt time. However the organisation itself, though composed of learning agents, may not be adaptable.

To address this challenge they have developed what they term a "complexity science of generative leadership".[36] This study uses their theory to describe a CAS view of organisations. The theory is grounded in the identified CAS features (see Figure 2).

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[35] McDaniel, "Management Strategies for Complex Adaptive Systems Sensemaking, Learning, and Improvisation."

[36] Jeffrey Goldstein, James K. Hazy, and Benyamin B. Lichtenstein, *Complexity and the Nexus of Leadership: Leveraging Nonlinear Science to Create Ecologies of Innovation*, First (New York: Palgrave Macmillam, 2010).

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They reframe "leader" and "leadership" to refer to "leadership events" rather than people; where leadership is an influence process arising out of all interactions across the organisation. Their term "generative leadership" refers to the mutual influence of leadership expressed in any interaction and how innovation can emerge from multiplicities of such interplay. Even if the interaction is between a supervisor and an employee, this is seen as mutual leadership, rather than of a supervisor being a leader *over* an employee.

Generative leadership is active; participating and co-evolving with the CAS. It is not external to the area of interest and does not idly wait for desirable outcomes to appear. Its purpose is to enable and nurture complexity, and to harness its rewards. It is "hands-on" in nurturing the emergence of innovations by building "ecologies of innovation", creating effective social networks, and searching for and amplifying novelty.

Desirable emergence requires top-down and bottom-up influences. Hierarchical structures are necessary to limit unanticipated undesirable outcomes.

Key themes of their theory are described below.

a) Ecologies of innovation

Goldstein et al. set out to guide organisations on creating "a new context for connection and creativity that goes beyond the exceptional individual".

They identify an ecological ecosystem as the best representation of a complex, nonlinear, adaptive and interactive system. Sub-ecosystems are the interacting components with each other and with other subsystems. The interactions supply the resources and materials that are exchanged through the web of interconnected relations to the whole ecosystem. They use complexity science and ecology research to describe patterns that sustain ecosystems within a continuously changing environment, which they apply to an organizational context.[37]

These insights from flourishing ecologies are suggested as a basis for developing strategies to create an "ecology" of innovation in an organisation. They highlight

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[37] They use industry case-studies to illustrate their claims (e.g. The rise and rise of Netflix and IBM's response to the shift from mainframe to microcomputers)

"symbiotic connections and synergistic interactions" which they claim leads to emergent order of improved "behavioral flexibility as well as greater adaptability to unexpected changes".

They describe seven features of ecosystems:

a.1)   Ecologies Are Systems of Difference

The interaction of two identical things cannot generate something new. In organizations, "meaning emerges through the differences in individuals' backgrounds, skills, opinions, and perspectives". Diversity is highly desirable, seeding innovation, but also providing strength and stability to the system.

a.2)   Diversity is the Source of Adaptability

As diversity increases between agents and heterogeneity at the group level, the chances increase that differences can be amplified into emergent innovations.[38] Generative leadership should encourage exploration and experimentation, more than seeking efficiency or reducing costs. Micro-level diversity and difference should be supported within boundaries and constraints. Dissent and individual voices must be allowed.

a.3)   An Ecology Is a Nexus Of Interacting Ecosystems

Nexus is defined as the intricate couplings between the nodes of a network, which can become "so significant that the identity of each node or subsystem becomes interdependent with the identities of all the other subsystems". Leadership events and behaviours emerge in an organisation from interactions in its nexus of internal relationships and its relations with other environments. Individual leadership is de-emphasised; what is important are the relationships and interactions, and not the content of the network nodes.

a.4)   Ecosystems Require Interaction Resonance

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[38] Bradbury, R. H., Van Der Laan, J. D., & Green, D. G. (1996): The idea of complexity in ecology. Senckenbergiana marit., 27(3/6), 89–96. cited by Goldstein, Hazy, and Lichtenstein, *Complexity and the Nexus of Leadership: Leveraging Nonlinear Science to Create Ecologies of Innovation.*

In organizations, interaction resonance refers to a high quality of engagement and responsiveness in interactions, generated over time. As the resources and information required to sustain the sub-system are accessed through relationships and interactions it is important they are readily available and fruitful.

a.5)   Ecosystems Coevolve by Cooperative Strategies

Cooperation strategies between subsystems play an important role in maintaining and developing shared ecosystems. With co-evolution individual subsystems contribute to the evolution of the whole system, which in turn affects the sub-systems to evolve; so potentially providing increasing benefits for all the sub-systems. This is an additional view to the more widely accepted notions of conflict and competition. In organisations, they can develop strategies to encourage coevolution with partners.

a.6)   Ecosystems Thrive in a Disequilibrium World

Considered as ecological communities, organizations can survive and thrive only when in conditions of disequilibrium.

a.7)   Ecosystems Exist at Multiple Levels

A whole ecology is composed of many subsystems, inter-related in complex ways. As a wide-angle lens gives a view of a forest, a normal lens a tree in that forest, and a macro lens the lichen on the bark of the tree, so any ecology can be analysed at multiple levels and granularity. An organisation such as a public sector institution has departments, which have county offices. The institution belongs to an economic cluster. It has suppliers and partners, and so on. There is an interrelatedness of all these subsystems through multiple levels that is necessary to sustain the whole, and that provides a potential for the system to change and adapt. As complex systems are inherently non-linear, events at a micro-level can have large impacts on a higher level.

b) Interaction resonance within social networks

The patterns of interactions and feedback loops between interdependent, interacting components are foundational to a complex system. This is why generative leadership needs to pay attention to the nexus of relationships that links individuals into a social

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network. The nexus is the "source of influence, the driver of innovation, and the regulator of change".

All social interaction are through a social network that can be described within an organisation, but also extends outside to the larger ecosystem, where an individual could interact with a supplier representative, friend, child or any number of other individuals.

The generative manager should act to "enrich" information as it is exchanged in social interaction. Goldstein et al. term this process of enrichment interaction resonance.

c) Differences, information and novelty generation

Complex systems are heterogeneous, comprised of diverse interacting components, agents and parts. Interaction between identical components cannot create something new; while between different components it creates novelty. The more a group is comprised of different individuals, the greater the range of mental models that can be mobilized to solve a complex problem. Goldstein et al. see these differences as the potential seed for emergent innovation. Meaning emerges through "the differences in members' backgrounds, skills, opinions and perspectives"

Information is the "life-blood" of the organisation, akin to energy in physical systems. It flows through organisations and connects them to systems in their environment. Information does not only convey formal facts, but also surprises.

In any organisation there are individuals and groups tinkering and experimenting, and who achieve outcomes that are unconventional or unexpected. They have created novelty, and it is often ignored or marginalized. Generative leadership should take steps to identify these novelties, albeit a weak signal, and amplify it, for it is seeds like this can emerge as novel and transformative patterns and practices. Novelty is often generated on the edge of the organisation where diverse individuals engage with the environment. These weak ties are important as the individuals can be best placed to identify surprising opportunity or threats.

An ecology of innovation encourages the emergence of "new practices, structures and programs" using currently available and past elements, but also with the recombination

and repurposing of these elements in a process of 'bricolage' into attempts at building new solutions. [39]

However, not all deviance should be amplified. Leadership should have strategies to select which deviations could have the potential for significant desirable emergent innovation.

Goldstein et al. recommend Positive Deviance as a powerful method to identify useful novelty and propagate it through the organisation. The starting point is the principle that there will be individuals ("positive deviants") within the system who achieve better outcomes from their available resources than their peers. They provide an internal, locally-driven and administered method to identify such positive deviancy, and diffuse the novel behaviours through the system.

Another method Goldstein et al. recommend is intercohesion[40]. This is a method to stimulate a rich interaction between separated but internally cohesive groups, by mingling them to some extent, for the purpose of stimulating innovation. The weak-ties of separated groups cross-fertilise seeds of novelty into the strong ties of the capable teams that share "mental models, resources and practices" with a good ability to nurture the seeds into innovations.

d) Critical periods and their potential for innovation

Complex systems can reach a critical state where they go through a rapid transformation. Goldstein et al. refer to these periods as "criticalisation". Their insights about this phase are drawn from phase transitions in the self-organizing physical and natural systems. During criticalisation a system moves from the stability of a relative equilibrium (attractor) to an openness to novel and unstable states, and then to a new attractor. They claim that generative leadership's role is to understand this as natural in complex systems, and to embrace the period of criticalisation, and not try to ignore its effects. Criticalisation offers opportunity for a deep transformation that is impossible in more normal times.

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[39] Goldstein et al.explain that the term 'bricolage' was used by cultural anthropologist Claude Levy-Strauss to describe how every culture fashions together what is readily at hand - such as local flora, fauna, and rocks - into emergent cultural products

[40] Intercohesion was developed by Balazs Vedres and David Stark

Generative leadership should position the organisation, at all levels, to build the connections to provide awareness of changes in its environment. This is necessary to create the commensurate potential for renewal and emergence.

e) Emergence

Goldstein et al. see emergence as "the arising of [radically] novel structures, patterns or processes in complex systems" with a "life of their own" and their own rules and possibilities. It is unpredictable and cannot be deduced from its components. It is the "essence of innovation" in organisations. The outcome of emergence, and (confusingly) innovation,[41] add to a complex systems "repertoire of possible actions and processes".

The "recognition, amplification and dissemination" of micro-level novelty creation is what seeds emergence. Generative leaders are entreated to foster this ability.

Goldstein et al. explain the process of emergence through four phases: 1) Disequilibrium, where the system can no longer maintain its normal method of operating , 2), Amplifying Actions, when there is an increase in stress and in experiments in novelty, and previously dampened fluctuations become amplified and the system enters a non-linear zone, 3) Recombination ,when novel rearrangements of available resources increase the system's ability to adapt, and 4) Stabilizing Feedback, when the new emergent order will stabilize itself around the new arrangements.

Differentiating their approach from earlier approaches, Goldstein et al. assert that emergence "demands rigorous containing, constraining, and constructional operations" by generative leaders. They contrast this with earlier approaches believing that when "command and control mechanisms were relaxed", it was necessary to wait for emergence to manifest.

f) Boundaries and constraints

Goldstein et al. believe that constraints and boundaries that consistently impact on the choices and actions of individuals are required to allow adaptability to emerge. For the

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[41] We take this to mean more planned or unsurprising innovation

same reason it is necessary to maintain the information difference between individuals. The constraints create difference and an incentive to change.

Generative leadership should maintain their understanding of context, which is as important as content. They believe that the context of organizational interactions determines individuals' contribution. The context generates "opportunities and constraints".

The practice of generative leadership

Goldstein et al. describe the practice of generative leadership as "focusing on 'the space between' people, giving more voice to the marginalised stakeholders, and creating the conditions for the emergence of something new and uncertain".[42] This study summarises their recommendations to guide the actions of generative leadership in a table below:[43]

	Area of focus	*Activity required by generative leadership*
1	On creating an ecology of innovation	
1.a	On increasing energy flow across boundaries	Identify the boundaries within the organisation, and between the organisation and others. Assess the flow of energy and resources within and across those boundaries. Increase the permeability of those boundaries. This enhances micro-diversity
1.b	On enacting an ecosystem of innovation	Begin the process of enacting the "Seven features of ecosystems". Start with two or three, which is enough to show benefit, and build on their success to add more.
	The "Seven-features of ecosystems" are combined into four categories below:	

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[42] Goldstein, Hazy, and Lichtenstein, *Complexity and the Nexus of Leadership: Leveraging Nonlinear Science to Create Ecologies of Innovation*, 190.

[43] This study has adapted the language of the recommendations to be particular to organisations rather than more abstract notions of ecosystem

1.b.i	On increasing and amplifying differences in the ecology	Increase all forms of diversity in the organisation (demographic, tenure, expertise, perception, mental models, perspectives and so on). This increases generation of novelty. Encourage variation in organisational functioning; these differences increase fluctuations from norms that can lead to creative and pragmatic solutions
		Also keep identifying and encourage an ongoing diversity of ideas over time, and resist attempts for standard operating procedures to stultify opportunities for change.
		Identify and highlight differences, "especially giving voice to those who do not represent the dominant majority."
		Challenge prevailing assumptions when warranted.
1.b.ii	On finding the nexus of interaction and giving it resonance	Increase the depth and quality of communication and flow of information through the organisation. Encouraging interaction resonance between people helps create meaning. Provide tools and encourage a culture for people to have rich interactions and safely express and amplify difference and novelty.
1.b.iii	On pursuing coevolution through symbiotic relationships	Develop strategies for co-evolution of the organisation with outside elements, and between elements (people, workgroups and other units) within the organisation. The integrity of each element should be maintained, but increased integration and "even fusion" with other elements will increase their repertoire of capabilities to achieve specific goals.

1.b.iv	On preparing for disequilibrium, and a multi-level ride	Find and embrace disequilibrium in the organisation. It is the "precursor to coevolutionary change". View and understand the organisation from all levels; from the interaction of an individual and her peer, through increasingly higher levels to the organisations interactions with outside stakeholder groupings and beyond.
2.	On taking advantage of the cusp of change (Note: This refers to the unexpected occasions when the organisation (or a sub-unit) faces criticalisation, when unprecedented change appears imminent.)	Link external opportunity with the novel internal responses that are generated internally when the organisation faces disruption during criticalisation. This enactment of the response drives the need for further response, increasing disequilibrium. When opportunity tension and informational differences increase sufficiently, a point is reached where a *new* stabilizing conception of the organisation (or sub-unit) emerges distinct from the now unstable *old* conception. Act to help resolve the tension and encourage movement towards the preferred conception (integrate elements of one with the other if desirable). Help choose the pace and nature of the transition.
3.	On leading emergence	Facilitate the process of emergence through the four stages of 1) disequilibrium conditions, 2) amplifying actions, 3) recombination's, and 4) stabilizing feedback to improve chances of positive emergence.
	On disequilibrium conditions	Consider "turning up the heat" in the areas that could benefit from emergence by knowledge creation, extending social networks, or unlocking technological advances. Consider increasing diversity and opportunity tension (where an opportunity is dangled

		in front of a unit).
	On amplifying actions	Encourage and welcome experimentation by affected people in response to the tension evoked by the threat of change. Acknowledge and ease their "discomfort and ambiguity".
	On recombinations	Identify the proposals for recombining old and new ideas into hybrid solutions as a way forward, and support those mobilizing broad support.
	On stabilising feedback	Stabilise the emergence by creating new routines and procedures to support the new conception. Build legitimacy for the new conception by creating supportive coalitions and partnerships.
4.	On generating experiments in novelty	Emphasise differences and stop "group think" by building teams rich in diversity across all dimensions. Increase the frequency of experiments. Make the most of weak signals; identify and pay close attention to weak signals, generated from the periphery, the isolated and marginalised. Develop network intercohesion by identifying a set of cohesive workgroups that have proven capability, along with characteristics of homogeneity, such as having worked together for a long time. Mix these members to a degree, so that the workgroups are linked together into a broader network. This provokes a creative tension that stimulates the flow of ideas and resources across boundaries, and into the capable

		hands of strong-tie teams that can execute on novel ideas.
5.	On creating more through positive deviance	Identify opportunities to practice positive deviance. Use the correctly structured approach to find these positive deviants and diffuse their innovation. [44]
6.	On creating smart network	Develop ways to integrate key individuals who are more marginal with the dense networks at the centre of the organisation. Bridge potentially troublesome intermediaries between networks; build direct connections or reorganize responsibilities. Add redundant pathways to central nodes of the network.
7.	On practicing generative leadership	Every employee must enact generative leadership at all times through mutual, reciprocal influence. Generative leadership must be enacted as events rather than through persons; it is not embodied in senior managers, but in the interactions between all individuals. There should be focus on the quality and quantity of all these interactions. Accept that it will take time for the systemic process of building generative leadership in the organisation to show full benefit.

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[44] Goldstein, Hazy, and Lichtenstein, *Complexity and the Nexus of Leadership: Leveraging Nonlinear Science to Create Ecologies of Innovation*, 205 provide the guiding rules devised by Jerry Sternin, one of the founders of the Positive Deviance method. These rules are not included here .

Chapter 3.

Problem Driven Iterative Adaptation (PDIA)

3.1   Theoretical framework

PDIA is an approach to building the capability of public organisations to implement policies and programmes.

Andrews et al. argue that the dominant strategies deployed by governments and development agencies to build institutions in developing countries has failed by producing systems that "look like those of modern states but that do not (indeed, cannot) perform like them". Attaining this, what they term isomorphic mimicry, means that targets and metrics are met that "enable funds to continue to flow and legitimacy to be sustained" in donor communities, yet the reformed systems do not actually perform well, with a "clear inability to actually implement incrementally more complex and contentious tasks".[45] If this dynamic of isomorphic symmetry proliferates across institutions the country can fall into a "capability trap", which is difficult to recover from.[46]

Instead of the focus being on the form of the institution, they propose that reforms should encourage more effective function, which will in turn build "good" institutions and state capability (in that they are the "consolidation and reification of successful practices").[47] The form of an institution is not very important; rather it is the "process of arriving at state capability…which matters for sustained functional success".[48] It is the struggle to

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[45] Matt Andrews, Lant Pritchett, and Michael Woolcock, *Building State Capability* (Oxford University Press, 2017), 4, https://doi.org/10.1093/acprof:oso/9780198747482.001.0001.

[46] Andrews, Pritchett, and Woolcock, 48.

[47] Andrews, Pritchett, and Woolcock, 28.

[48] Andrews, Pritchett, and Woolcock, 47.

achieve improving function that provides a public-sector reform with an "immune system" to inure itself from "the many diseases" that could infect it.[49]

The PDIA approach was developed to improve the "frequency, quality, and robustness" of such successful reforms. PDIA is a coherent "strategy and set of tactics", both "pragmatic and supportable", to guide such reform interventions.

3.2   The PDIA strategy

Andrews et al. illustrate the tensions and choices that produce capability traps (Figure 3); differentiating the choices or strategies that are made at three social, interlinked levels of an organization: the overarching organizational ecosystem, the organization, and the organizational agents (leadership and front-line workers). The choices at each level are shown as a continuum, with choices on the right-hand-side associated with high-performance, and on the left-hand-side with capability traps.
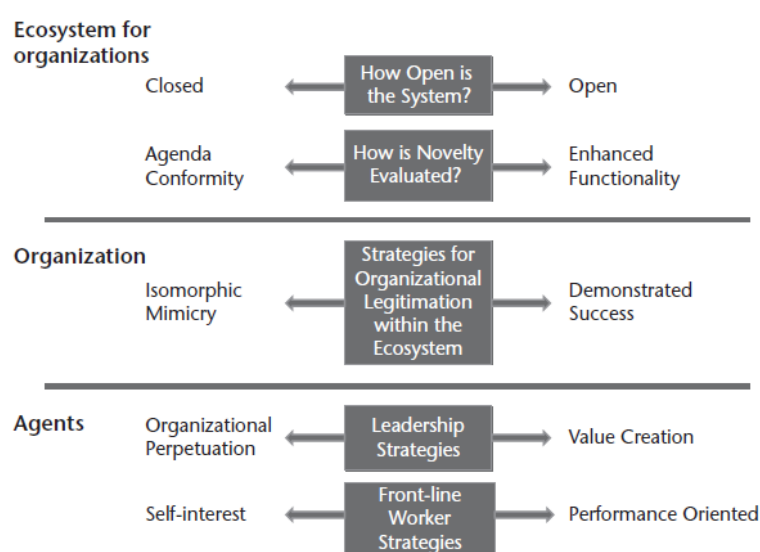
Figure 3 - The organisational ecosystem: agents, organisations and ecosystem[50]

At the level of the larger ecosystem within which the organization is embedded, which includes external stakeholders such as suppliers and regulators, the system's openness to novelty will tend to either be closed, or open. Here novelty will also be evaluated to

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[49] Andrews, Pritchett, and Woolcock, 49.

[50] Andrews, Pritchett, and Woolcock, *UNU-WIDER Working Paper No. 2012/64 Escaping Capability Traps Through Problem Driven Iterative Adaptation (PDIA)*.

encourage either conformity of the current agenda, or to enhance functionality by improving on the current agenda.

PDIA sees an organisations pursuit of legitimacy as key to its survival, being necessary to attract human and financial resources.[51] The organization itself, as an entity with its own ontological status, can deploy a mix of strategies in its pursuit of legitimacy that tend it either towards isomorphic mimicry, or to "demonstrated success in producing outputs and outcomes".

Front-line workers choose to either pursue self-interest or to be performance oriented by "promoting the best purposes of the organization". Management and leadership can choose strategies that simply perpetuate the organization's existence or to orient activity towards creating enhanced value.

These choices may cohere. For example, an ecosystem of closed systems will be less likely to encourage novelty to enhance functionality, which will encourage an organization's retreat into isomorphic mimicry, with leadership merely perpetuating the status quo, and staff pursuing self-interest.

The PDIA strategy for developing state capability is to move the "ecological equilibrium in Figure 3 "from the left to the right".[52] The "broader fitness environment of this ecology" will shape outcomes, requiring the reformers attention at all levels to encourage coherence.

PDIA seeks to overcome state institutions retreat, and entrapment, into isomorphic symmetry when pursuing legitimacy. A strategy for building state capability has to find a way to be open to and encourage novel ideas and actions and reward desirable innovation in a non-competitive environment, where the state is usually a monopoly provider. The process of evaluating such novelty should be in terms of its ability to provide a state institutions "enhanced functionality" (where the organisation has better abilities), rather than the common tendency of providing "agenda conformity" (where the existing agenda is reinforced or intensified).[53]

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[51] Andrews, Pritchett, and Woolcock, *Building State Capability*, 33.

[52] Andrews, Pritchett, and Woolcock, 51.

[53] Andrews, Pritchett, and Woolcock, 37.

An effective strategy should also take care not to push an institution into "premature load bearing", whereby the organisation is expected to operate outside of its possible performance envelope. Developing country institutions have limited human and financial resources and cannot be expected to deliver the range and intensity of services provided by rich country counterparts. Andrews et al. warn "putting organizations … under duress before they have developed sufficient capability—not just apparent capability but also robustness to pressure—is a recipe for disaster".[54] The consequences of premature load bearing will be to create a divergence between the institutions notional practice and its actual practice. If this divergence grows it can lead to a collapse where notional reform policy is increasingly ignored by institutional actors, who will pursue alternative objectives. Such divergence can create conditions that become increasingly difficult to recover from in subsequent attempts at reform, with distrust among actors, cynicism among citizens, and increasingly entrenched perverse incentives amongst staff. To maintain legitimacy under pressures of premature load bearing, the organisation can be tempted to retreat into isomorphic mimicry.

Andrews et al. caution that well-intentioned external actors such as international development funders can encourage isomorphic mimicry. Pursuing legitimacy themselves, they often have unrealistic expectations of what can be achieved, and negotiate unrealizable notional reforms with "upper-level" government leaders who have developed a "value-system" alien to front-line staff. They operate with "high-modernist mental models" in their efforts to support developing country institutional reform, requiring performance metrics and methods that emphasise form rather than the outcome-based indicators that reflect function.[55]

Policy effectiveness depends on the quality of implementation by the mandated government organisations. PDIA defines organisational capability as "the ability of an organization to equip, enable, and induce their agents to do the right thing at the right time to achieve a normative policy objective".[56] It is not the achievement of policy compliance, as codified policy may well drift from normative policy objectives. This

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[54] Andrews, Pritchett, and Woolcock, 62.

[55] Andrews, Pritchett, and Woolcock, 64.

[56] Andrews, Pritchett, and Woolcock, 95.

organisational capability for implementation needs to be improved to achieve better policy outcomes.

3.3 The PDIA tactics

The nature of the requirement necessitating an organisational capability will determine the type of capability. We have to think beyond the "dominant tendency in public sector organisations … [to see them as] either 'policymaking' organisations or 'logistical'", which has insufficient variety. PDIA uses an "analytically-grounded" classification typology to identify five types of organisational capability, being:

a) Policymaking and/or concentrated (elite) services,

b) Logistics,

c) Implementation-intensive delivery of services,

d) Implementation-intensive imposition of obligations.

e) Wicked hard. [57]

Four questions should be asked of a chosen policy objective to identify the needed type of organisational capability. Each question begins with "Does the successful accomplishment of your policy objective require actions or activities that are . . . ?":

a) Transaction intensive – Does it require many or few agents to act

b) Discretionary – Are decisions by implementing agents based on inherently imperfectly specified and incomplete information

c) Service or obligation – Are the implementing agents providing a service, or imposing an obligation

d) Based on known technology – Do implementing agents depend on known protocols or accepted techniques, or must they innovate to achieve success. [58]

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[57] Andrews, Pritchett, and Woolcock, *Building State Capability*, 107.

[58] Andrews, Pritchett, and Woolcock, *Building State Capability*, 104.

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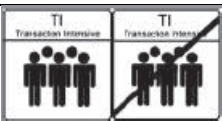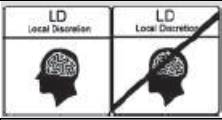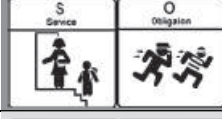
Answer for each question on requirements:		
Either		**Or**
Transaction Intensive		Not transaction intensive
Discretionary		Not discretionary
Delivery of service		Imposition of obligation
Known technology		Not known technology

Figure 4 - Four key questions about an activity to classify the capability needed

The answers to these questions, using Figure 4 as a key and transposed onto Figure 5, determine the classification of organizational capability required

Figure 5 - Five types of activities that have different capability needs in implementation

Andrews et al. make an important clarification on the use of the taxonomy of capability requirements;[59] that "moving an organisation from lacking capability to capability is itself wicked hard" , even though the organisations role may be pure logistics, such as a post office. Building capability is not known technology, and "[c]hanging organizations is

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[59] This distinction is relevant to the reforms identified in this study, where many of the activities were to build capability from a low base

changing the behaviour of people and many aspects of human behaviour are just too complex to pretend it can be reduced to a simple formula".[60]

3.4 Four principles of PDIA

The four principles of PDIA are outlined:

a) Problem solving

PDIA requires that reformers focus on identifying "good" problems that matter to key actors, and not on solutions. Andrews et al. argue that a problem focus is "the most direct way" to reorient efforts from externally prescribed form towards locally prescribed function and performance[61]. Benefits of such a focus are that it "offers a window" that forces reformers to reflect and ask questions about the current way of doing things, promotes a search for alternatives that could be a better way of doing things, and be appropriate solutions, unleashes efforts to solve the problem, and provides a rallying point for building coalitions between distributed stakeholders to deal with a common concern they are unable to solve separately

Not all problems motivate actors and encourage change. "Good" problems are those that matter – that people care about - and cannot be ignored, can be broken down into easily addressed underlying causes, and allow for real, sequenced and strategic responses.[62]

b) Authorizing positive deviation

Authorisation is required for reformers to act. However, the authorizing environment can be fragmented and complex. Authority can vest in charismatic individuals, or by those holding traditional positions embodying customs, or by those holding formal roles.[63.] Public sector reforms often span many domains and organizational units, both vertically and horizontally. Each of these domains will have its own mix of protocols or conventions that need to be followed to win the authority required for participation in a reform. Authority can be formal and informal, and may be inscrutable, especially to

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[60] Andrews, Pritchett, and Woolcock, *Building State Capability*, 117.

[61] Andrews, Pritchett, and Woolcock, *UNU-WIDER Working Paper No. 2012/64 Escaping Capability Traps Through Problem Driven Iterative Adaptation (PDIA)*.

[62] Andrews, Pritchett, and Woolcock, *Building State Capability*, 142.

[63] Andrews, Pritchett, and Woolcock, 195 citing Max Weber (Weber 1978) who examined ways that social and economic power were exerted in society.

outsiders. It can also be "fickle and inconsistent" and changing over time. Nevertheless powerful agents across the domains will have the ability to encourage support for a reform initiative, or to discourage progress. The impact of these authorisers goes far beyond assenting to a reform; they can determine "who will be involved in building this capability, how the process will work, how long it will continue, and what it will involve." It is essential for reformers to understand and navigate this authorizing environment if they are to make progress.

Another complication Andrews et al. recognize from New Institutional scholars[64] is that many authorisers are by dint of their powerful position likely to want to maintain the status quo, rather than take the risks, uncertainty and possible failure associated with big changes.

Authorisers will also have to understand and buy-in to the principles of PDIA.

c) Iterating and adapting

Andrews et al. maintain that reformers should incrementally[65] find a "pathway" [66]towards solutions by "iterating, experimenting and learning". [67] Any temptation towards immediate or "best-practice" solutions should be avoided as they are unlikely to address all the issues, unlikely to be accepted by local staff who see the full complexity of the situation, unlikely to gain political acceptance, and they close down space for novelty and positive deviance to emerge.

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[64] Andrews, Pritchett, and Woolcock, 196 citing Greenwood and Suddaby, (2006), Pache and Santos (2013), Seo and Creed (2002), Waddock et al., (2015).

[65] Andrews et al. cite the influence of Charles Lindbaum (1959) who described the policy making process as one of "muddling through", where "A policy is directed at a problem; it is tried, altered, tried in altered form, altered again, and so on"

[66] Matt Andrews, "Explaining Positive Deviance in Public Sector Reforms in Development," *World Development* 74 (October 1, 2015): 197–208, https://doi.org/10.1016/j.worlddev.2015.04.017 cites Albert O. Hirschman's writing on implementation in development (Hirschman, 1967, p. 35) and the importance of thinking about development projects as journeys: "The term 'implementation' understates the complexity of the task of carrying out projects that are affected by a high degree of initial ignorance and uncertainty. Here 'project implementation' may often mean in fact a long voyage of discovery in the most varied domains, from technology to politics."

[67] Andrews et al., in many of their information resources on PDIA, use a metaphor to explain the approach. The use the journey of Lewis and Clark in 1804, a team of adventurers mapping out the territory in the United States of America from St Louis to the west coast. They contrast this with how to approach such a journey in 2015, with a car, infrastructure and Google maps, and ask 'Is Building State Capability a 2015 or 1804 Challenge?'

An incremental step-by-step approach towards addressing challenges is recommended. As reformers seek solutions to their problems in a complex environment typical of developing countries, they will be unable to see clearly beyond a few steps ahead. So instead of a linear step-wise approach, an iterative incrementalism will be a better strategy. With this, as each step is taken, reformers reorient by reflecting on their experience and learning, gather new resources, and then plan a next-step from their new vantage point. "Contextual challenges", including those provoked by the reform, are seen and considered as they emerge.[68] With this strategy the pathway emerges as the journey is undertaken; reformers can proceed apace, diverge sharply or take a step back as they find their way ultimately forward.[69]

Andrews et al. recommend acting on multiple solution ideas at a time, rather than one. Also, where appropriate the process can be accelerated to create momentum.

These features enable the benefits of positive deviance to emerge, where the search and deployment of context-appropriate solutions, even if in unconventional form, is encouraged by the authorizing environment. Small steps are relatively cheap and can achieve progress early in the reform journey. Achieving these "quick-wins" builds the confidence of the reform team, demonstrates success to detractors, and may attract potential allies.

Active learning is fundamental to this iterative method of making progress. Active learning requires an awareness of change and feedback from the environment as each small "real intervention in a real context" is taken. These lessons "becom[e] part of the landscape of knowledge and capacities 'at-hand' from which new arrangements emerge…".[70] The process should allow "attributes from various ideas", perhaps including best-practice and local innovation, to "coalesce into new hybrids" that are "locally legitimate".[71] Mechanisms are required to support the process by capturing any lessons learnt so as to best inform future decisions.

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[68] Andrews, Pritchett, and Woolcock, *UNU-WIDER Working Paper No. 2012/64 Escaping Capability Traps Through Problem Driven Iterative Adaptation (PDIA)*.

[69] Andrews et al. liken this to "crawling the design space available to …reformers". They explain that elements of PDIA share the ideas of design thinking process

[70] Andrews, Pritchett, and Woolcock, *UNU-WIDER Working Paper No. 2012/64 Escaping Capability Traps Through Problem Driven Iterative Adaptation (PDIA)*.

[71] Andrews, Pritchett, and Woolcock, *Building State Capability*, 171.

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d) Engaging broad sets of agents

Another PDIA principle is that there should be "breadth and depth of 'agency'"[72] to achieve the potential where reform is "likely to emerge and diffuse". [73] There are many reasons for this. Firstly, elites and central authorities who are the beneficiaries of the existing arrangements are not well motivated to institute change.[74] While they can play an important role in reforms, additional influences can help overcome any resistance caused by the nature of beneficiaries' embeddedness. Secondly, front-line civil servants and others on the periphery have less to lose by encouraging change from the existing arrangements, and may also have good insight into where problems lie. Thirdly, peripheral actors may also have roles in other networks, which represent different interests, and whose participation may bring more benefit than their exclusion. Fourthly, a more diverse representation will provide more diversity in understanding the problems, and in the range of ideas needed to confront the problem. Fifthly, public sector systems often span horizontally and vertically across functional areas and agencies. Affected parties bring knowledge of their specialist roles in the system, and their inclusion will encourage an authorizing environment in their domains. Sixthly, a diversity of leadership roles are required in major reform efforts, which are not likely to be embodied into one central leader; these roles can be broadly classified as "substantive", such as identifying problems and solutions, "procedural", such as providing authority, motivating, empowering and providing financial support, and "maintenance", such as convening stakeholders and connecting people.[75] These roles can be provided by the extended network of reform participants.

Andrews et al. believe that these four PDIA principles will "create enhanced possibilities of success". However, they caution not to see them as yet another "solution" or recipe. They should rather be interpreted broadly, where they accommodate a "wide range of implementation options".[76]

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[72] Andrews, Pritchett, and Woolcock, 218.

[73] Andrews, "Explaining Positive Deviance in Public Sector Reforms in Development."

[74] Andrews, Pritchett, and Woolcock, 239 cite The paradox of embedded agency, where the beneficiary of power have little interest in encouraging changes to any arrangemennt that benefits them.

[75] Matt Andrews, *The Limits of Institutional Reform in Development*, *The Limits of Institutional Reform in Development* (Cambridge University Press, 2013), https://doi.org/10.1017/cbo9781139060974 cited by Andrews et al.

[76] Andrews, Pritchett, and Woolcock, *UNU-WIDER Working Paper No. 2012/64 Escaping Capability Traps*

3.5 Methods for applying the PDIA principles

Andrews et al., in line with their non-prescriptive approach to the applying the ideas underpinning the four PDIA principles, give examples where practical methods have been used to apply these principles that include "design thinking, rapid results implementation modalities, agile policymaking, the use of problem trees and Ishikawa…in problem analysis, problem-driven political economy diagnostics, double-loop learning methods and more".[77]

Andrews et al. provide resources, including a book,[78] and free online video-based courses,[79] that provide the frameworks and tools to help practitioners think through and deploy the PDIA approach.

They include a number of tools and techniques that PDIA practitioners can adapt for use in their context. Some of these are discussed here:

Identifying good problems

Andrews et al. say the first step in doing PDIA is to "construct problems out of conditions, drawing attention to the need for change and bringing such change onto the social, political and administrative agenda".[80] They propose a problem construction process to "transform a solution and process-oriented condition into a 'good problem' that fosters real state building".[81] Their approach to constructing "good" problems is to:

a) Convene a select and diverse team of internal, engaged change agents, comprising the powerful and non-powerful, decision-makers and agitators.

b) The team is then challenged with a question: "What is the problem?"

Through Problem Driven Iterative Adaptation (PDIA).

[77] Andrews, Pritchett, and Woolcock, *Building State Capability*, 136.

[78] Andrews, Pritchett, and Woolcock, *Building State Capability*.

[79] Matt Andrews, Lant Pritchett, and Michael Woolcock, "PDIA: Building Capability by Delivering Results - YouTube," Youtube, accessed August 31, 2020, https://www.youtube.com/playlist?list=PLVJQsjaKb-4TOE5wna6IlcvpPCxbYRqZH.

[80] J Kingdon, Agendas, Alternatives and Public Policies, Agendas, Alternatives and Public Policies 2nd Edition, 2nd ed. (New York: HarperCollins, 1995) cited by Andrews et al. Langdon notes that "conditions become problems when we feel we should do something to change them" "Getting people to see a condition as a problem is a central political accomplishment".

[81] Andrews, Pritchett, and Woolcock, *Building State Capability*, 145.

c) Once the initial problem is agreed on, then the team is asked "Why does it matter?" When the team agrees on an underlying issue as the answer, this same question "Why does it matter?" is now asked of that underlying issue, resulting in a deeper underlying issue. This drilling-down into the answers is repeated up to 5 times.[82] The intention is to shift the focus from "conditions" that may be initially expressed, towards underlying tangible, actionable problems and deficiencies; towards a compelling problem statement.

d) With a potential "good" problem now identified, the team is asked two further questions: "To whom does it matter?", and "Who needs to care more?" Answering these questions explores whether the problem is one that people care about and "cannot be ignored" (so fulfilling a requirement for a "good" problem). It encourages the team to consider the stakeholders and the social dimensions of the challenge, not only the affected parties who may be directly impacted, but also the people who may have some responsibility for the problem, or with the potential to help address it. It is amongst these stakeholders that a participation in change process can be fostered.

e) The question "How do we get them to give it more attention?" then tests the teams insights and ideas into how to build and focus required energies and support.

f) A final question can be considered: "What will the problem look like when it is solved?", providing a positive vision to organize supporters and detractors around. [83]

To ensure the validity and defensibility of the outcomes, it is important that answers to all the questions are supported by evidence. This construction process requires a deft understanding and navigation of the power dynamics in the domain and the team, combining the inertia and intent of the powerful with the experience and knowledge of the front-line workers and other stakeholders. Care must be taken in the process to "inspire and encourage vision" and "mobilise action".[84]

Deconstruction activity

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[82] Andrews et al. call this process of recursively questioning the outcome the "5-why"

[83] Recall the definition of a "good" problem: "Good" problems are those that matter – that people care about - and cannot be ignored, can be broken down into easily addressed underlying causes, and allow for real, sequenced and strategic responses.

[84] Andrews, Pritchett, and Woolcock, *Building State Capability*, 148 They also suggest including elements of Appreciative Enquiry, using it to discover what the problem-driven work can deliver.

An agreed problem can be weighty and imposing in scope and nature, and could appear intractable. Andrews et al. recommend a process of deconstructing the problem into its underlying causes. This encourages a fuller exploration of all aspects of the problem, and helps to break the problem down into smaller and more easily understood parts that can then be tactically approached for local solution building.

Learning from production process theory used by Toyota to find and sustainably address problems in its production lines, [85] Andrews et al. recommend using tools such as the "5 why technique" and fishbone diagrams to break the problem down into its "causal roots" and to visualize the findings.

The "5-why technique" starts with the problem that the reformers are considering (see Figure 6 for illustrative example). They pose the question: "Why is this problem occurring", and then seek out a number of evidence-based answers (answer 1.1, 2.1, 3.1…), which are visually recorded. Then, for each answer (let us say answer 1.1), the question is asked "Why does this happen?" and the answer (answer 1.2) recorded. For this answer (answer 1.2) the question is repeated "Why does this happen?" and the answer (answer 1.3) recorded. This is repeated twice more (achieving answer 1.4 and finally answer 1.5)

A "5 why" exercise (with authors' illustrative example in italics)					
Why 1	Why is the problem occurring? Why do government laptops need to be replaced on average every 2 years	Answer 1.1 Laptops are not maintained	Answer 2.1 Laptops disappear	Answer 3.1 Laptops are poor quality	Etc.
Why 2	Why does this happen?	Answer 1.2 Nobody is	Answer 2.2 Staff take the	Answer 3.2 The procurement	

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[85] Jeffrey Liker, *The Toyota Way: Fourteen Management Principles From the World S Greatest Manufacturer*, *McGraw-Hill*, 2004; Taiichi Ohno, "Toyota Production System Summary," in *Toyota Production System: Beyond Large-Scale Production* (New York: Productivity Press, 1988), 152, https://doi.org/10.1108/eb054703 cited by Andrews et al. (2017) .

		given the responsibility to do maintenance	workstations home	office does not ask the IT department for its recommendations	
Why 3	Why does this happen?	Answer 1.3 Laptops are not included in the asset management protocols when they are provided	Answer 2.3 The office has frequent power outages, so staff need to work from home	Answer 3.3 The procurement office has its own people that they trust to make recommendations	
Why 4	Why does this happen?	Answer 1.4 Laptops are usually donated, and IT donations are not required to be entered in the Asset Management System	Answer 2.4 The power utility cuts off the power	Answer 3.4 There is no regulation guiding the procurement department on IT purchases	
Why 5	Why does this happen?	Answer 1.5 The protocols for donated IT equipment have not been updated in 10 years	Answer 2.5 The ministry does not pay its electricity bill timeously every month	Answer 3.5 The minister has not signed the regulations which were finalized 4 years ago	

Figure 6 - A '5 why' example exercise

In reality there may be many answers (e.g. 4.1, 5.1 etc.) to the question, and with sufficient evidence all should be included. The "5 whys" then unpack each answer into an analysis of their underlying causes. Andrews et al. describe this process as "allow[ing] one to identify multiple root causes and to interrogate each cause in depth."[86]

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[86] Andrews, Pritchett, and Woolcock, *Building State Capability*, 151.

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These findings can be recorded in a fishbone diagram (see Figure 7 for illustrative example) which illustrates the presenting problem as being composed of "fish-bones" of causes, which are in turn composed of sub-causes

Laptops are poor quality

The protocols for donated IT equipment have not been updated

IT donations not reqd. to be entered in Asset Management System

Laptops are not included in the asset management protocols

Nobody is given the responsibility to do maintenance

Laptops disappear

The ministry does not pay its electricity bill timeously every month

The power utility cuts off the power

Office power outages, so staff need to work from home

Staff take the workstations home

Govt. laptops need to be replaced on avg. every 2 years

Procurement office doesn't ask IT dept. for its recommendations

Procurement office has own people they trust to make recommendations

No regs guiding procurement dept. on IT purchases

Minister hasn't signed regs which were finalized 4 years ago

Answer 4.1

Laptops are not maintained

Figure 7 - Fishbone diagram

Andrews et al. argue that this deconstruction process "breaks often intractable and complex problems down into manageable, bite-sized pieces". The "real solution" to large problems is through "small solutions" to these smaller pieces ("causal strands").[87] It also helps the team to understand that there is no single solution to the larger problem, with many ways to intervene.

The process of selecting which of the smaller causal strands to pursue, and in what order, is "key" to the PDIA process. In PDIA this sequencing is a step-by-step determined by "contextual opportunities and constraints" which offer "space for change." Andrews et al. define a heuristic to help reformers know where to start and where to move next.[88] This heuristic helps identify "space for change" and can be applied to any piece of the deconstructed problem. Three factors (triple-A factors) enable or constrain the change space:

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[87] Andrews, Pritchett, and Woolcock, 152.

[88] Andrews, Pritchett, and Woolcock, *Building State Capability*, 158 They stress that this is not a scientific approach at assessing change readiness, but is a tool to generate important and helpful questions.

a) Authority – Change requires some mix of political, legal, organizational and personal support from one or more authorisers, dependent on the context

b) Acceptance – Change will impact people, depending on their role and place in the system. Change requires their willingness or ability to accept these changes

c) Ability – Change requires the ability – skills, time, financial and other resources - to implement it

The rationale for the heuristic is that any change requires an authorizing environment, willingness from affected parties, and an ability to execute the change process. A reform team should assess each causal-strand of the deconstructed puzzle by these factors, establish how much of each exists, and the gap with what is needed to proceed.

If each factor is assessed to be either *Large*, *Mid*, or *Low*, the change space can be illustrated graphically (see Figure 8). Here it can be seen that the largest change space is obtained when all three factors are *Large*: *Large* Authority, *Large* Acceptance and *Large* Ability. With two factors being *Large*, there is a small change space. With only one factor being *Large* there is no change space, regardless of the state of the other two factors.

The assessment of the triple-A factors for each causal strand can be mapped onto the fishbone diagram derived earlier in the process (see Figure 9). The diagram provides illustrative triple-A assessments on three causal-strands, depicting "No, "Small", and "Large" change spaces. If these assessments were to be made on all causal strands, it would provide a map of opportunity to initiate change. Causal strands with:

a) "Large Change Space" are well placed to begin with reforms.

b) "Small Change Space" could proceed, but will benefit from growing the *Mid* "A", and

c) "No Change Space" will require growing the *Mid* and *Low* "A"'s before attempting reform.
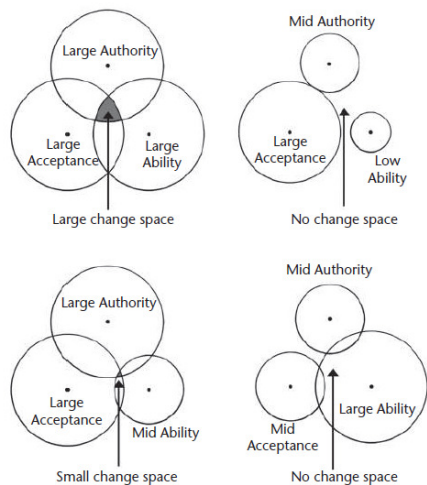
Figure 8 – Triple-A Change space possibilities[89]
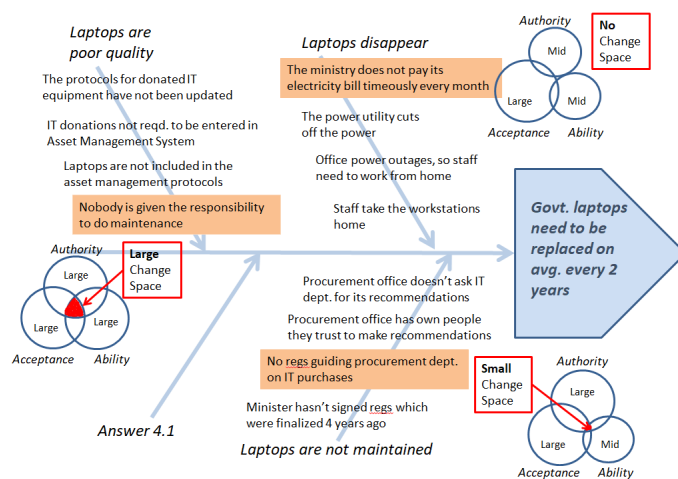
Figure 9 - Fishbone diagram with Triple-A assessments on example strands

Growing the *Low* or *Mid* A's requires the reform team to consider how they could improve the weak factors. For example, should Authority be assessed as *Mid* or *Low* the team could consider how this can be improved; it could be fairly straightforward, such as informing and gaining the support of potential authorisers who are not aware of the issue, or it could be difficult and require tactics that will take considerable time and effort to have any chance at achieving improved authority. Together with an understanding of those causal strands with "Good change space", this helps the team develop an initial informed map of the terrain. The map shows where the reformers can act, and how they

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[89] Andrews, Pritchett, and Woolcock, 161.

should be doing it. This map can guide initial sequencing,[90] and be developed and improved as the reform journey is undertaken.

Reform teams may yet be confronted by a bewildering set of choices as to what to do when addressing complex problems. Andrews et al. propose a core PDIA principle, that what to do "must emerge through active iteration, experimentation, and learning"; that they "cannot be pre-planned or developed in a passive or academic fashion by specialists applying knowledge from other contexts".[91] An "iterative incrementalism" is required, [92] allowing reformers to take small, perhaps experimental steps, learning through the process, and adapting their planned pathway to the newly acquired knowledge.

Andrews et al. term this search for solutions as "crawling the design space".[93] They develop a diagram of a stylized design space (see Figure 10) to illustrate a number of areas to search for solutions. The scaled vertical axis indicates whether technically correct ideas already exist that have been shown to solve a problem. The scaled horizontal axis indicates whether an idea is administratively and politically possible in the relevant context.
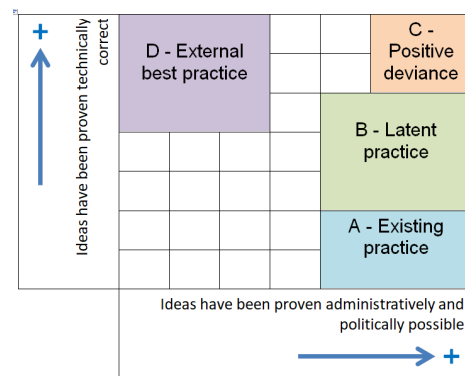
Figure 10 - Design space: sources of ideas[94]

The four zones in the design space are all sources of ideas. They are briefly discussed:

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[90] Andrews, Pritchett, and Woolcock, 169. stress the importance of identifying quick-wins from the "Good change space", which will "[build] the authorization for reform…and will likely grow the change space in other areas"

[91] Andrews, Pritchett, and Woolcock, 168.

[92] Andrews, Pritchett, and Woolcock, 170 also suggest that the cadence of activity should be quick; actions steps should be rapid, and lessons quickly gathered.

[93] Andrews, Pritchett, and Woolcock, 171.

[94] Andrews, Pritchett, and Woolcock, 172.

a) Area A – Existing Practice. Here ideas are administratively and politically possible, but have shown not to be the technically correct solution. Starting from existing practice empowers embedded local actors, harnessing their knowledge to gain good insight into how things work and what strengths and weaknesses are in existing arrangements. Their support can be gained through their participation in the reform efforts, bolstering local ownership and leadership of the process and encouraging sustainability of the outcomes.

b) Area B – Latent practice. The zone of ideas that are administratively and politically possible and will be more correct than existing practice, but that will require effort to emerge. This draws from the knowledge of staff embedded in local practice. The belief is that with their close involvement and observation they will be a store of latent novel ideas that will aid reform; with encouragement they will develop new and valuable ideas that go beyond making improvements within existing practice.

c) Area C – Positive deviance. The zone of ideas of positive deviance, being proven good ideas that are shown to be technically good, but are hidden or not mainstream, and may already be implemented in the change context. Finding these ideas, bringing them to light and encouraging replication may allow their benefits to proliferate.

d) Area D – External best practice.   The zone of ideas which have been shown to be technically good ideas in other contexts, but have not been shown to be administratively and politically possible in the local change context. When drawing ideas from this zone care should be taken to avoid the "prevalent desire to search for the 'one best way'",[95] and to instead search for multiple examples of best practice, preferably from contexts that are similar to the change context. Care should also be taken to effectively translate these external ideas into the local change context.

Andrews et al. recommend, on the selection and iteration process, to always try more than one idea at a time. Seldom will one idea be clearly better than another. Instead, with learning and adaptation locally constructed hybrid solutions will develop, drawing from many attempted ideas.[96] Efforts should work with tight time boundaries at the early

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[95] Andrews, Pritchett, and Woolcock, 175.
[96] Andrews, Pritchett, and Woolcock, 175.

stages of the process to build momentum and establish an "action-oriented work culture".[97] Iterations should be "rapid and aggressive", and the process should have "structure and discipline" and not be "haphazard and informal" as it needs to establish credibility and build support.[98] To build local agents knowledge, which is an essential requirement for effective capability, "intense and applied" opportunities for learning should be integrated into all aspects of the process.[99] Much of the learning that must be facilitated is experiential in nature, where instead of being a passive receiver of knowledge as is all too common in capacity building efforts, the learner is both "source and creator of emergent knowledge".[100]

The Searchframe

The dominant convention among funders and other development organisations is to use linear planning methods, such as logframes, which are not well suited to iterative, adaptive learning methods.[101] Andrews et al. propose an alternative mechanism for complex challenges, being the Searchframe, a "logframe-type" mechanism to structure planning into PDIA methods.

The Searchframe illustrates to authorisers a commitment towards an intentional and rigorous process, specifying what can be known, while also accommodating the adaptive nature of PDIA progress. The reform team, in the construction and deconstruction process, will set an aspirational goal that sets the end-point and proposed successful outcome of the reform effort (see Figure 11). The team will define, and commit to achieving successive proposed focal points on the path towards achieving this aspirational goal. These focal points would explain what would have been achieved by this stage in the process. At the start of the project only the initial focal points might be tightly defined, given the uncertainties as to how the project will unfold. As the reform journey proceeds and the road ahead becomes more certain, the later focal points would become more detailed.

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[97] Andrews, Pritchett, and Woolcock, 179.

[98] Andrews, Pritchett, and Woolcock, 183.

[99] Andrews, Pritchett, and Woolcock, 188.

[100] Andrews, Pritchett, and Woolcock, 189.

[101] Andrews, Pritchett, and Woolcock, 184.
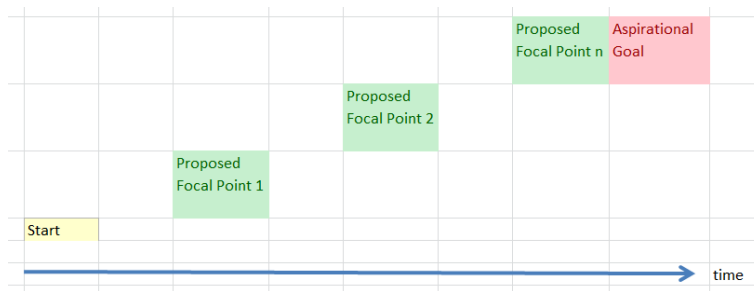
Figure 11 - Searchframe - setting the focal points[102]

PDIA comprises a repetitive set of iterations, where ideas are selected, implemented, reviewed (at a check-in) and then the next iteration planned and implemented. These steps are illustrated in Figure 12. A set of iterations comprising the journey to the first proposed focal point (focal point 1) is illustrated as:

a) Iteration 1a – the design, selection and implementation of the first iteration

b) Check-in of 1a – the review and learning of iteration 1a

c) Iteration 1b - the design, selection and implementation of the second iteration

d) Check-in of 1b– the review and learning of iteration 1b

e) This is repeated for as many iterations are required to achieve the proposed focal point 1

A similar process of iteration will be constructed and implemented to complete the journey from proposed focal point 1 to proposed focal point 2, and then onwards towards any further focal points, eventually culminating in achieving the aspirational goal

In developing the reporting arrangements to the authorisers, the reform team will specify the number of iterations between each proposed focal point. They will commit to reporting back on the detailed findings of each check-in as it is completed, and on the composition and target completion date of the next iteration. Note that only the immediate next iteration is fully defined at any one time. This scheduled and detailed reporting to the authorisers will help foster their commitment by illustrating purposive activity in addressing the problem, and by giving them insight into the issues, challenges and learnings that are uncovered during the process.

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[102] Andrews, Pritchett, and Woolcock, *Building State Capability*.
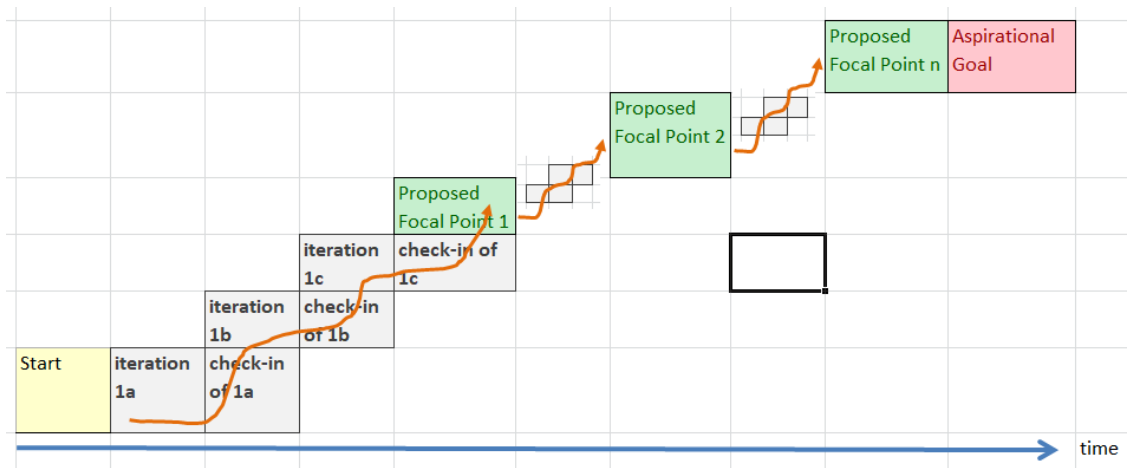
Figure 12 - Searchframe - an iterative, adaptive process[103]

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[103] adapted from Andrews, Pritchett, and Woolcock, 185.

Chapter 4.

Digital Liberia and Electronic Governance Activity (DLEG)

This section provides an overview of the Digital Liberia activity, its composition, the reasons why it was programmed and its intended technical objectives. It describes its technical approach, including its intention to utilise a PDIA approach. The activity's contractual expected results are shown. The component of the Digital Liberia activity that is the focus of this study is distinguished. Key aspects of the activity's governance are described. A model describes how the activity delivered its services to a portfolio of reform initiatives. The methods of managing these initiatives are described, including the methods for their identification and approval, the composition of the project teams, the integration of performance management techniques and their reporting artefacts and routines.

4.1   Background

Liberia, an economically poor country already facing significant challenges to its development, was severely impacted by the outbreak of the 2014 Ebola Virus Disease. By the time the country was declared Ebola-free in September 2016[104] the effects of the epidemic were wide-spread, with significant social and economic damage. 5000 lives had been lost, with "significantly higher unemployment, lost incomes, lower schooling, and less food consumption". The 2015 deficit was estimated at 8.5% with real GDP growth estimated to fall from 8.7% in 2013 to 0.3% in 2015.[105] The estimated

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[104] "WHO | Ebola Transmission in Liberia over. Nation Enters 90-Day Intensive Surveillance Period," *WHO*, 2015.

[105] Ali Zafar, Cyrus Talati, and Errol Graham, "2014-2015 WEST AFRICA EBOLA CRISIS: IMPACT UPDATE," 2016.

comprehensive economic and social burden from the 2014 outbreak to the West African region was estimated to be $53.19 billion.[106]

With the immediate health emergency contained, local and international actors implemented plans to assist the country to recover from these setbacks.

4.2   Program Overview

The Digital Liberia and Electronic Government[107] (eGov) Activity (Digital Liberia) was a USAID funded program to strengthen the Government of Liberia's (GOL) Information and Communications Technology (ICT) capacity and improve its digital connectivity. The rationale for the program was rooted in the 2103-2015 Ebola epidemic in Liberia, which had "exposed a fundamental fragility in the social contract and the inability of the central government to provide essential services, including information to Liberian citizens". The belief was that "better information could have saved thousands of lives and stronger communications and digital integration within the Government of Liberia would have been invaluable in aiding the government in its response". Recognising this Digital Liberia was programmed to help GOL recover from the impact of the epidemic, and "to better prepare the GOL to prevent, detect, and respond to potential future health crises".[108]

Digital Liberia began in October 2016, completing three and half years later.

Digital Liberia described its aims as "to improve government's performance and bring government closer to citizens by assisting it to develop its internet and computer technology capability. This is achieved through provision of technical assistance to help improve the connectivity and institutional capacity necessary to provide effective services. The Activity also seeks to increase sustainable utilization of ICT related systems, processes, and procedures at targeted Ministries, Agencies and Commissions (MACs) to improve government decision making and management. By supporting the

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[106] Caroline Huber, Lyn Finelli, and Warren Stevens, "The Economic and Social Burden of the 2014 Ebola Outbreak in West Africa," in *Journal of Infectious Diseases*, 2018, https://doi.org/10.1093/infdis/jiy213.

[107] The activity's technical documents tend to use an activity name of 'Digital Liberia and Electronic Government", abbreviated to "Digital Liberia and eGovernment", rather than use the 'Governance' term which is the contractual name. This study infers from this, and from the planned and actual activities of the project, that eGovernment more correctly describes the activity, and uses this term

[108] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Final Report," 2020.

capacity development of government internet services provision, the Activity works to extend inter-agency connectivity"

Digital Liberia had two broad technical objectives:

a) Objective 1: to increase sustainable ICT utilization at targeted MACs to improve government decision-making and management.

b) Objective 2: to support the capacity development of government internet service provisioning. [109]

The Digital Liberia Activity was jointly implemented by two separate implementing partners[110], IBI and Chemonics International (Chemonics). While they had a "one project approach", with a shared field office, a common activity governance model, and "collaborated, coordinated, and shared information on implementation approaches", IBI was contractually tasked with fulfilment of Objective 1, and Chemonics International with Objective 2.

4.3   Technical approach

Digital Liberia recognized early on in the activity the challenges to achieving its objectives, with the government facing "many, often inter-related and inter-mingled obstacles and uncertainties that impede its ability to achieve … improvements" and with "no clear path on how best to navigate forward through these 'wicked' challenges". [111] Its planned response to this reality was to assert the importance of relevant local stakeholders leading, designing and implementing any reforms, with their "[d]eep understanding of local context, heightened situational awareness, appreciation of local behaviors, local memory, tacit knowledge and trusted relationships, and 'skin-in-the-game'".

Digital Liberia's plans were to assist GOL to:

a) "identify and encourage participation of relevant stakeholders, including inter-institutional and inter-disciplinary participation,

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[109] DLEG also terms these 'objectives' as 'components' when discussing their implementation. That is, 'Component 1' is that functional part of DLEG responsible for implementing 'Objective 1'

[110] 'Implementing partner' is the term USAID uses to describe an organisation they contract to implement a programmed activity

[111] IBI & Chemonics, "Digital Liberia and Electronic Government (EGov) Activity: Annual Work Plan Oct 1, 2017 to Sep 30, 2018," 2017, 1.

b) identify available resources that can be marshalled,

c) design and deploy its institutional framework to more effectively organize and house its ICT capabilities,

d) develop the knowledge, skills and behaviors in the bureaucrats and officials within this institutional framework to identify desirable reforms and ICT investments, and to successfully deliver these improvements,

e) deploy these improved capabilities on prioritized ICT initiatives"

Digital Liberia planned to use the PDIA approach to implementation. It characterizes this approach as "a GOL-driven step-by-step discovery, using available resources, of what is possible in the near-term to progress towards aspirational goals, and then working to achieve these possibilities. The process is typically not a straight line … but involves experimentation, failure and setbacks, and frequent shifts in direction in adapting to found realities. It is a method of 'crossing the river by feeling for the stones'…of on-the-job learning-while-doing that builds confidence and best encourages new behaviors that will be sustained."

4.4   Expected Results

Digital Liberia was contractually required to achieve specified results by the end of the contract period. [112] These expected results are detailed for each of the objectives:

Objective 1:

a) "Targeted MACS with sustainable and institutionalized ICT systems, processes and procedures enabling improved decision making, management and strategic communication.

b) Increase in timely, accurate and transparent information available for informed decision making and management of government resources

c) Identification and Prioritization of systems and procedures to digitize through ICT and change management support.

d) Change management process and planning to implement and institutionalize digitized processes and procedures at targeted MACS.

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[112] IBI & Chemonics, 3 where it is stated: "The expected results … are directly from the Digital Liberia contracts.". This reference is to the implementation contracts between USAID and the activity's implementing partners

e) Build technical capacity of ICT Personnel at targeted MACs."

.Objective 2:

a) "Government Internet Services Provisioning available to prioritized MACs and their individual facilities

b) 10 –15 MACs provisioned with improved connectivity

c) Development of Concept of Operations [for Libtelco]

d) Standard Operating Procedures (SOPs), Tender Templates, Provisioning Guidelines, etc. [for internet provisioning across government]

e) Broadband Communications and Value-Added Services (VAS) Procurement

f) Design for Shared Infrastructure and Application Services"[113]

4.5   Study Focus

As has been summarized above Digital Liberia had a common approach and governance structure for the two objectives. However the implementation had two distinct objectives (or components), each being the responsibility of separate implementing partners. This study limits its focus to the implementation modalities of the Objective 1 component. To draw the distinction between the entire activity (Digital Liberia), this study uses the term DLEG for that portion of the Digital Liberia responsible for the implementation of Objective 1.

4.6   Governance model

Digital Liberia recognised two key guiding policy documents, being the National eGovernment Strategy[114] and the revised National ICT Policy[115], which "provide the mandate for Digital Liberia activities, with the MoPT providing interpretation for project application."

There were two structures at the heart of Digital Liberia's governance, being a Project Advisory Council (PAC) and an eGovernment technical working group (eGov TWG). A Project Advisory Council was set up to "create increased ownership and sustainability of Digital Liberia activities" and to provide Digital Liberia with "guidance on GOL

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[113] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY2017," 2017, 2.

[114] "Republic of Liberia E-Government Strategy (2014-2018)" (2014).

[115] Government of Liberia, "Government of Liberia National ICT Policy (2008-2018)" (2010).

priorities and [authorize] areas for project support[116]. Chaired by the Minister of Posts and Telecommunications, the council included leaders from eight (later extended to 10) relevant MACs. [117] An eGovernment technical working group (eGovernment TWG), operating under the mandate of the CIO Office,[118] was established to "offer technical guidance to the PAC, [ensure] operational alignment of [Digital Liberia] activities to national priorities, assist in coordination, and accelerate the adoption of standards across all ICT initiatives in government." Initially members included technical representatives from 9 MACs.[119] During the life of the project this working group transitioned in stages to the Chief Information Officer (CIO) Council, which took over the eGovernment TWG's governance role in Digital Liberia. The CIO Council is the institutional body responsible for the strategic implementation of the e-Government Strategy. Its role is to set and oversees GOL ICT standards, encourage coordination and harmonization of efforts and ICT development and implementation across government, and to endorse and review ICT strategic direction and initiatives.[120]

At the start of Digital Liberia its governance model was "visualized as a stand-alone, specific, Digital Liberia model". Within the first year, however, it was realigned to be closer to the Liberian government national eGovernment model, recognizing that this would gain Digital Liberia and its efforts "better acceptance and authority". Digital Liberia adapted to "integrate its approach and activity closely [to] the implementation of the eGovernment Strategy, not least by supporting initiatives to better mainstream that Strategy, to develop the capability of the CIO Council (or its proxy), and to develop the capability of the PMO."

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[116] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Final Report," 3.

[117] Ministry of Posts and Telecommunications, Ministry of Finance and Development Planning, Public Procurement and Concessions Commission, Liberia Telecommunications Authority, Libtelco, Office of the President – President's Delivery Unit, Governance Commission, and Cable Consortium of Liberia (CCL). In Financial year 2019, the Civil Service Agency and University of Liberia were added.

[118] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY2017," 5.

[119] Ministry of Posts and Telecommunications, Liberia Revenue Authority, Ministry of Finance and Development Planning, Cable Consortium of Liberia, Ministry of Health, General Audit Commission, Ministry of Education, National Elections Commission, Ministry of Agriculture, Liberia Telecommunications Authority, Libtelco,and the PDU.

[120] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY 2019," 2019, 12.

4.7   Service Delivery model

DLEG was contractually required to provide technical assistance to GOL in three areas, being Change Management, Communications and Capacity Development. It also provided services to create effective stakeholder engagement, such as facilitating interaction and convening and hosting of meetings.

DLEG was project-based, in that it provided services to support a portfolio of separate ICT projects identified by GOL, and reported against these projects. The GOL term for these ICT projects was e-Initiatives; a term which this study adopts.[121] E-Initiatives could be any ICT-related project, either located within a MAC, or cross-cutting. An e-Initiative could be small and simple, such as building the capacity of a small team in a technical skill, or it could be large and complex, such as developing a new national ICT Policy. E-Initiatives were varied in nature; examples include the design or deployment of an information system, the diffusion of a strategy or plan, and the reform of an administrative function.

Figure 13 illustrates the DLEG services delivery model, with an overlay of DLEG services onto a model of the GOL e-Government Strategy. [122] This e-Government Strategy model begins with the setting and administration of a government-wide ICT governance model (the top blue horizontal text box labelled 'Global Governance'). This governance model would lead to the identification and prioritization of a diverse set of approved e-Initiatives (the grey vertical columns). The typical services required to successfully complete any e-Initiative are categorised (alternating orange horizontal grid), being Project Governance, Monitoring and Evaluation, Change Management, Communications, Capacity Development, Resource Mobilisation and Specialist Services.

Two central government institutions, the CIO Council and the eLiberia Project Management Office (PMO), have key roles to ensure the global governance is in place and the required services available to e-Initiatives (service delivery is indicated by horizontal arrows).

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[121] E-Initiative is used in the GOL eGovernment Strategy to refer to initiatives that have a *digital* component, to distinguish these from *non-digital* initiatives. This study uses the word initiative to refer to either kind of initiative

[122] Republic of Liberia e-Government Strategy (2014-2018).

The CIO Council (blue text box on the left-hand side) is mandated by policy to implement the national ICT governance framework, to encourage the identification, selection and prioritisation of e-Initiatives within all government entities, to guide the formulation and adoption of the project-level governance for e-Initiatives, and to monitor and evaluate the performance of e-Initiatives

The eLiberia PMO is mandated to assist with the implementation of the e-Initiatives by implementing standards, implementing shared services, providing technical assistance to MACs and supporting the CIO office. This will include the delivery of shared technical services to the e-Initiatives, including change management support, communications support, capacity development support, and specialist technical services, such as web-site or data-base development.

The services that DLEG provides are then overlaid onto the e-Government Strategy Model, showing how they integrate into the ecosystem. DLEG (red text box on the right-hand-side) provides technical assistance services in Change Management, Communications and Capacity Development to the various e-Initiatives, where it is requested (indicated by the red tick marks).

While the depicted e-Initiatives are illustrative, two are highlighted as they develop the capability of the two key institutions, [123] described above, to perform their role:

a) "Build PMO capability" – With DLEG providing Change Management, Communications and Capacity Development support to the PMO, it is enhancing the PMOs ability to provide those services itself across the range of e-Initiatives as per it mandate.

b) "Build Council capability" – With DLEG providing capacity development support to the CIO Council, it is developing that Council's ability to perform its critical role in governance and oversight of government-wide ICT efforts

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[123] This shows a plan for the sustainable exit of DLEG from the ecosystem on completion of the project, where their services are replaced by governments self-provision of the same services
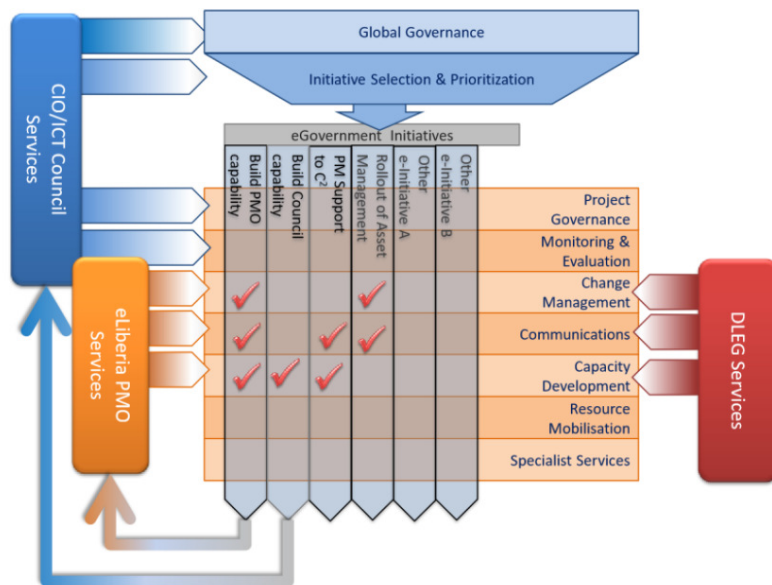
Figure 13 - DLEG Services Model[124]

4.8   Project Management of e-Initiatives

Identification and approval of e-Initiatives

At the start of the DLEG Activity the PAC determined the scope of the e-Initiatives to be supported, and together with the technical support of the eGov TWG they identified and approved a number of e-Initiatives. A number of these early approved e-Initiatives were to build government capability to implement its eGovernment Strategy, including e-Initiatives termed "Build ICT Council capability", "Build eLiberia PMO capability", and "Mainstream eGovernment Strategy". This support helped design and develop protocols and tools to guide the identification and approval of ICT initiatives from across government. MACs that had identified ICT-related reforms completed concept notes[125] that outlined the need and justification for the reform, identified the relevant leadership and contacts, detailed any assistance required, and then submitted these to the eGov TWG. The TWG, guided by the dictates of the eGovernment Strategy, and in collaboration with the technical team of the applicant MAC, appraised the concept for technical fit. If it was considered feasible, then it was presented to the PAC who would consider it from a non-technical perspective, such as its priority, value and suitability for

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[124] source FY2018 DIGITAL LIBERIA ANNUAL REPORT," 2017, 33.

[125] Concept notes are submitted on a standard template: "Proposal to implement an e-Government initiative (E-INITIATIVE)"

support. If both the eGov TWG and the PAC approved the concept, the concept note was then developed into a more completely defined e-Initiative plan, subject to any recommendations and constraints that these oversight bodies provided. This plan then became the genesis of an approved e-Initiative.

Project Management Teams

Each e-Initiative identified a Project Implementation Team (PIT) responsible for making the decisions on how to proceed towards achieving the initiatives aspirational objectives, and in implementing these decisions. The members of each PIT were "key stakeholders and implementers"[126], and vary according to the needs of the e-Initiative, but could include technical staff from the host institution, technical assistants from DLEG or other external bodies, assigned personnel from the national CIO Office or PMO, and technical staff from other institutions. This team would meet regularly to assess progress, plan next steps, assign duties and set time frames. The PIT would report to their e-Initiative leadership. The PIT would collaborate with the eGov TWG, presenting regularly at TWG meetings to share plans and experiences with the wider government ICT community and to solicit their assistance in problem-solving.

Performance management of e-Initiatives

DLEG was contractually required to ensure that only those e-Initiatives that met periodic agreed performance targets would be considered for ongoing support by the project. This performance-based process of assessment was to foster an "informal competition approach [to] help assure that the maximum benefit is extracted from very limited [contracted Activity] resources".[127]

DLEG developed a project management framework for the e-Initiatives that was "adapted to" the PDIA approach, and integrated the required performance-basis. The framework

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[126] IBI & Chemonics, "Digital Liberia and Electronic Government (EGov) Activity: Annual Work Plan Oct 1, 2017 to Sep 30, 2018," 62.

[127] CIO Office Government of Liberia, "E-Liberia Project Information Systems & Performance Management," accessed September 3, 2020, http://eliberia.gov.lr/download/6766/ citing the USAID contract with the implmenting partner.

would provide a "simple and good early warning system for non-performance or deviation from objectives."[128]

Recognising that progress of an e-Initiative "is not a straight line of progress towards completion, but rather is a journey of discovery that could include set-backs, loss of focus, indecision, and uncertainty how to proceed, before progress is regained', DLEG breaks the aspirational path of the initiative into stages (see Figure 14 for a conceptual representation). A stage is an "interim en-route goal that has been identified as significant to achieve". Only once a stage is substantially achieved is the next stage agreed to.
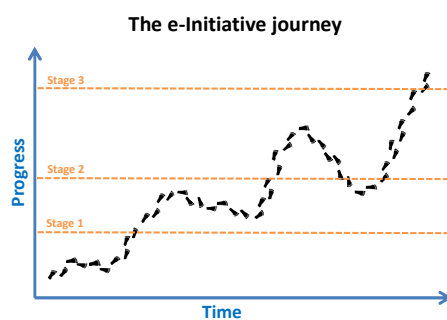
Figure 14 - Path of an e-Initiative[129]

Figure 15 uses a metaphor of a traveller crossing an unknown river to illustrate the concept. "The goal is to cross the unknown river. Our traveller navigates the crossing in stages, aiming for the next exposed safe rock. Once she has achieved a stage she evaluates her progress, and then plans the next stage, informed by what she has learnt, what resources she has with her, and what she now judges as achievable from her new perspective. Only from this rock can she see the threats and opportunities that are invisible from the shore."

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[128] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY2017," 26.

[129] CIO Office Government of Liberia, "E-Liberia Project Information Systems & Performance Management."

Figure 15 - Crossing an unfamiliar river[130]

On project inception, or on satisfactory attainment of a stage, the new next stage is defined through a process of reflection and learning. A new stage is defined by the e-Initiative Project Team, and signed off by the project authoriser. Details of the stage definition include:

a) A description of the Stage

b) Key dates, being the start of the stage, and date of approval of the stage

c) Defined milestones and performance targets that would constitute successful completion of the stage

d) Any assumptions and comments on the specified performance targets

e) A performance appraisal is recorded on conclusion of a stage. Details include:

f) Key dates, being the date the stage was achieved, and the date it was evaluated

g) An evaluation of the attainment of stage targets

h) A signed recommendation, if the evaluation was positive, to proceed towards the following stage, or if it was negative, to not proceed

A recommendation not to proceed would be a red-flag to any decision to provide ongoing support to the e-Initiative.

While stages are significant markers, there could well be a number of interim steps needed to complete a stage. The steps, or activities, are "iteratively determined, implemented and evaluated" until the stage is considered complete. "Larger ambitions are broken down into smaller and realizable steps, with frequent stops for evaluation and

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[130] CIO Office Government of Liberia.

reorientation of the path ahead." This ongoing process of reflection, and reconsideration of how to proceed "allows GOL to be able to adapt its chosen path … towards achieving the objectives of each e-Initiative. Similarly, it allows [DLEG] to continuously learn and to adapt its support for best fit to the circumstances of each initiative" [131]

Documentation is developed over the life of the e-Initiative to record activities, progress, achievements, failures, and learnings.

Figure 16 diagrammatically illustrates the life of an e-Initiative through this staging process. There are a number of stages. Within each stage there are a number of activities ("Stage 1: Activity") after which a performance assessment is undertaken ("Stage success?"). If the assessment is negative ("No") the e-Initiative goes for review and support can be withdrawn ("Initiative review/End"). If the assessment is positive ("Yes"), an assessment is made whether the e-Initiative is completed. If not completed ("No"), then the next sequential stage begins. This process iterates until the e-Initiative is assessed as having achieved its objectives. Documentation (Green document symbols) is generated at the activity level for each stage

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[131] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY2017," 27.

DLEG: Initiative build-out
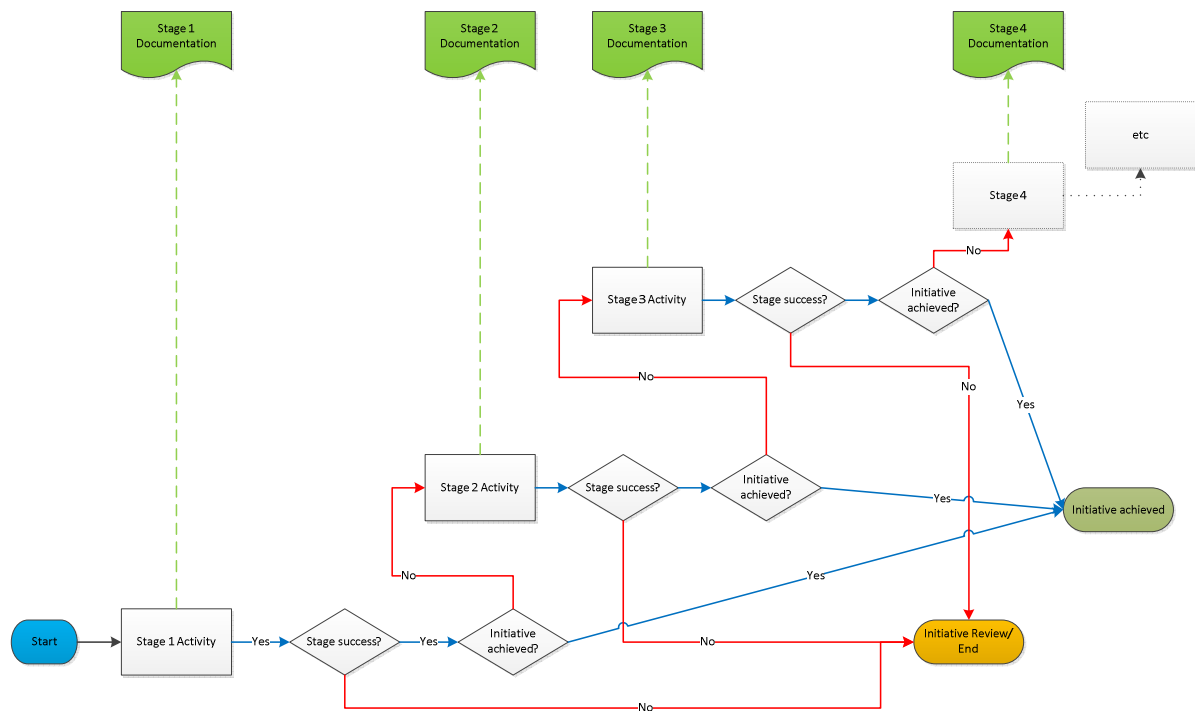
Figure 16 - Stage workflow through life of an e-Initiative

Project Documentation

Standard documentation was developed to guide administration of an e-Initiative through its life-cycle. These standard documents[132] included:

a) Proposal to implement an e-Government Initiative – A document outlining the proposed reform, explaining why it is needed, the problems it will solve, and the benefits it will provide. It lists the leadership and authorisers of the reform and the contact details of key personnel. It details supporting documentation, and any assistance required

b) E-Initiative Approval and Prioritisation record – A record of the approval (or not) of the proposal, detailing outcomes and recommendations. It classifies the

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[132] CIO Office Government of Liberia, "E-Liberia Proposal to Implement an e-Government Initiative (E-INITIATIVE)," accessed September 3, 2020, http://eliberia.gov.lr/download/6770/.

62

strategic fit of the e-Initiative, and assesses its criticality and feasibility in terms of the eGovernment Strategy criteria.[133]

c) E-Government initiative: Stage Definition - A document describing the intended goal of any one stage for an e-Initiative, recording key dates, including stage approval and start date. The performance targets indicating satisfactory completion of the stage are defined, together with any assumptions or further commentary to explain or contextualise those targets. The key activities that have been identified to complete the stage are listed. It is also a record of the outcome of the stage, indicating when it is completed or abandoned, and providing the assessment of the performance targets.

d) E-Government initiative: Stage Approval – a summarised register of all assessments of all stages for a specified e-Initiative. For each stage it details the findings of the assessment panel, providing the date, the decision to proceed or not, the panel members, and supporting comments. It also indicates whether the PIT agreed with the decision.

Digital Liberia produced regular project reports detailing its activities, progress and lessons learnt:

a) Annual reports; produced at the end of every USAID operational year (April-March)

b) Quarterly report; produced every quarter

c) Workplans; developed at the start of every USAID operational year

d) Final Report; on completion of the DLEG Activity

e) Monitoring, evaluation and learning plans, and associated reports

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[133] Republic of Liberia e-Government Strategy (2014-2018).

Chapter 5.

Qualifying Digital Liberia and Electronic Governance Activity(DLEG) as a case-study

5.1   Overview

Given the study's research question is to evaluate the application of the PDIA approach from a CAS perspective,[134] it was necessary to validate that the selected case actually used the PDIA approach, and operated within a CAS.   The evaluation process is illustrated in Figure 17. Any feasible case must be shown to use a PDIA approach, and operate within a CAS, to qualify as a suitable case for this study. To achieve this the USAID Digital Liberia and eGovernance project was identified as a potential object of study. A high-level review of the project was undertaken, and a component of this project selected as the feasible case to be studied (which we refer to as DLEG).

The study determines whether DLEG used a PDIA project management approach. To do so, a set of research questions are selected to guide the analysis. [135] The DLEG project management approach is analysed against these research questions to determine if it is true to PDIA.

The study then determines whether DLEG operates within a CAS. To do so, a set of research questions are identified to guide the determination, and then applied to DLEG and its context.

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[134] Stake, 4 defines this as an instrumental case-study where we study the case to gain insight into a "puzzlement" or "general understanding".

[135] The selected research questions were developed by Andrews, an author of the PDIA approach, in his research (Andrews, "Explaining Positive Deviance in Public Sector Reforms in Development.") to guide an enquiry into whether any project uses either a PDIA or a more traditional 'top-down' approach.
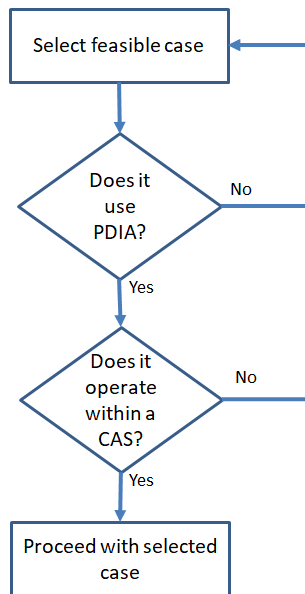
Figure 17 - Selecting a case study

5.2   Selecting an Evaluative framework for PDIA

This study's strategy of enquiry requires the selection of a case, being a reform project implemented in accordance with PDIA principles. An evaluative instrument, described below, was identified to guide the evaluation of any feasible case as having used PDIA.

Andrews conducted a study to help build theory about the intervention strategies that lead "to more effective solutions to public sector problems than is normal"; that is "positive deviants".[136] The study compared two competing theories, being "Solution- and leader-driven change" (SLDC) and PDIA.

The interpretation of PDIA is built on Andrews past work and consistent with the PDIA principles described in this study.

 The SLDC theory is that success results from a "disciplined, formal project process" where "solutions are fully identified up-front". The reform is "fully planned out at the start an implemented as planned". The reform initiative is driven by a champion, and best-practice is deployed.[137]

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[136] Andrews.

[137] These "established and entrenched views on what makes for effective reform in development" are in common with what this study refers to as the "traditional" approach to international donor-funded development projects

In Figure 18 four key questions are used to evaluate a reform projects' reform strategy, and are asked of each of the competing theories, organized by four characterizing hypotheses.

Key question	Solution and leader driven change (SLDC)	Problem driven iterative adaptation (PDIA)
What motivates reform?	H1. Successful reform is motivated by the promise of a solution *One expects reform solutions to be fully identified at the reform's start and that reforms will focus on implementing solutions*	H5. Successful reform is motivated by a problem (performance deficiency). *One expects that a problem will be clearly identified at the start of reform, promoting an appetite for change and a process of change*
How do reforms get implemented?	H2. Successful reform is implemented according to a specified plan of action *One expects to find that reform content is fully planned out at the start of the change process, and is implemented as planned*	H6. Successful reform emerges through a process of experimentation as agents find and fit content to context *One expects to find reform content emerging through a process of experimentation and trial and error*
Who leads the reform process?	H3. Successful reform is led by a champion; some high-level individual with authority *One expects to find a single individual in a high-level position identified consistently as "leader" of the reform*	H7. Successful reform is led by a group of agents who provide various functions required to make reform work *One expects to find multiple individuals identified as playing key functional roles in the reform process*
What do the "new" government/ governance structures look like?	H4. Successful reforms produce the "right" best practice solutions commonly argued as necessary to foster good governance *One expects final reform products to resemble pure form best practice solutions identified at reform's start*	H8. Successful reforms produce hybrid solutions that blend ideas from inside and outside the context; all fitted to the context *One expects to find that final reform products are mixed-form products of many influences; including best practices and internal ideas*

Figure 18. Two competing theories explaining positive deviance in public sector reform[138]

In the Andrews study the evaluative instrument and questions given in Figure 18 were used in a case-survey of 30 case-studies to establish evidence of how these competing theories were deployed as strategies in each case.

This study proposes to use this evaluative instrument to assess whether a feasible case is broadly compliant with the PDIA approach.

5.3 Analysis of DLEG case using a PDIA evaluative instrument

This study uses document analysis as a data collection method, "gathering, reviewing and interrogating relevant documents"[139]. O'Leary cautions, additional to the bias of the researcher which is common to most research techniques, of the bias of the author of the document. This bias can best understood by exploring the "unwitting" evidence about any documents, by asking questions related to "author, audience, circumstances of production, document type, whether it is a typical or exceptional example, the style, tone,

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[138] source: Andrews, "Explaining Positive Deviance in Public Sector Reforms in Development."
[139] O'Leary, *The Essential Guide to Doing Research*, 177.

agenda, political purpose, whether it contains facts, opinions, or both". An exploration to identify author bias in the research documents, based on the O'Leary guidance, was undertaken (see Appendix B for results).

The documents are then analysed using the interview technique[140] to illustrate the application of DLEG's methods in an evaluation and interpretation of two selected DLEG e-Initiatives, being the "Asset Management Information System" and "Build ICT/CIO Council capability" initiatives, as they developed through the life of the activity. (These are referred to as the "illustrative examples" in the evaluative framework below). The analysis is detailed in Appendix E.

The document analysis and the "illustrative examples" are then used to complete the evaluative instrument that assesses whether DLEG utilised a PDIA approach.

Evaluative instrument

The study adapts an evaluative instrument developed by Andrews (Figure 18) to evaluate whether DLEGs activity conforms to either a "Solution and Leader Driven" or a PDIA approach to change.

The evaluation of each key question is detailed below:

a) Key question: What motivates reform?

H1. Successful reform is motivated by the promise of a solution *One expects reform solutions to be fully identified at the reform's start and that reforms will focus on implementing solutions*	H5. Successful reform is motivated by a problem (performance deficiency). *One expects that a problem will be clearly identified at the start of reform, promoting an appetite for change and a process of change*
The USAID contract with Digital Liberia specified that Objective 1 (DLEG) should assist GOL to build its ICT capability through support for Change Management, Communications, and Capacity Development. Specifying these competencies suggests an attempt	Digital Liberia details this principle of developing "good problems" to lead the reform process in describing its approach in its work plans, and annual reports Entities seeking approval for an e-Initiative were required to complete a "Concept Note", using a standardised template.

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[140] O'Leary, 180.

at guiding reform efforts. However, it is apparent that Project Management was found to be a critical gap.[141]

The GOL ICT Policy and the eGovernment Strategy require certain reforms, such as the development of a CIO Council and of a Project Management Office. While the motivations for these reforms at the time of policy development could have been to address performance deficiencies, the requirement in policy could in itself motivate the reform (e.g. driven by the need to implement policy) | There is a prominent requirement on the template to detail the problems that the initiative would solve.

The "illustrative examples" provide evidence of e-Initiatives organising to address underlying performance deficiencies |

Key question: How do reforms get implemented?

H2. Successful reform is implemented according to a specified plan of action *One expects to find that reform content is fully planned out at the start of the change process, and is implemented as planned*	H6. Successful reform emerges through a process of experimentation as agents find and fit content to context *One expects to find reform content emerging through a process of experimentation and trial and error*
No evidence	Reform content in the form of e-Initiatives, was emergent, only being identified after the PAC had been established, and the TWG mobilised. E-Initiatives continued to be identified throughout the life of the

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[141] It is noteworthy that USAID did accommodate a shift to address the gap. Much of the support described in the technical reports is in project management, and later change references to "Change Management" to "Project/Change Management"

	project.
	Within e-Initiatives the protocols (detailed in technical reports,[142] and exhibited in project management artifacts)[143] were to use a process of exploration, discovery, and learning to navigate in a step-by-step fashion towards an aspirational outcome.
	The "illustrative examples" both provide evidence that the reform content within the e-Initiatives was emergent.

Key question: Who leads the reform process?

H3. Successful reform is led by a champion; some high-level individual with authority *One expects to find a single individual in a high-level position identified consistently as "leader" of the reform*	H7. Successful reform is led by a group of agents who provide various functions required to make reform work *One expects to find multiple individuals identified as playing key functional roles in the reform process*
Entities seeking approval for an e-Initiative were required to complete a "Concept Note", using a standardised template. There is a requirement to specify who the "champion" of the initiative will be.	Project documentation describes how separate institutional groups provided leadership and functional roles for all e-Initiatives. The Project Implementation Team (PIT) members were the primary designers and implementers of approved e-Initiatives. The PIT was composed of multiple stakeholders who would collectively collaborate and make decisions on problems and potential solutions. Where necessary the PIT would approach the institutional leadership[144] of their MAC for authorisation and guidance.

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[142] CIO Office Government of Liberia, "E-Liberia Project Information Systems & Performance Management"; IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY 2019."

[143] CIO Office Government of Liberia, "E-Liberia Proposal to Implement an e-Government Initiative (E-INITIATIVE)."

[144] Liberia MACs are headed by political appointees at the level of Minister, Deputy Ministers and Assistant

	The CIO Council would regularly host report-backs from PITs to assess progress, and encourage participation and technical problem-solving from other council representatives. The PAC received regular report-backs, and its members provided high-level direction and support (e.g. where a problem was beyond the institutional reach of the PIT) As e-Initiatives pass through different stages with defining technical requirements, the PIT would draw in technical assistants to advise and perform technical roles A panel considered approval for Stages and performance targets

Key question: What do the "new" government/ governance structures look like?

H4. Successful reforms produce the "right" best practice solutions commonly argued as necessary to foster good governance One expects final reform products to resemble pure form best practice solutions identified at reform's start	H8. Successful reforms produce hybrid solutions that blend ideas from inside and outside the context: all fitted to the context One expects to find that final reform products are mixed-form products of many influences; including best practices and internal ideas
No evidence	The "illustrative examples" both provide evidence that the reform products are novel and hybrid.

Interpretation of the evaluation

Key question: What motivates reform

Ministers or Director General, Deputy Director General, and Assistant Director General. Their support is key to any reform

Evidence of a SLDC approach to what motivates reform is weak. The contract between USAID and its implementing partners does specify the type of assistance that will be provided to GOL. It also specifies desired outcomes. However, these cannot be seen as fully identified solutions at the start of the project. Instead it requires that reforms are identified within the project. It is also noteworthy that the classification of the type of assistance that could be offered, and the detail of the desired outcomes, changed through the life of the project, suggesting that there was flexibility and adaptation by USAID.

Evidence of a PDIA approach to what motivates reform is strong. The principle of being problem-driven and seeking to address performance deficiencies is comprehensively asserted and discussed throughout DLEGs technical reports, reflected in GOL project artefacts, and demonstrated in the "illustrative examples"

Key question: How do reforms get implemented?

There is no evidence to suggest that reforms are implemented with a SLDC approach.

There is evidence that a PDIA approach was used. The emergence of reform content is exhibited at the level of the identification and approval of e-Initiatives, and within the processes of implementing initiatives. Evidence of emergence is also provided in the "illustrative examples"

Key question: Who leads the reform process?

There is a hint to suggest that reforms may be lead in a SLDC approach, by a requirement to specify a "Champion" for the initiative in the GOL project management artifacts. However, the role of the champion is not further asserted or demonstrated in any other study documentation. Given that an e-Initiative emanates from a MAC, we interpret this champion as being a well-placed focal point within the institution who would be able to propose and defend the initiative to institutional principals and other interested parties. They could well play a key role within the activity, but would depend on others to fulfil many types of leadership and technical roles

There is evidence that multiple individuals play key roles in the DLEG supported reforms. The importance of collaboration and team approaches is often referenced in the project documentation, and at multiple levels, with members of the PAC, CIO Council, and PIT are all encouraged to interact and participate in reform activity and draw in expertise when required.

Key question: What do the "new" government/ governance structures look like?

There is no evidence that the reform products reflect SLDC-type pure-form best practice.

The "illustrative examples" both provide evidence that the reform products are novel and hybrid, as expected in a PDIA approach

Conclusion of PDIA evaluation

DLEG conforms with a PDIA approach to reform efforts.

5.4   Analysis whether DLEG operates within a CAS

The research objective of this study is to explore the performance of a PDIA project management approach in complex adaptive environments. The method is an interpretive case-study. DLEG is proposed as a feasible case. To qualify DLEG as a suitable research case this study needs to established that DLEG operates in a CAS environment.

Views of the case from different levels

Cilliers described ten characteristics of complex systems.[145] This study evaluates how these characteristics manifest in the DLEG context.

To do this the study needs to frame the level of detail for the analysis.

DLEG provided GOL with an opportunity to receive technical assistance (within the scope of the project) in the approach, identification and execution of reform efforts. These can be summarised as:

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[145] Cilliers, *Complexity and Postmodernism*, 3.

a) Identification: Technical assistance to help GOL identify the issues they wanted to address (within the scope of the project)

b) Approach: Technical assistance for GOL to develop a strategy to address the issues

c) Execution: DLEG would then provide technical assistance, where requested by GOL, in the execution of the strategy. Technical assistance was available in the areas of project and change management, communications and capacity development.

GOL's response to this opportunity can be summarised as:

a) Identification: Convened whole-of-government PAC and CIO governance bodies, which decided on GOL needs.

b) Approach: Initiated a portfolio of projects[146] across government to address these needs, employing a PDIA approach.

c) Execution: The projects drew on DLEG, other development partner and private sector technical support when required

Figure 19 provides different views of GOLs response to this DLEG-supported project activity:

Diagram A provides an abstract simplified schema of the bureaucratic arrangement of GOL institutions. The Ministry of State heads a number of Ministries, Agencies and Commissions, which may have one or more departments. Many of these institutions were either directly or indirectly involved in interactions that touched the DLEG-supported activities. We term this the "Whole-of-government view"

Diagram B shows the field of study from a higher view. GOL interacted with "external" development partners in interactions that touched on DLEG-supported activities. Most of these interactions would have been with DLEG, but also directly with USAID and US Embassy. Other development partners that are mentioned include UNDP, The World Bank and International Monetary Fund. We term this the "Development partnership view"

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[146] GOL and DLEG refer to these projects as e-Initiatives

Diagram C shows the field of study from a lower view than the "Whole-of-government" view. The DLEG activity is executed through a portfolio of projects. Project P1 involves interaction with a single department while project P2 spans 2 departments in the same MAC. Project P3 spans multiple MACs, and Project P4 involved interactions with all MACs. We term this view the "Project view".[147]

It is important to the note that projects could have "external", non-governmental stakeholders. This is reflected in Diagram D which illustrates interaction of a project with citizens, suppliers and funders and possible others, which could include business groupings, special interest groups and so forth

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[147] Projects P1, P2, P3 and P4 are reflective of actual DLEG-supported e-Initiatives. Examples are given, with their aims:

P1: "Project Support to cSquared Rollout" - to build the project management capacity of a department within MOPT - being the eLiberia PMO – so they could play GOL's role in the deployment of the metropolitan area fibre network by a private sector consortium named cSquared

P2: "Assist LRA adoption of AMIS" - to deploy a digital asset management system across all departments at the LRA

P3: "Improve GOL GIS Capability" - to develop and implement a shared strategy for MACs who had geospatial needs and information resources

P4: "Mainstream ICT Policy & eGovernment Strategy" – to encourage the adoption of ICT policy and strategies across all of government
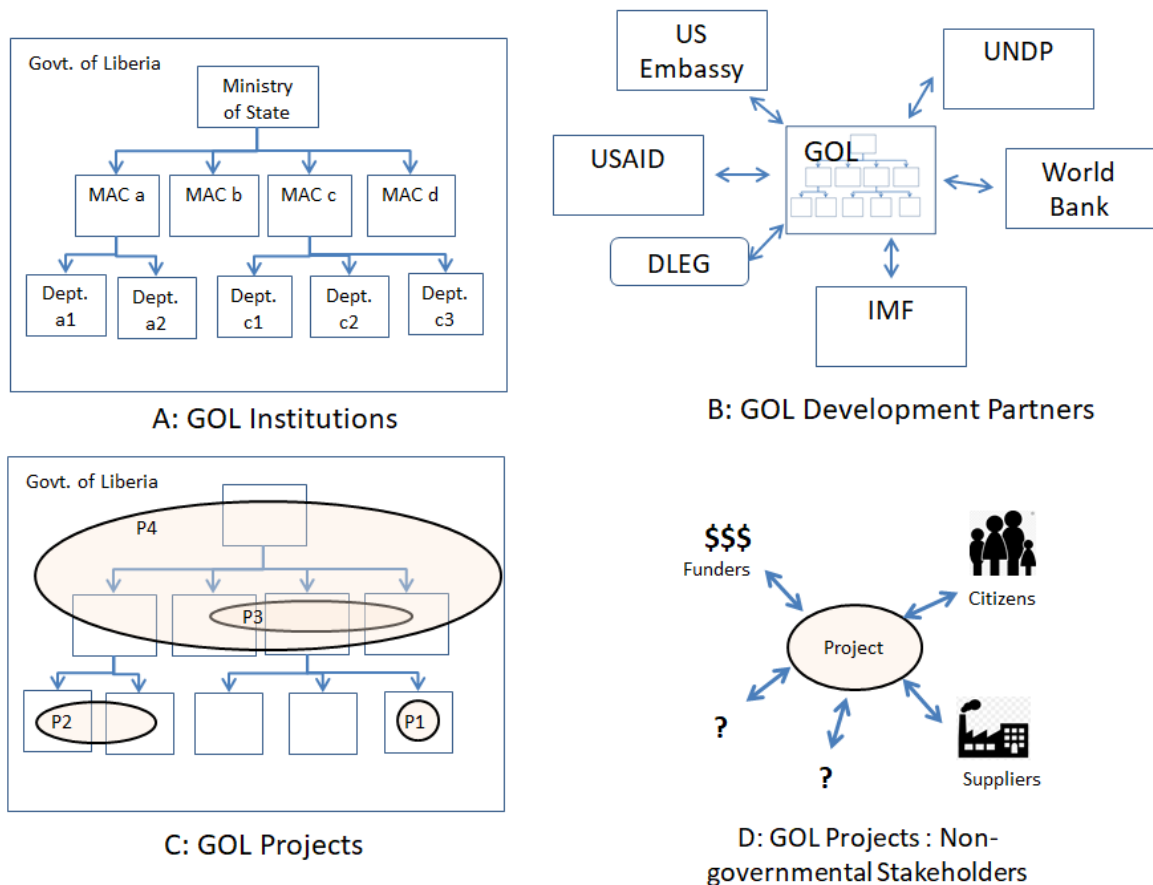
Figure 19 - DLEG-supported activity: A view from many levels

It is also important to clarify the perspective of the view. The view could be from DLEG's perspective or from GOL's. DLEG was an externally funded intervention to help build GOL's capabilities. DLEG was brought to life by USAID to support GOLs development efforts, and after 3 years ceased to exist, hopefully leaving GOL with enhanced capability. DLEG was transient; GOL persists. The impact and dynamics of the intervention will continue with GOL. For this reason this study takes a view from the GOL perspective, and then situates DLEG in this view.

The study analyses the project context against Cilliers' 10 characteristics of complex systems.[148] Initially the "Whole of Government view" is used for the analysis, followed by the "Development partnership view", and finally the "Project view".

Complexity of the "Whole of Government view"

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[148] Cilliers, *Complexity and Postmodernism*, 3.

1) Characteristic: Complex systems consist of a large number of involved people

Many thousands of GOL public and civil servants in the GOL are involved with or affected by ICT-related reform efforts. Citizens, business representatives, universities and special interest groups are also directly involved stakeholders.

2) The constituent people need to dynamically interact

The GOL civil servants, development partner staff, citizens, business people and others dynamically interact over time in formal and informal arrangements. They meet, correspond, interact on public fora and media, and use GOL DSOs

3) Characteristic: Interaction should be fairly rich, and not limited to a few constituents

GOL civil servants responsible or interested in ICT-based reforms are spread across GOL, providing ICT services to colleagues and stakeholders. Representatives from across government participate in centralised efforts to improve governance (such as the CIO Council or workshops to develop ICT policy and strategies

GOL interactions with development partners are frequent, rich and varied. Development partners also interact among themselves frequently to share knowledge, plans and progress and to co-ordinate efforts

4) Characteristic: Interactions should have a non-linear effect.

The interactions are non-linear. A statement from the President will have very much greater impact than the same statement from a junior minister. Some civil servants and other stakeholders are able to amplify their contributions, through social media feeds, newspaper columns. Rural constituents may speak loudly, but would not be heard as they may be isolated from central communication nodes.

5) Characteristic: Interactions should be primarily from local neighbours

Most interaction in the GOL civil service, being a bureaucracy, is with colleagues co-located in local organisational units, and servicing needs up and down the hierarchy.

Citizens interact with family and local community service providers. Business people interact through their local networks.

6) Characteristic: Positive and negative feedback loops should be induced from the interactions

An interaction that is perceived as a wrong step by any GOL employee can result in a corrective sanction being imposed, either formally or informally. These apply to members at all levels, including the presidential appointees in senior positions such as Ministers and their deputies who can be changed by presidential decree. Activities that deliver benefits will be rewarded by increased adoption. On a longer cycle, national elections are held every five years to replace the administration, and are partly contested on government service delivery.

7) Characteristic: The system is open and interacts with its environment.

The GOL is open to many influences, as governments are meant to be. Liberia has a democratic country with a political process that replaces the administration every five years. It services and interacts with a resident population of close to 5 million people. Many Liberians live in the neighbouring countries and the USA. Many of these citizens belong to groups such as trade unions, faith-based organisations, sports teams, debating societies, and so forth, which influence how government operates. GOL is dependent on international donor funding to meet its obligations. It seeks out local and international investment. It is embedded in the wider West African economic ambit and belongs to the ECOWAS regional body which provides legal and other frameworks that guides its activity. GOL has open-government principles that ensure citizens have rights to access key government information. Liberia has a diverse and active media landscape that interacts with GOL activities.

8) Characteristic: The system operates under conditions far from equilibrium, needing energy to maintain its organisation.

GOL's activities are dependent on the flow of financial resources to service its needs. Liberia faces many challenges to maintain a steady flow of such resources. The unexpected Ebola epidemic in Liberia collapsed public revenues. There is a historical

dependency on development aid, which can dry-up suddenly. It is also dependent on scarce skilled personnel, who are attracted away from their posts by opportunities elsewhere. It is beholden to the political arrangements that control it; most leadership in institutions are political appointees serving at the mercy of the president. Politically induced changes can have big impacts on the operation of the government institutions

9) Characteristic: The system has a history, which is responsible for its behaviour

GOL's activities are greatly affected by its history. Strategies, work practices, routines and habits expressed in the present are learned and derived from what came before. Explicit rules and plans adopted in the past, such as legal bills and institutional budgets, guide present behaviour.

10) Characteristic: Constituents have limited, largely local interactions, and do not understand the behaviour of the whole system.

The social and economic system within which DLEG's reform efforts are undertaken cannot be completely understood by any one individual. To provide just one example, financial resources are allocated to government entities through an annual budgeting exercise. Given that central resources are scarce, expectations are not met. The contestation for the resources is political; often decided in interaction with public representatives in the legislature. These processes of influence and horse-trading are inscrutable to any one individual.

Complexity of the "Development partnership view"

The inclusion of development partners in the view adds complexity to the "Whole of Government" view, widening the possible influence that development partners, who play a very significant role in supporting state services, could have in the system of study.

We explore how the answers provided to the 10 questions above would change:

1) Characteristic: Complex systems consist of a large number of involved people

In addition to the GOL people, DLEG, Digital Liberia, USAID Liberia and USAID Development Lab in Washington DC would have significant numbers of people

interacting in DLEG and other related USAID-funded reform efforts in Liberia. UNDP, World Bank, IMF and other partners would also have people interacting with the project in various roles.

2) Characteristic: The constituent people need to dynamically interact

There is frequent interaction with development partner staff and GOL staff, both within and across hierarchies, formally and informally. Development partners also interact often, and in diverse ways

3) Characteristic: Interaction should be fairly rich, and not limited to a few constituents

GOL interactions with development partners are frequent, rich and varied. Development partners also interact among themselves frequently to share knowledge, plans and progress and to co-ordinate efforts. Many development partners provide varied technical assistance within GOL, often to large numbers of staff and their stakeholders.

4) Characteristic: Interactions should have a non-linear effect.

The interactions are non-linear. Development partners such as the World Bank and IMF can wield significant influence because of their role, and a "minor" interaction, such as press-release, can have considerable consequential impact on the system. On the other hand large, well-resourced development and reform efforts provided by development partners have been shown to have achieved very little

5) Characteristic: Interactions should be primarily from local neighbours

Most interactions between GOL and development partners are through local in-country representatives

6) Characteristic: Positive and negative feedback loops should be induced from the interactions

Each development partner has its own approach to providing resources to GOL. Their contributions ebb and flow over time, for many reasons that could have little to do with Liberia, such as reduced availability of funds or a change in their domestic policies.

However, development partners face domestic pressure to ensure funds are well accounted for, and achieve a desirable impact. To the extent this happens resources can be increased or decreased. Development partners also sometimes co-ordinate their approaches, so if one partner steps forward with resources, other partners could either increase or decrease their support depending on the agreements

7) Characteristic: The system is open and interacts with its environment.

Development partners have constituencies and stakeholders that they interact with independent of GOL. They often belong to and interact with global knowledge networks. Many have transparency protocols that allow anyone access to valuable information.

8) Characteristic: The system operates under conditions far from equilibrium, needing energy to maintain its organisation.

Development partners are continuously created, renewed, and retired. Examples of such changes include that the mandates that create them can change, they may not be able to raise the funding to sustain themselves, they could be closed down because of some impropriety, international development strategies can change. The relationship between GOL and development partners needs to be serviced and maintained by all sides; if it were not then relationships and the partnerships would break down.

9) Characteristic: The system has a history, which is responsible for its behaviour

GOL has a long history of engagement with development partners. This history informs GOL and development partners current actions. A few examples suffice. Development partners design a support activity based on an assessment of needs, but it takes a year or longer to initiate the activity in Liberia. GOL calls for US support for its reform efforts based on the historical relationship between the two countries

10) Characteristic: Constituents have limited, largely local interactions, and do not understand the behaviour of the whole system.

The impossibility of any one agent understanding the behaviour in the "Whole-of-Government" view is compounded with the addition of the development partners.

Complexity of the "Project view"

The "Project view" is a closer view than the "Whole of Government view" and "Development Partners view". Much of the interaction described in these two higher level views is still relevant but now lies outside the (porous) boundaries of the object of study, becoming part of the encompassing ecosystem.

We explore how the answers provided to the 10 questions would change, referencing in Figure 19 , diagram "C: Project View", the projects P1, P2, P3, and P4.

1) Characteristic: Complex systems consist of a large number of involved people

This is project-dependent: P1 could involve only a handful of people, whereas P4 would involve many. All projects aim to develop capabilities, strategies and systems that will affect stakeholders

2) Characteristic: The constituent people need to dynamically interact

Any project would require the dynamic interaction of the project team, stakeholders and affected parties

3) Characteristic: Interaction should be fairly rich, and not limited to a few constituents

A successful project implementation plan requires participation and collaboration of not only the project implementation team, but project principals and stakeholders. In more focused projects rich interaction could be limited to a few constituents. Where projects are localised to a department, such as P1, a close-knit and empowered project team who know each well and have prior experience together, and who have a close understanding of the project context may limit interaction with the project. Less focused projects, perhaps more likely to be P2, P3, and P4, would require interaction with more constituents across all affected departments, with varying degrees of richness

4) Characteristic: Interactions should have a non-linear effect.

All interactions are not equal within projects. For example, the effect of an interaction with the institution's principals or PAC could significantly impact project activity, with a

cascade of consequences, whereas an interaction with a client stakeholder could have little impact until their contribution was validated and aggregated with others.

5) Characteristic: Interactions should be primarily from local neighbours

Project-based activity is, by design, localised in its interaction. The more localised the project (e.g. P1 < P2 < P3 < P4) the more localised the interactions will be.

6) Characteristic: Positive and negative feedback loops should be induced from the interactions

All DLEG-supported projects had feedback loops that amplify or dampen patterns. Formalised performance monitoring and evaluation was built into each project with reviews after attaining each stage. Consultative sessions were held within the PIT, and between the PIT and the CIO council, with the project and the PAC, and with DLEG. The PIT would interact with institutional leadership. Informal interaction would also provide ongoing feedback through the life of the project.

7) Characteristic: The system is open and interacts with its environment.

All DLEG-supported projects are open and interact with the larger GOL and social environment

8) Characteristic: The system operates under conditions far from equilibrium, needing energy to maintain its organisation.

Projects are impermanent, designed to exist for the purpose of achieving some step towards reform or change in a host. Projects gather and allocate resources (energy) to achieve this progress towards a goal. If resources are not made available, or the project completes, abandons or fails in its mission, the project dissolves and the reform outcome has to be sustained in the host independently of the project. These reforms outcomes still need attention and resources to maintain their organisation.

9) Characteristic: The system has a history, which is responsible for its behaviour

Reforms are efforts to change patterns within a system to achieve more desirable outcomes. The patterns have not just sprung into existence, but are based on the systems

history; an expression of past efforts and interactions. Similarly a new project-based reform effort interacts through its life span with that historical expression to attempt to influence new patterns, and in so doing becomes a recent addition to the system's history.

10) Characteristic: Constituents have limited, largely local interactions, and do not understand the behaviour of the whole system.

This is project dependant. Certain projects (for example P1 which operates in a local and familiar environment) may be sufficiently well bounded and have a history that allows behaviours to be well understood within tolerances acceptable to the context.

Conclusion of the CAS evaluation

As the focus of the study's view changes to a more close-up observation, it becomes clear that there could be systems that do not meet Cilliers definition of a CAS. Using an example from DLEG, the eInitiative to develop the project management capacity of the e-Liberia PMO to support government's role in the roll-out of the metropolitan fibre-area network by a private-sector consortium, required the capacity development of one mandated individual in the department. [149] It does not involve a large number of people, interaction could be limited to a few constituents, and the constituents could sufficiently understand the behaviours of the whole system. Although the eInitiative is embedded in a context that is a CAS, the initiative itself does not meet all of Cilliers' criteria. The eInitiative to "Develop an improved ICT Handbook" is another project that would not meet the criteria. It involved a small number of people, with one or more individuals sufficiently able to understand everything necessary to complete the task of identifying, collating and distributing the authoritative reference materials that comprise the ICT Handbook.

The study establishes that at the levels of "Whole of Government view" and "Development partnership view" DLEG would be operating within a CAS. At the "Project view" most, but not all of the DLEG-supported eInitiatives are CAS.

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[149] The manager of the eLiberia PMO

5.5   Chapter conclusion

This analysis establishes that the DLEG project management conforms to a PDIA approach and that DLEG operates within a CAS. DLEG supports initiatives that are CAS, although a few of the supported initiatives do not satisfy the criteria for CAS. This qualifies DLEG as a suitable case-study for this research project.

Chapter 6.

Problem Driven Iterative Adaptation project management as a Complex Adaptive System

6.1 Overview

This chapter provides the evaluation of the DLEG PDIA project management. An evaluation instrument is presented, developed from research that describes the features for an organisation to operate effectively in CAS. The research method is briefly described. The analysis is presented in an accompanying Appendix. The interpretation of the findings are presented.

6.2 Analysis of DLEG case using a CAST evaluation instrument

One way to view DLEG is as an effort to reform the state to be better able to reform itself;[150] to build its reform capability. Goldstein et al. propose a set of features that organisations should develop to allow them to thrive in a CAS, through their ability to ability to reform and adapt with their environment.

The core principles (in italics below) of the PDIA approach have a resonance with the traits, identified by Goldstein et al.. The principle of *Problem Solving* (finding "Good" problems) is reflected in the desired traits of finding the nexus of interaction in the organisation and giving it resonance, by the search for disequilibrium in the organisation, and on positioning to take advantage of any cusp of change. The principle of *Authorise*

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[150] DLEG's objective was to improve GOL capability to use ICTs effectively; that is to build GOL ability to identify and implement ICT-based reforms across government.

positive deviance is reflected in the need to establish an ecosystem of innovation, including the creation of a culture for people to have rich interactions and safely express and amplify difference and novelty, by the practice of generative leadership by all members of the organisation, and by the need to lead emergence. The *Iterating and adapting* principle is reflected in the enactment of an ecosystem of innovation in the organisation, by generating experiments in novelty, by searching for positive deviance, and by facilitating the process of emergence by encouraging disequilibrium conditions, and experimentation and recombinations of ideas into hybrid solutions. The principle of *Engaging broad sets of agents* is reflected by the desired practice of generative leadership, by creating smart networks extending to all employees, by increasing the energy flow across boundaries, and in enacting the ecosystem of innovation by increasing and amplifying differences, by finding the nexus of interaction and giving it resonance, by developing symbiotic relationships across groups, and by viewing the organisation from all levels.

A set of features guides our interpretation of how the principles that encourage the practice of generative leadership, as formulated by Goldstein et al., have been expressed in the DLEG case study. The features are formulated from our summary of Goldstein et al.'s recommendations to guide the actions of generative leadership (as presented in chapter 2 above).

The features formulate the evaluative instrument, which is described below. A few of the features are broken into focal sub-categories, which simplifies the analysis:

Features	*Focal categories*
F1: How were CAST principles in creating an ecology of innovation expressed in the PDIA approach of the DLEG activity?	FC1.1: On increasing energy flow across boundaries FC1.2: On enacting an ecosystem of innovation FC1.2.1: On increasing and amplifying differences in the ecology FC1.2.2: On finding the nexus of interaction and giving it resonance FC1.2.3: On pursuing coevolution through

	symbiotic relationships FC1.2.4: On preparing for disequilibrium, and a multi-level ride
F2: How were CAST principles on taking advantage of the cusp of change expressed in the PDIA approach of the DLEG activity?	
F3: How were CAST principles on leading emergence expressed in the PDIA approach of the DLEG activity?	FC3.1: On disequilibrium conditions FC3.2: On amplifying actions FC3.3: On recombinations FC3.4: On stabilising feedback
F4: How were CAST principles on generating experiments in novelty expressed in the PDIA approach of the DLEG activity?	
F5: How were CAST principles on creating more through positive deviance expressed in the PDIA approach of the DLEG activity?	
F6: How were CAST principles on creating smart networks expressed in the PDIA approach of the DLEG activity?	
F7: How were CAST principles on practicing generative leadership expressed in the PDIA approach of the DLEG activity?	

O'Leary advises that when performing document analysis, to gain as complete a picture as possible. This study asks questions of the data, engaging at different levels. Firstly by interrogating the project management approach that DLEG identifies as its chosen methods. To validate the claims to use these methods, their application is identified in the data. The longitudinal nature of the reports allows for applications to be tracked through the duration of the project, giving a picture of how the reform efforts evolve as well as how the project management approach evolves. Efforts are made to triangulate narrative claims across initiatives, and against the structured monitoring, evaluation and learning (MEL) reports[151] for the DLEG activity. The application of the approach is considered at the various levels of the project management, being whole-of-government level, e-Initiative level, and e-Initiative Stage level, and e-Initiative Action-Step level.

The responses for each feature are grouped according to one or more category, being:

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[151] The MEL reports are a USAID reporting requirement for activities, seen as an "essential step to manage the process of assessing and reporting progress towards achieving project outputs and outcomes, and to identify what evaluation questions will be addressed through evaluation. The MEL Plans contribute to the effectiveness … by assuring that comparable data will be collected on a regular and timely basis". The data should be "objectively verifiable" and is collected according to published data quality standards. USAID, "Project M&E Plan," 2019, https://www.usaid.gov/project-starter/program-cycle/project-monitor-evaluation-plan.

a) Expression in theoretical PDIA approach: Seeks to correlate the CAST principles with the theory of the PDIA approach

b) Expression in the DLEG application of PDIA: Seeks expression of the principles in DLEG's practice, and the areas of DLEG support to GOL

c) Discussion: Discussion on other issues that may inform an interpretation of the response to the research question

d) Conclusion: A concise interpretation of the findings from the research question

The documents included in the document analysis were identified and interrogated for author bias, and are listed in Appendix A: *Document list, explored for author bias*.

The summary of the analysis is provided in Appendix B: *Analysis of DLEG by Goldstein et al. framework*.

6.3 Conclusion

GOL has taken serious strides to reorganise itself to take better advantage of the possibilities offered by ICTs, beginning with the adoption of an ICT Policy in 2008, and guided by an eGovernment Strategy in 2014. The 3-year DLEG activity supported GOL to achieve further progress on the reform journey.

The PDIA approach to building state capability was introduced with the DLEG activity, and adopted into GOL ICT-related reform activities.

This study analyses the exercise of those PDIA activities in the process of GOL reforming itself, and interprets whether it conforms with principles, rooted in CAST, that are recommended for GOL to develop ecologies of innovation.

Our interpretation is that the PDIA approach was effective in helping GOL to develop towards an ecology of innovation, conformed with the CAST-based approach and helped to make progress in building the competencies and practices that are recommended.

Our findings are summarized:

There is good available evidence that DLEG's PDIA approach has led to increased flow of ICT-related energy and resources across GOL. Available evidence suggests that more

efforts could be undertaken to increase flow with the private sector, civil society, donors and other external stakeholders

Progress was achieved with developing an ecosystem of innovation:

a) There is good evidence that diversity is being encouraged. There are many more opportunities to further enrich the diversity.

b) There is good evidence of an increase in the depth and quality of ICT-related information flow through GOL. The CIO council was an important nexus of this flow, but also with strategy and capacity development programs. Much of the flow is generated by donor-driven interventions, such as DLEG-supported activities

c) There is evidence of GOL initiatives experimenting productively in novel arrangements with outside elements. Strategies for building internal symbiotic relationships were playing out with some evidence of success at individual e-Initiative level. Resource constraints limited the development of centralized competencies such as shared-service-centres that were identified as critical to a whole-of-government approach.

d) There is evidence that GOL was developing its capability to understand and act at multiple levels, and to integrate its actions between those levels. The development was in its early stages, with modest opportunity to practice its new capabilities, and was vulnerable without adequate resourcing and strong leadership.

There is evidence that at an e-Initiative level, some institutions are able to be creative and adapt to criticalisation. There is no evidence of this ability at the central levels of the MOPT, CIO council and PMO, which are institutional custodians of the eGovernment strategy. The presented evidence also demonstrates the key role that the donor-funded intervention, being DLEG, played in the process. There is no evidence in the data of GOL being able to "take advantage" of criticalisation independently of DLEG.

The PDIA approach, as applied in the DLEG support, provided a mechanism to encourage emergence through "recognition, amplification and dissemination" of novelty,

and through the "rigorous containing, constraining and constructional operations" of generative leaders. [152]

a) There is good evidence that the heat was being turned up on disequilibrium conditions, but in a context characterized by stultifying inertia. DLEGs support to GOL improved knowledge creation at all levels, extended social networks amongst the ICT practitioners, and achieved modest technological advances. An increase in diversity was evident in the participation of people and in the selection of reforms. Limited opportunity tension was created with the support offerings of DLEG.

b) There is good evidence that experimentation was being used within some of the ICT reform initiatives.

c) There is good evidence that hybrid solution are being developed as part of reform efforts, at all levels

d) There is evidence that emergent reforms can be stabilized, especially at a local level within e-Initiatives. MOPT, as ICT sector head, and hosting the CIO council and eLiberia PMO has some tools to aid stabilization, such as the development of supporting policy and procedure, and legitimizing and replicating success. Ongoing changes to the context, such as growing austerity in operational budgets, threaten further disequilibrium and an ongoing search for solutions that fit.

There is evidence that the PDIA approach generated experiments in novelty at whole-of-government and e-Initiative level. There is insufficient data to fully understand how experiments in novelty were manifest at the granular level within the e-Initiatives; at the level of e-Initiative Stage, or e-Initiative Activity Step. Network cohesion between strong teams and ideas from the periphery was improved, with demonstrable beneficial outcomes.

Mechanisms were put in place that will enhance reformers efforts to identify positive deviance, with the CIO council being a key component at sharing ideas and knowledge. There is evidence of an initiative that benefited from positive deviance.

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[152] Goldstein, Hazy, and Lichtenstein, *Complexity and the Nexus of Leadership: Leveraging Nonlinear Science to Create Ecologies of Innovation*.

A major step towards smarter networks was achieved with the emergence of a centralized functioning CIO council through PDIA-type reform efforts. This reoriented the opportunities for interaction between members of the ICT community, creating closer and lateral links across the bureaucracy. Efforts to integrate a well-functioning eLiberia PMO into the smart network were not successful, with the PMO not able to perform its specialist role. There was evidence that potentially troublesome intermediaries were bridged, with more direct links developed for interaction.

There is good evidence that the process of encouraging generative leadership was advanced. The frequency and quality of interaction amongst the ICT-related personnel increased in a diversity of fora with diverse aims, such as strategy and capacity development, and with participation by all levels in the bureaucratic hierarchy. Regular meetings of the CIO council and PAC offered interactive event opportunities, on top of routine host-institution meetings. The design and implementation of reforms and e-Initiatives, enabled through the participative and creative processes of PDIA, offered many interactive events among team members and with other stakeholders and groups.

Type of e-Initiative	No. of Initiatives
Build a capacity	5
Develop a strategy	5
Execute a strategy	2
Develop DSO	6
Deploy DSO	4

Figure 20 - Number of DLEG e-Initiatives by Type

MACs involved	No. of Initiatives
One	6
Few	5
Many	11

Figure 21 - Number of DLEG e-Initiatives by involved MACs

Chapter 7.

Conclusion: adaptive models and public sector reform

7.1   Overview

This chapter discusses the results of the study, and its implications for the potential of adaptive management models in public sector reforms. To explain why the study matters, it briefly describes the context of the DLEG study, the challenges that international development assistance faces in such contexts, and the search for new ideas to improve reform outcomes. The implications of this study are discussed against this backdrop. A few novel components of the DLEG PDIA approach are identified. The generalizability of the findings concludes the chapter.

7.2   Discussion

Summary of the findings.

New approaches have gained support in the practice of international development, with growing recognition of the limits of the historical methods. This study looks at one case-study that attempted to deviate from a mechanistic tradition of project management. DLEG was a development project required to use a new approach, being PDIA . PDIA is a form of adaptive management that attempts to overcome the limits of historical methods by "operationalising" a model of building state capability. Instead of pursuing imported best-practice solutions, PDIA adopts a purposeful step-wise ongoing and iterative search by local stakeholders of the local solution space to provide incremental progress towards solving locally defined problems. The DLEG activity was one of the earlier USAID-funded projects to specify PDIA as a required approach.

DLEG assisted in a Liberian government reform effort to build its ICT capabilities.

This study validated that DLEG used PDIA to guide the reform activity. This study also evaluated that the context for the reform, and many of the portfolio of initiatives that were the focus of the assistance, can be identified as CAS.

Previous bodies of research identify the characteristics and nature of CAS, and the attendant challenges and opportunities agents face when operating in these environments. Goldstein et al. note that while organisations have always been complex we now have empowering insights from complexity science to help us recognise and understand them as complex, and to help us influence them[153]. Organisations need to adapt and innovate to survive and thrive, and they can use the affordances of their complexity to achieve this. They recommend organisations build an "ecology of innovation" with a practice of "generative leadership", and they present a "host of insights"[154] from complexity science on what these features and capabilities are.

If public sector organisations in developing countries are operating in CAS, and wish to be able to adapt and thrive over time, then the development of ecologies of innovation and generative leadership and its related features identified by Goldstein et al. could help the organisations overcome their problems and harness the benefits of complexity to their advantage.

PDIA provides an approach to building state capability to innovate and reform. There is an apparent overlap in intent and style between this approach and the generative leadership capability. PDIA will need to usefully accommodate the reform methods and insights applicable in CAS if it is to operate effectively in those environments. However PDIA could have shortcomings as scaffolding, limiting its utility in a CAS.

This study considers how an enactment of the PDIA project management approach in DLEG expressed these recommendations from complexity science in its practice and in the results of reform activities. This gives us insight into the extent to which the PDIA model embodies the principles of complex adaptive systems theory (CAST), and to evaluate how well the PDIA approach performed during the Liberian DLEG implementation

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[153] Goldstein, Hazy, and Lichtenstein, 10.

[154] Goldstein, Hazy, and Lichtenstein, *Complexity and the Nexus of Leadership: Leveraging Nonlinear Science to Create Ecologies of Innovation*.

This study's finding is that the PDIA project management approach, deployed by DLEG, conformed to CAST principles and expressed many of the insights of a CAST-based approach to developing ecologies of innovation. It was effective in assisting GOL's development of many of the competencies and practices that are recommended for building these ecologies.[155]

The context for ICT reform in the Liberian public sector

A brief exploration of the context in which DLEG and GOL operated in during the study period illuminates the case-study.

GOL had weak capability to enact digital reforms, which had been further degraded over the course of the Ebola emergency. The challenges to improving this capability were broad, with hard and soft infrastructure problems, gaps in technical know-how and serious resource constraints. Although the country had world-class internet capacity at the undersea cable landing station, the government was not able to take advantage of it. Government institutions, where they had connectivity, were badly serviced by inadequate, expensive and unsustainable arrangements. The universities had no fixed internet. There was no available data-centre facilities in-country to host government applications. The guiding ICT Policy, formulated in 2001 was due for renewal, with many of the core ICT governance arrangements, including the coordinating Chief Information Officer program, not operational. Government's ICT technical teams had few of the skills required to play their role in improving the performance of their institutions. Resource allocations to ICT were inadequate to maintain the progress achieved with digital systems in critical areas, such as government asset management and the administration of concessions. While policy encouraged a shift in service-delivery to a whole-of-government approach, ICT arrangements remained largely silo-based. These compounded challenges made it very difficult for GOL to deliver its eGovernment Strategy of using ICT to "improve its performance" and "to bring government closer to its citizens".[156]

Macro conditions partly explain why the state had only achieved a weak ICT capability.[157] Liberia was severely impacted by the outbreak of the 2014 Ebola Virus

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[155] As recommended by Goldstein et al.

[156] Republic of Liberia e-Government Strategy (2014-2018).

[157] In 2005 Liberia emerged out of 16 years of civil war that caused great social distress, devastated the

Disease. By the time the country was declared Ebola-free in September 2016[158] the effects of the epidemic were wide-spread, with significant social and economic damage. 5000 lives had been lost, with "significantly higher unemployment, lost incomes, lower schooling, and less food consumption". The 2015 deficit was estimated at 8.5% with real GDP growth estimated to fall from 8.7% in 2013 to 0.3% in 2015.[159] The estimated comprehensive economic and social burden from the 2014 outbreak to the West African region was estimated to be $53.19 billion.[160]

The responsibility for ICT was mandated to the Ministry of Posts and Telecommunications, which was severely underfunded. In the 2014/2015 fiscal financial year the ministry's budgetary allocation was less than $1.5 million.

This is a difficult environment for ICT to emerge in. Foundational infrastructures that support effective service delivery were often non-existent or performed poorly, including the postal system, libraries, grid electricity supply, fixed-line telephony and internet, government email and collaboration systems, data centres, roads, sewers, water reticulation and public transport.   Large and diverse needs had to compete for scarce resources in a highly politicized environment.

Professional skills were in short supply and difficult for the public sector to retain. The civil service was poorly incentivized and with limited capacity. Political appointees fill most senior leadership posts in GOL, are replaced in any change of administration, and leave with their institutional knowledge,.

International development assistance and its challenges with supporting reform

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economy, destroyed infrastructure, and interrupted social development. While much was achieved in the ensuing 13 years, the country remains with one of the lowest per-capita incomes in the world (2013 GDP/capita = $721.90) and government revenues are meagre (2013 Final consumption expenditure/capita = $141.50). Education services collapsed during the war years and technical training was often only available outside of the country to people in the diaspora and in refugee arrangements in regional countries. Tertiary qualifications in computer science and related fields were only made available in the country in 2012. The country is rated 153 out of 157 countries in the Human Capital Index (HCI). Government effectiveness is rated as being in the poorest 10% (2013: 7.83%) in the Worldwide Governance Indicators. (source: World Bank "World Development Indicators (World Bank)," n.d., https://databank.worldbank.org/reports.aspx?source=World-Development-Indicators.)

[158] "WHO | Ebola Transmission in Liberia over. Nation Enters 90-Day Intensive Surveillance Period."

[159] Zafar, Talati, and Graham, "2014-2015 WEST AFRICA EBOLA CRISIS: IMPACT UPDATE."

[160] Huber, Finelli, and Stevens, "The Economic and Social Burden of the 2014 Ebola Outbreak in West Africa."

International development assistance often achieves limited success. An understanding of the difficult terrain, the recognition of the rich complexity of the environment, and the contestation inherent in reform helps explain the limits of traditional modes of providing assistance

Ramalingam et al. outline the terrain where development assistance is offered: "International development and humanitarian agencies face some of the most complex and challenging problems confronting humankind. The social, economic and political improvements that aid agencies focus on are characterised by 'novel complexity, genuine uncertainty, conflict of values, unique circumstances, and structural instabilities.'[161] Such improvements need to be induced, shaped, facilitated and supported in situations of limited national resources, weak institutional capacity and, in many cases, endemic corruption and protracted conflict."[162]

To proceed with reforms in this context requires engaging with contestations rooted in power, often hidden. Chambers, discussing the intertwined nature of knowledge and power, states it clearly: "Answers to these questions [about realities and power] are mediated by power embodied in contextual and personal, professional, institutional, and social dimensions and domains. These can be gender, class, caste, ethnicity, wealth, age, faith, specialization, professional status, and many others. To say this is to state the glaringly obvious. But what may seem obvious is not always visible or seen. It is, though, fundamental."[163]

The design and implementation of development projects has traditionally focused on "identification and rollout of 'best practices' … arguably ... shaped more by the needs of aid bureaucracies than by evidence and research" [164] with planning tools such as logframes having linear logic, top-down approaches, and the predetermination of the steps required to achieve the desired outcomes. There is considerable personal, professional and institutional investment into this mode of development planning,

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[161] citing David Ellerman, *Helping People Help Themselves: Toward a Theory of Autonomy-Compatible Help*, Policy Research Working Papers (The World Bank, 2001), 26, https://doi.org/10.1596/1813-9450-2693.

[162] Ramalingam, Laric, and Primrose, "From Best Practice to Best Fit: Understanding and Navigating Wicked Problems in International Development."

[163] Chambers, *Can We Know Better?*

[164] Ramalingam, Laric, and Primrose, "From Best Practice to Best Fit: Understanding and Navigating Wicked Problems in International Development."

resourced by the inherent inertia of large government bureaucracies, and international NGOs.

Chalmers comprehensively unfolds the limiting nature of much development activity, describing it as replete with "errors, myths, and omissions". He acknowledges the increasing intellectual acceptance of "plural knowledges, epistemic relativism, methodological pluralism, and inclusiveness"[165], but then contrasts this with the reality project implementers are locked into. He allocates some of the blame to mechanistic methodologies: "In practice, however, we are again and again trapped and locked in personally, professionally, and institutionally to ways of learning and acting which are mechanistic, costly, reductionist, and dysfunctional…. Mechanistic methodologies for research and for project procedures have become widespread…." [166]

A new approach to public sector reform

The Liberian context for the DLEG reform project, presented above, provides many constraints to reform. On the other hand it illustrates the need for reform. International development assistance to support such reform, even though well intentioned, often performs poorly and may be maladapted to achieving the desired outcome.

New ideas and thinking may be able to improve outcomes of public sector reform projects such as DLEG. With growing recognition of the limits of the historical development paradigm, new approaches have gained support.

Andrews et al., based on extensive research into the challenges of building state capability in developing countries, recommend PDIA as a new approach. They claim PDIA to be more effective than traditional alternatives, able to build capability while avoiding a common reform trap where "[t]he emphasis on form (what organizations 'look like') over function (what they actually 'do') is a crucial characteristic". As with all new theories, the ideas need to be tested and validated in real-world activity.

Also, research into complexity provides insights, new to the international development sector,[167] which may help reformers to better understand and work within the reform

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[165] Chambers, *Can We Know Better?*, 80.

[166] Chambers, 63.

[167] Complexity theory has been developed and explored in many other domains, such as economics, biological

context. If the terrain, organisations and systems are CAS, then an understanding of the nature, possibilities and limitations of CAS are necessary.

While there has been growing understanding and acceptance of the relevance of complexity science to international development,[168] as well as of PDIA,[169] it is early days in rigorously testing the theories against existing and prior projects, and to evaluate efforts to incorporate the insights into development planning and execution. The intention of this study is to assess the suitability of the PDIA approach in the DLEG context, using the insights of complexity theory and CAS. The study's finding that GOL was able to foster many aspects of a complexity aware "ecology of innovation" and a practice of "generative leadership" in the course of the DLEG-assisted reform period adds a modest validation of the PDIA approach. Our hope is that this case-study will add to the growing body of knowledge that public sector reformers can draw on to effectively operationalise reforms through adaptive management models.

Reform projects in developing countries often rely on donor support, through projects such as the USAID-funded DLEG, so reforms remain embedded in the international development eco-system, with defined procedures, governance and reporting requirements to funders. Bolstering the evidence base is necessary not least to encourage international donors to shift their approaches to development reforms. Chalmers has harsh words for the donors: "Over the past two decades there has … been an insidious creep to lock the dynamics of the development sector into ever more mechanistic, rigid, formulaic, and dysfunctional procedures, imperiously required by funders." [170] Development practitioners seeking to use new approaches are constrained by institutional lock-in to older paradigms, and by onerous and rigid procedural requirements. If donors are to accommodate more flexible, dynamic and trust-based approaches, such as adaptive management, they will need to be convinced of the benefits, while also ensuring that they

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systems, weather, forecasting, epidemiology

[168] Ramalingam, *Aid on Edge of Chaos: Rethinking International Cooperation in a Complex World*; Ramalingam, Laric, and Primrose, "From Best Practice to Best Fit: Understanding and Navigating Wicked Problems in International Development"; Scoones et al., "Dynamic Systems and the Challenge of Sustainability."

[169] Andrews, Pritchett, and Woolcock, *UNU-WIDER Working Paper No. 2012/64 Escaping Capability Traps Through Problem Driven Iterative Adaptation (PDIA)*; Ramalingam, *Aid on Edge of Chaos: Rethinking International Cooperation in a Complex World*.

[170] Chambers, *Can We Know Better?*, 81.

are able to be accountable to their principals, which are often the custodians of public funds.[171]

This study analysed DLEG's performance management process, being a component of the project management. These processes demonstrate a novel method for providing accountability through the adaptive management process, and could go some way to addressing the fears of donors reliant on top-down, mechanistic and log-frame methods. These novel methods are discussed later this chapter.

Root cause analysis – a tension between PDIA and CAS?

In guiding project teams how to execute a PDIA approach Andrews et al. recommend they use techniques to deconstruct large problems into component parts.[172] These processes will help teams think through the larger problem, and identify underlying causes which can be addressed with available resources and having sufficient authority, acceptance and ability to act. They refer to these smaller parts as "causal strands" and "multiple root causes". The recommended techniques are reductionist, encouraging the project team to identify underlying causes for each underlying cause. They believe this deconstruction activity gives teams insight into the many ways of approaching a problem, and the ability to tackle it in a "bite-sized" manner.

CAST cautions against reductionist approaches. The CAS principles suggest we should see the parts of a system as interacting in non-linear ways, with the system exhibiting behaviours that cannot be fully ascribed to descriptions of the constituent parts. It may not be possible to identify all the parts, and the influence of each part on the whole may be surprising. As such any attempt at deconstructing "causal strands" may be futile. Flood cautions that complexity theory has "mighty lessons" for "traditional problem solvers" if they believe that they can reduce situations "rich in issues and full of tension, to an

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[171] An additional danger is that new approaches can be negated. Citing (Cooke and Kothari, 2001) Scoones et al., "Dynamic Systems and the Challenge of Sustainability" give the example of how the potential for new particpatory methods in development can be overwhelmed: "Local knowledge, context-specific understandings and inclusive forms of engagement among diverse, knowledgeable stakeholders has been at the core of the argument for participation in development. As a challenge to the blueprint, instrumentalist, managerial approach to development participation was seen by many as the new opportunity. But just as with other approaches, 'participation' can be routinized, narrowed and closed down, captured in the process by particular interests and locked in bureaucratic procedures that subsume participation in their exclusion of complexity, dynamism and uncertainty, along with alternative perspectives and marginalised interests".
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[172] See PDIA tactics, including the 5-why technique and the fishbone diagram.

illusory problem that is considered solvable". [173] Problem solvers rather need to accept they operate in environments with "complex interrelationships and emergent behavior that is inherently unknowable to the human mind."

Do these insights from CAS expose a weakness in the deconstruction methods described by Andrews et al.?

Andrews et al.'s recommend a problem driven process as it "provokes reflection, mobilizes attention, and promotes targeted and context-sensitive engagement."[174] To the extent they are reductionist techniques, they are a means to encourage a project team to take useful action. These, typically small, actions are then subject to iterative cycles of learning, adaptation and reformulation. This makes them low-cost and low-risk mechanisms to probe the solution space for progressive gains towards addressing the larger problem. If these actions are considered as experiments to explore and influence the reform effort, with suitable awareness of non-linearity, ongoing learning, and opportunity to redesign next steps after assessing impacts, then they align with CAST insights. It should not just be about "learning from action, but deliberately taking action in order to learn under conditions of ongoing uncertainty."[175] The non-prescriptive nature of the PDIA approach gives the space for this interpretation. [176]

7.3   Novel characteristics of the case-study PDIA approach

This study identifies possibly novel techniques in the PDIA method, as deployed by DLEG, which could extend its effectiveness. These are its use of a portfolio approach, and of a performance management technique embedded in the project management.

Portfolio approach

This study has described the weak and fragile state of GOL's ICT capability. A 3-year support activity, such as DLEG, would not be able to address the many needs across the

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[173] Robert Louis Flood, *Rethinking the Fifth Discipline* (Routledge, 2002), 87, https://doi.org/10.4324/9780203028551.

[174] Andrews, Pritchett, and Woolcock, *Building State Capability*, 142.

[175] Patricia Rogers and Alice Macfarlan, "Monitoring and Evaluation for Adaptive Management," 2020, 4.

[176] See footnote 77 above

eco-system. Nevertheless DLEG had ambitions to impact on the larger eco-system itself, and not just on the parts.[177]

DLEG rapidly diversified its support efforts into a portfolio of separate and related initiatives. These differed in scope and nature (see Figure 22) and were given equivalence in reporting. Each initiative was identified and selected through the governance methods. All project efforts were directed through these initiatives. DLEG reported on its progress and success solely against these initiatives, with no monitoring and evaluation of any overarching effort outside of these activities. Even the challenging development of a critical element of the DLEG activity's governance model, being the CIO council, was defined as an initiative, and reported at the same level as more modest initiatives. The effect of this levelling of small and large activities is consistent with the CAS insight that the impact of a part on the system can be non-linear, with small effort causing a large impact, and large efforts having little impact. The diversity of initiatives, each with its own teams, provides opportunity to explore and learn across the eco-system and to experiment with reform effort. These learnings were shared in central forums, such as the CIO Council meetings, and opportunities explored for cross-fertilisation and linkages. This is consistent with Goldstein et al. recommendations.[178] This commends a portfolio approach.

CAS, however, are more than the sum of their parts. Reporting against the parts cannot tell the full story of the impact or changes to the eco-system. With DLEG the data from a project monitoring and evaluation system reporting at an initiative level cannot be aggregated to tell the full story of the eco-system. In addition to initiative-level, overarching eco-system level project management and reporting is required to more completely reflect the status of the eco-system. This study's analysis of the DLEG project management tools and techniques recognises such overarching reporting in the narrative of the technical reports, although the MEL reports are almost completely at initiative-level.[179] Based on its view of available data, the study recommends that eco-

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[177] This is reflected in DLEG efforts ranging across the ICT eco-system: governance, policy development, financing, skills development, implementation support

[178] For example Goldstein et al. encourage the development of micro-diversity, an increase in the depth and quality of information flow through the organisation, and the development of symbiotic relationships between distant competencies,

[179] The study had no visibility of documents that are not in the public domain, including minutes or reports of centralized competencies that could gather such whole-system data, such as the CIO Council, PAC or DLEG

system level reporting, integrated into the project management techniques, would have improved learning and accountability.

In summary, the study sees benefit in reform projects adopting a portfolio approach, while also including whole-of-project management and reporting.

Performance management

The study has shown that the DLEG PDIA project management approach performed well in the CAS that it operated within. GOL made progress across a range of initiatives that it identified, while also building its capability to achieve further ICT-related reforms. The study has shown how CAST principles were expressed in the project management and in the new capabilities of GOL.

The adaptive management approach requires effective products and processes for monitoring and evaluation of performance, integrated through all stages of the initiative to support the process of iterative experimentation and learning. The DLEG PDIA approach was for the project management to be adaptive by-design in situations of ongoing uncertainty and insufficient knowledge to inform all decisions, and with plans and activities deliberately assessed and changed, if necessary, as new information or circumstances arise. There was a deliberate effort to encourage iterative experimentation and learning through the implementation lifecycle.

These monitoring and evaluation products and processes are required to inform investment decisions, improve implementation, guide scaling up, to ensure accountability and to strengthen local capacity.[180] They need to be "accountable, rigorous and high quality", not least to face off resistance with "bilateral donors, development organisations, and governments [where] there is often low tolerance for experimentation and learning, and strong preferences to follow a clear plan or blueprint that is known to 'work'."[181] PDIA's focus is to improve government function, and to have less regard for form and its allure of agenda conformity and isomorphic mimicry. This, however, opens

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technical teams.

[180] Rogers and Macfarlan, "Monitoring and Evaluation for Adaptive Management."

[181] Ben Ramalingam, Leni Wild, and Anne L Buffardi, "Briefing Note Making Adaptive Rigour Work Principles and Practices for Strengthening Monitoring, Evaluation and Learning for Adaptive Management," 2019.

PDIA reformers up to criticism that reforms are "unprofessional ('promoting non-best-practice solutions'), inefficient ('reinventing the wheel'), even potentially unethical ('failing to meet global standards')."[182]

Andrews et al. proposed a method – the Searchframe (see Figure 12) – in the PDIA approach to give structure to the iterative search of "finding and fitting solutions", while informing authorisers of purposive activity.[183] It requires a reform team to set successive focal points (see Figure 11) on their journey towards achieving their aspirational goal. The focal points, akin to project milestones, would be defined and describe what would have been achieved by this stage.[184] The reporting would include details and findings of completed iterations, learnings and adaptations made, and the plans and completion date for the next planned iteration.

The DLEG project management used an interpretation of the searchframe to track and inform implementation of the supported initiatives. Its processes and products reflected the adaptive management approach, and were used to inform monitoring and evaluation for internal control and by authorisers and funders. There are differences in terminology, and in some underlying processes.

DLEG project management conceptualises individual reform efforts as *Initiatives.*[185] *Initiatives* are pursued by the incremental definition, action and review of interim *Stages*. *Stages* are pursued through the iterative definition, action and review of *Steps* (see Figure 16 and *Performance management of e-Initiatives* in Chapter 4 for a fuller description).

The conceptualisation of a *Stage,*[186] being an activity target formulated and designed by the project team and agreed to by authorisers, provides a mechanism to aid monitoring

[182] Andrews, Pritchett, and Woolcock, *UNU-WIDER Working Paper No. 2012/64 Escaping Capability Traps Through Problem Driven Iterative Adaptation (PDIA)*.

[183] Andrews, Pritchett, and Woolcock, *Building State Capability*, 184.

[184] Unlike in a logframe approach, only near-term focal points would be tightly defined. More distant loosely defined focal points would be clarified as more clarity was achieved on the journey of discovery.

[185] GOL termed its ICT reform efforts as *e-Initiatives*. Here we use the more generic term of *Initiative*, as the concept is not limited to ICT-type efforts

[186] The PIT, (after considering requirements and options), defines a near-term realizable stepping-stone towards meeting the objectives of the *Initiative*. This is the *Stage* they aim to achieve, and they holding themselves accountable by stating what will be achieved, and by when. They then iteratively search the solution space to define and pursue multiple *Steps* towards achieving the *Stage*. They convene to review whether they have achieved the *Stage*, defining and pursuing further *Steps* as necessary, or abandoning or redefining the *Stage*. If attained, a new next *Stage* is defined for authorization. This process is continued until the *initiative* finds a

and evaluation of initiatives in adaptive management contexts. Periodic reporting could include progress towards achieving a *stage*, the outcome of *stage* reviews, and the timeliness and completeness of *stage* achievement. Reporting on the *Steps* taken towards the achievement of a stage provides increased granularity in *stage* reporting. The conceptualisation of *Initiatives*, *Stages* and *Steps* of a stage has multi-level applicability and can be used for large or small initiatives; *Steps* towards a *Stage* at a higher level could encapsulate one or more *Initiatives*, each with its own *Stages* and *Steps* at lower levels.[187]

The DLEG project management process differed, asides from terminology,[188] with Andrews et al.'s recommendations for the searchframe. With the DLEG process the PIT did not commit to their idea to complete a minimum number of iterations by a specified date. Instead their performance reporting was against criteria, set and agreed to by the PIT, which defined what successful attainment of a next stage would look like, and a targeted completion date. They reported the *Steps* towards the *Stage* as they were defined and pursued.

DLEG's adaptive management conceptualisation of reform activity accords with the features of CAS (see Figure 2). Its project management tools and processes provide a potential mechanism to monitor, evaluate and learn from complex multi-dimensional inter-related and inter-dependent efforts undertaken at multiple levels in a complex terrain. It operates in and enables nested systems, reflects the non-linear relationship between component elements by tracking small and large events in equivalent manner, surfaces generation of novelty beyond an *Initiative*, and has flexibility to allow reorganization, adaptation of teams, plans and activities.

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suitable solution 'fit' or is abandoned or redefined. Each of these interactions, and their outcome, is documented

[187] For example, at a ministry level there could be an *initiative* to "Establish a virtual data centre for key government digital systems." The ministry project team could define the first *stage* as "Identify key government digital systems", and set about deciding on achievable steps to achieve that, such as "Define what determines a key system", "Identify and catalogue all government digital systems". They could work on the first *step* themselves, and then delegate the latter *step* to the Government CIO Office. The CIO Office could define this task as an *initiative*, with the CIO project team defining their own first *stage*, such as "Develop an online tool to allow MACs to register their digital systems", and then work on *steps* towards that stage. *Steps* in subsequent stages could be delegated to MAC CIO units to complete, which they could define as *initiatives*. When *initiatives* are completed they mark completion of a *step* at a higher level, informing progress towards the higher level *stage*.

[188] The DLEG terminology for *Initiative*, *Stage* and *Step* equates respectively to the Andrews et al. *Aspirational Goal*, *Focal Point*, *Iterations (with Action Steps)*

Managers are able to traverse and interrogate the ecosystem of reform effort and its dynamics over time, allowing "rigour" in management by potentially having access to "a documented, transparent trail of intentions, decisions and actions."[189] It also provides a mechanism to proactively (or retroactively) detect and contextualise faint signals, and the flow of influence through the network.[190]

This conceptualisation has potential for general application in other contexts, where adaptive management is deployed in CAS.

7.4 Observations of the PDIA approach from CAS

This study makes a few further observations, from a CAS perspective, on the PDIA approach.

Record keeping of activity

This study had no access to activity records maintained for each e-Initiative by the PITs. The project management guidelines and templates for the e-Initiatives encourage the documentation and assessment of *Steps*, *Stages* and *Initiatives*. To realise the benefits of the adaptive management approach it is important that accurate and complete records are maintained as per the guidelines. This is necessary to allow for full retrospective accountability of the iterative process of searching for solutions, giving authorisers and auditors the ability to track the purposefulness, effort and integrity of the search. It could, for example, provide insights why a particular stage was not achieved, by providing a credible detail of the exploratory steps taken in efforts to achieve the stage. It will also give funders who are locked into traditional methods of project management, credible data to bridge the new PDIA-style investment into their traditional methods. Such records also provide a resource of ideas and experience for other teams searching for solutions. Documentation on project activity is the data source for the detection of such faint signals, informing actions to amplify or dampen such signals.

Integration of adaptive and traditional project management approaches

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[189] Ramalingam, Wild, and Buffardi, "Briefing Note Making Adaptive Rigour Work Principles and Practices for Strengthening Monitoring, Evaluation and Learning for Adaptive Management," 2.

[190] Given CAS' non-linear nature, faint signals can have large importance. Goldstein et al. tell us to "make the most of weak signals…from the periphery, the isolated and the marginalised"

It is interesting to consider the circumstances where the pursuit of a reform will benefit more from a more traditional pre-structured approach than an iterative and adaptive search for solutions, and then consider how to integrate this into an overarching approach. Ramalingam et al. believe that adaptive management is required "to respond to those complex problems that will always demand contextual learning, and to problems where the challenges faced and/or the interventions are novel and untested, and where there is little evidence for what will work in a particular context".[191] While the DLEG reform effort and supported initiatives operate within CAS, this study has identified initiatives that do not meet the definition of being CAS.[192] There are also steps within other initiatives that are well understood, and operate in conditions of reasonable certainty.[193] Within most steps actors will find tasks that they eventually pursue in a traditional pre-structured manner as they find themselves on familiar and well-understood ground. These traditional pre-structured components of the search for solutions can be seen as building blocks that are encapsulated within an encompassing iterative and adaptive search. In the same way as adaptive management needs to consider traditional structured approaches in the right circumstances, traditional structured approaches need to consider the benefits of adaptive management in the relevant context; not least as even a structured reform initiative will be nested in a larger CAS, and adaptive techniques will be appropriate to gain acceptance and integration into that larger ecosystem,.

Cautionary note about insights from complexity science

Insights drawn from complexity should be interpreted with caution. Ramalingam quotes Murray Gell-Mann repeatedly telling him "Complexity is not yet a science, it is the hope of a science…It is a body of research…and it has done some useful, even powerful things. But the science of complexity doesn't [yet] exist".[194] Complexity has helped with understanding in many and diverse areas of "organised complexity" and offers "findings

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[191] Ramalingam, Wild, and Buffardi, "Briefing Note Making Adaptive Rigour Work Principles and Practices for Strengthening Monitoring, Evaluation and Learning for Adaptive Management," 2.

[192] Two examples are given: Initiatives to: 1) develop the project management capacity of the e-Liberia PMO came to involve only one mandated individual in a well-understood context. 2) develop a government ICT Handbook involved few people in a relatively simple task of identifying, collecting and packaging relevant information resources.

[193] These are not necessarily small tasks. An example is a step in the "Mainstream eGovernment Strategy" initiative, where a consultant was commissioned to produce financial reports, extracted from published government budget and expenditure reports, of ICT expenditure.

[194] Ramalingam, *Aid on Edge of Chaos: Rethinking International Cooperation in a Complex World*, 233.

[that] are promising" in these areas. [195] In its application with international development aid we should remain tentative in our findings while ongoing research provides firmer footing for interpretation.

Goldstein et al.'s recommendations to encourage a practice of generative leadership and an ecology of innovation will take time and experimentation to implement. Many of the ideas are anathema to large bureaucratic-style organisations, which are notorious for resisting change. However, the recognition that these organisations exist in a world of CAS is reason enough to attempt the adoption of the ideas; otherwise the organisation risks becoming increasingly sclerotic or maladapted to the currents of change swirling around and through it. An increased receptivity to opportunity and reflexivity to changing circumstances offers the opportunity for the organisation to adapt, perform better and hopefully to thrive. Many state institutions that are the object of international development reform efforts are bureaucracies, which typically have an organisation design that encourage conformance and reduce diversity of practice; features which are sharply at odds with the idealised environment visualised by Goldstein et al. Even developed countries have difficulty reforming their state bureaucracies. Why should it be different in developing countries?

DLEG efforts to help reform the state to be better able to reform itself[196] – to build its reform capability – were focused on state institutions. This study shows how the efforts were spread across multiple institutions, with the development of new whole-of-government institutions (such as the CIO Council) and strategies (such as a new ICT Policy and eGovernment Strategy). The government wide participation through the design, development and implementation phases, the ongoing experimentation and learning, the hybrid nature of the outcome are reflective of good practice in the PDIA and CAS domains. PDIA strategy and tactics were used in the support activity. Progress was made in many of the e-Initiatives supported by DLEG. However it is important to note the study does not evaluate the **success** of the e-Initiatives or of the DLEG project. The study recognises the progress towards an improved ICT-related reform capability in GOL, but has no view on whether it is or will remain an effective capability.[197] The focus

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[195] Ramalingam, *Aid on Edge of Chaos: Rethinking International Cooperation in a Complex World*, 143.

[196] DLEG's objective was to improve GOL capability to use ICTs effectively; that is to build GOL ability to identify and implement ICT-based reforms across government.

[197] The end of a development activity is too soon to gauge success. It is only the ongoing practice of the new

of the study was on the design, implementation and utility of the project management approach.

7.5 Generalisability of findings

This study adopts an interpretive research paradigm. The limitations associated with the paradigm need to be accepted,[198] including that the contextualised scope of the study limits the ability to generalise the findings outside of the context. Also the embeddedness of the researcher in the study exposes the risk that his biases could taint the study.

Self-awareness of the researcher and measures to avoid these biases are necessary. The value of research is derived from its trustworthiness and rigour, which can be considered through a set of conditional criteria, being credibility, transferability, dependability and confirmability.[199] This study addresses these criteria through recommended techniques such as the self-awareness and reflexivity of the researcher, by the researcher debriefing with uninvolved peers to test insights and get feedback, and by triangulating data and methods where possible. The study has attempted to provide well-grounded theory, used all publically available data, and provided a "thick-description", being a rich narrative to fully describe the context, and detailed all processes and assumptions to guide assessments of transferability to other contexts. The study attempts to provide an independent researcher with sufficient information to be to authenticate the interpretive inferences and to link findings to the original data through its analysis steps.

According to CAS principles a case study of an intervention in a complex system will not necessarily provide generalizable insights on how to replicate the outcomes, as large non-linear fluctuations can occur "connected to a great sensitivity in respect to initial conditions".[200] As the initial conditions will not be the same when approaching a new but similar intervention, similar efforts can result in very divergent outcomes. However, the methodology that guides the intervention may have generalizable insights.[201] This

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capability that will determine its degree of success. While success may be claimed in formal project reporting, the study recognises the inherent danger of bias in this reporting..

[198] "Interpretivism."

[199] Egon G. Guba and Yvonna S. Lincoln, "Epistemological and Methodological Bases of Naturalistic Inquiry," *Educational Communication & Technology* 30, no. 4 (December 1982): 233–52, https://doi.org/10.1007/BF02765185.

[200] Ilya Prigogine, "Exploring Complexity," *European Journal of Operational Research* 30, no. 2 (1987): 97–103, https://doi.org/10.1016/0377-2217(87)90085-3.

[201] Mike Yearworth and Leroy White, "The Non-Codified Use of Problem Structuring Methods and the Need

exploratory study focuses its analysis, interpreted through the lens of CAST, on the methods and application of the utilised PDIA project management framework. Insights gained from this interpretation may have real-world application in informing and guiding the operational framework for future interventions attempting to support improvements in similar complex terrains.

While the reform efforts of the case study were directed at the ICT sector, we should recognize that many of the reform activities are generic to the wider public sector. The heart of DLEG activity was to improve governance, design policies and execute strategies, and to develop internal reform capability. DLEG's PDIA project management approachis not hard-wired to the ICT sector, and can be readily deployed in other sectors.

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Appendices

Appendix A: Document list, explored for author bias

Document:	Proposal to implement an e-Government initiative (E-INITIATIVE)
Audience:	GOL technical staff and private sector consultants
Circumstances of production:	Made available by the GOL CIO office, along with other technical documents, to meet demand for technical guidance required by MACs to adopt national ICT standards and protocols
Type:	Ad-hoc reporting template. Marked as a draft, implying it is not finalised
Style and tone:	Technical/administrative. Authoritative.
Agenda and purpose:	Technical document to guide the: • formulation by MACs of proposals for ICT reforms/initiatives in their institutions, • administration of the initiative approval process by authorisers • administration of the staging and performance management aspects of the initiative
Facts or opinions:	Facts
Other comments on potential bias:	The provision of technical documents describing and facilitating required administrative processes does not necessarily result in the satisfactory adoption of these processes. They may be aspirational, guiding readers towards an ideal state. The documents could also be provided to signal to powerful interests that there is underlying substance to claims made by the providers of the documents, with no intention or ability to gain adoption of the described processes.
Document:	e-Liberia Project Information Systems & Performance Management

Audience:	GOL technical staff and private sector consultants
Circumstances of production:	Made available by the GOL CIO office, along with other technical documents, to meet demand for technical guidance required by MACs to adopt national ICT standards and protocols
Type:	Ad-hoc guide developed to inform and guide government departments
Style and tone:	Technical/administrative. Explanatory
Agenda and purpose:	Provides GOL technical staff with an understanding of how the administration of initiatives that are scoped for DLEG support will use the PDIA approach, and have compulsory performance targets integrated into a staged-approach. This will inform how concept notes are though about and formulated, and set expectations of any rigour required in the implementation
Facts or opinions:	Facts and opinions
Other comments on potential bias:	It appears to have been developed by Digital Liberia, and is made available on the government website. The voice is that of a Digital Liberia describing its protocols. The study does not see this as problematic, as it would be in GOL's interests to share the Digital Liberia protocols with its constituents

Document:	Digital Liberia and Electronic Government (eGov) Activity: Annual Work Plan (note: separate versions for activity years 2017, 2018, 2019)
Audience:	GOL development partners, USAID, Implementing Partners, Researchers, Public
Circumstances of production:	Authored by IBI and Chemonics, being USAID implementing partners of Digital Liberia, as a contractual requirement of the activity. While these reports are developed by the USAID implementing partners, USAID will comment on drafts requesting revisions until they are satisfied with the product.

Type:	Typical report produced annually through the life of the Digital Liberia activity
Style and tone:	Technical report. Both descriptive and detailed
Agenda and purpose:	Outlines progress of the Digital Liberia activity to-date, and details the planned activities for the ensuing year. It is a rich narrative that is required to demonstrate that the plans are grounded in reflection and learning, with a supporting monitoring and evaluation plan. The report has a standard structure each year. Sections include: • Activity description • Implementation approach • Monitoring, Evaluation and Learning (MEL) plan • Evidence-based decision making and adaptation • Integration of cross-cutting issues (gender empowerment, sustainability, environmental compliance, local capacity development, public private partnerships) • GANTT chart
Facts or opinions:	Facts and opinions
Other comments on potential bias:	Work plans will be in accord with contractual requirements between USAID and its implementing parties. Contractual goals and methods, often defined by USAID many years before project inception, may not be appropriate for found realities. If there is rigidity in the contractual relationship between USAID and its implementing partners the tension between trying to implement a plan in an 'imagined' contractual context and the 'real' found context could cause reporting requirements to service conformity with the 'imagined' plan, rather than the unfolding 'real' plan.

Document:	Digital Liberia and Electronic Government Activity Annual Report (note: separate reports are developed for each of the activity years

	2017, 2018, 2019)
Audience:	GOL development partners, USAID, Implementing Partners, Researchers, Public
Circumstances of production:	Authored by IBI and Chemonics, being USAID implementing partners of Digital Liberia, as a contractual requirement of the activity. These reports are published within a few months of completion of the reporting period e.g. the USAID FY17 reporting period is from 1 Oct 2016 through 30 Sept 2017; the Annual Report would be published before 31 Dec 2017. While these reports are developed by the USAID implementing partners, USAID will comment on drafts requesting revisions until they are satisfied with the product.
Type:	Typical report produced annually through the life of the Digital Liberia activity
Style and tone:	Technical report. Both descriptive and detailed
Agenda and purpose:	The reports focus is on Digital Liberia's progress towards achieving the contracts expected results. It is a rich narrative, supported by exhaustive listings of data, providing a comprehensive view of the activity's efforts and impact. The reporting format requires the implementing partners to provide context and substantiation to claims of accomplishment, including a monitoring and evaluation report. It also attempts to surface challenges and lessons-learned. The report has a standard structure each year. Sections include: - Executive summary - Program overview - Summary of accomplishments - Progress towards achieving expected results - Lessons-learned, applications and challenges - Integration of cross-cutting issues (gender empowerment, sustainability, environmental compliance, local capacity

	development, public private partnerships) • Stakeholder participation an involvement • Management and administrative issues • Planned activities for the next quarter • Registers of reports and deliverables, consultant activity, workshops, forums, training events, and purchases
Facts or opinions:	Facts and opinions
Other comments on potential bias:	USAID and its implementing partners may be incentivised to show their "best side" to their Liberian counterparts; similarly the organisational unit within USAID may want to do the same to their larger organisation. As such the report may be biased towards an optimistic interpretation of events. If plans have not met expectations the attribution of causes may be biased. For example, in a speculative scenario where USAID or its implementing partners were not able to deliver a planned benefit timeously, the report could ignore or deprecate the issue. Similarly if the Liberian government counterparts were not able to fulfil a condition because of powerful pressures outside of the scope of the activity to influence, the report could ignore or deprecate the issues.

Document:	Republic of Liberia e-Government Strategy (2014-2018)
Audience:	GOL Public Sector Institutions, Private Sector Organisations, Civil Society Organisations, GOL Development Partners, Citizens
Circumstances of production:	Developed under its mandate by the GOL Ministry of Posts and Telecommunications in consultation with the GOL ICT Sector, the document sets the strategy to develop an national e-Government capability for the period 2014-2018
Type:	Exceptional report detailing a government strategy
Style and tone:	Technical report. Authoritative

Agenda and purpose:	As detailed in the executive summary: "This document presents a strategy for development and implementation of electronic government "e-Government" in Liberia for the period between Q2/2014 to 2018.The Strategy reaffirms e-Government to the goal of delivering high-quality customer-centric and performance-driven services to e-Government customers. E-Government is a key enabler for accelerating work processes, delivering services to citizens and businesses, and increasing transparency and accountability, while also lowering costs of operation. An e-Government strategy is a guide to show us 'where we are at present'; 'where we want to be'; and 'what we are supposed to do to reach there'. By closely aligning with the National Agenda for Transformation, e-Government will contribute to Liberia's economic and social development, as well as the transformation into a competitive, innovative knowledge society. … Using lessons learned from Liberia's initial phase of e-Government, and leveraging global good practices, this Strategy will guide the government and other key stakeholders whose ownership and leadership are vital to delivering e-Government services in Liberia."[202] Sections included in the report: • The e-Government strategy: Objectives, Vision, Outcomes and Targets • Governance structures • Implementation Plan • Critical success factors and risks • Performance indicators • Challenges and limitations

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[202] Republic of Liberia e-Government Strategy (2014-2018), 2.

	• Mobilising support an managing expectations
Facts or opinions:	Facts and opinions
Other comments on potential bias:	The study considers elements of isomorphic mimicry in the strategy, noting cautions of Andrews et al.

Appendix B: Analysis of DLEG by Goldstein et al. framework

The analysis is summarised below according to the interpretive instrument detailed in Chapter 6.

As each feature or focal category is presented in the analysis, a brief summary is given of Goldstein et al.'s recommended actions on that issue. These summaries are distinguished by their placement in a text box labelled "Goldstein recommendation".

F1: How were CAST principles on creating an ecology of innovation expressed in the PDIA approach of the DLEG activity?

FC1.1: On increasing energy flow across boundaries

Goldstein recommendation: Identify the boundaries within the organisation, and between the organisation and others. Assess the flow of energy and resources within and across those boundaries. Increase the permeability of those boundaries. This enhances micro-diversity

1. Expression in the theoretical PDIA approach
    a. Andrews et al. compare high-performance organisations against those in capability traps by describing their respective strategies at three linked social levels, being the organizational ecosystem, the organization-level, and the agent-level (see Figure 3) ecosystem-level high performance requires that an organization is open to novelty, and has an ability to usefully evaluate and deploy that novelty towards enhanced functionality, rather than to "agenda conformity". The imperative for openness to new novelty[203] is aligned with CAST requirement that the flow of energy and resources within and across organizational boundaries should be increased
2. Expression in the DLEG application of PDIA
    a. Exercises were undertaken by DLEG at the start of the project to identify and "[clarify] the roles and relationships of the PAC, TWG, Project Working

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[203] Matt Andrews, Lant Pritchett, and Michael Woolcock, *Building State Capability* (Oxford University Press, 2017), 33, https://doi.org/10.1093/acprof:oso/9780198747482.001.0001 distinguish novelty from innovation, where "[n]ovelty just means new and different, not necessarily better."

Groups, MAC IT Units, and the centralized competencies of the PMO and the CIO Council".[204]

b. DLEGs approach was to support the implementation of the cross-cutting GOL eGovernment Strategy which sought to transform ICT operations and planning from a silo-based approach, to one that recognized the importance of "holistic coordination and cooperation across the government", and "knowledge sharing and resource sharing which can speed and improve the implementations"[205]. This is aligned with CAST imperatives to identify and overcome boundaries by increasing their permeability. DLEGs governance and implementation strategy reflects elements of this approach

c. DLEG's governance arrangements, which directed and provided oversight of its efforts, spanned beyond traditional boundaries in its composition. DLEG's governance was directed by the PAC, constituted of members from the GOL-mandated ICT Sector (MOPT, LTA and LIBTELCO) as well as representatives from other government sectors (MFDP, PPP, MOS, GC) and from the public/private CCL[206], and later the University of Liberia. Technical governance fell under the TWG, established to "develop and monitor initiatives within the mandates of the PAC"[207] and was constituted by representatives from 13 MACs. The TWG was transformed over the duration of the project into an interim, and then final, CIO Council mandated to set technical standards and co-ordinate IT initiatives across government, with representatives from across GOL institutions. Constituted in this way, the PAC and CIO council are developed to overcome bounded mentality trapped in silos and encourage increased permeability of ideas, energy and resources.

d. The CIO council was regularly convened. Its agenda required representatives from proposed and underway e-Initiatives to present their plans, progress and problems to the council for collective learning and discussion, and problem-solving.

e. DLEG-supported projects often spanned across conventional organizational boundaries in their scope and design and required a spectrum of participation

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[204] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY2018," 25.

[205] Republic of Liberia e-Government Strategy (2014-2018), 27.

[206] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY2018," 5.

[207] IBI & Chemonics, 25.

from affected entities[208]. A principle of "distributed ownership" of systems was adopted with teams with the strongest capacity leading development, and assisting with rollouts to less strong institutions[209].

    f. Project implementation teams[210], responsible for implementation of projects, often included members from outside of their institution. This could be a representative from the CIO Council, or from other institutions that had experience in a related project

3. Discussion

    a. The eGovernment strategy[211], which became the key guide of DLEG activity[212], intends for GOL to break with the traditional tightly bounded silo- and institution-based approach to ICT reforms, and replace it with a whole-of-government approach that necessitates more permeable boundaries, and rearrangements of resources to benefit the whole, rather than the parts of government. Much of the DLEG efforts supported the implementation of the eGovernment strategy. This notion is discussed in more detail below

    b. While the eGovernment Strategy does emphasise the important role that the private sector has to play in achieving GOL's ICT-related goals[213], there is little evidence of DLEG activity increasing permeability of boundaries between GOL and the private sector, civil society and other stakeholders. An important exception is DLEG's efforts to support GOL to engage with an ICT Donor Working Group[214], being a forum to bring GOL and a range of international donor organisations together to address and coordinate donors' ICT funding commitments.

4. Conclusion

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[208] Examples of projects that spanned bureaucratic boundaries include "Build ICT Council capability" and "Mainstream eGov Strategy"

[209] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY 2019," 70.

[210] Examples of PITs that included other members include "Asset Management Information System", "Develop Legislature Portal",

[211] Republic of Liberia e-Government Strategy (2014-2018).

[212] IBI & Chemonics, "Digital Liberia and Electronic Government (EGov) Activity: Annual Work Plan Oct 1, 2017 to Sep 30, 2018," 25.

[213] The eGovernment strategy states that "[g]overnment will never have sufficient capabilities and resources, both in terms of quantity and quality, to implement and operate all identified e-Government initiatives. It will require the participation of the private sector to implement efficiently and effectively.", cited in Republic of Liberia e-Government Strategy (2014-2018), 24.

[214] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY 2019," 58.

a. There is good available evidence that DLEG's PDIA approach has led to increased flow of ICT-related energy and resources across GOL. Available evidence suggests that more efforts could be undertaken to increase flow with the private sector, civil society, donors and other external stakeholders

FC1.2: On enacting an ecosystem of innovation

FC1.2.1: On increasing and amplifying differences in the ecology

<div style="border:1px solid black; padding:10px;">

Goldstein recommendation:

- Increase all forms of diversity in the organisation (demographic, tenure, expertise, perception, mental models, perspectives and so on). This increases generation of novelty. Encourage variation in organisational functioning; these differences increase fluctuations from norms that can lead to creative and pragmatic solutions
- Also keep identifying and encourage an ongoing diversity of ideas over time, and resist attempts for standard operating procedures to stultify opportunities for change.
- Identify and highlight differences, "especially giving voice to those who do not represent the dominant majority."
- Challenge prevailing assumptions when warranted.

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1. Expression in the theoretical PDIA approach

   a. "Agenda conformity" is identified by Andrews et al. as a strategy that is in opposition to the desirable outcome of "enhanced functionality" (ref Table). Types of agenda conformance are to focus on inputs, process compliance and control, relabelling problems and solutions, and intensification or implementation of an imported "best practice"[215].

   b. Building state capability through PDIA is an attempt to be open to and encourage novel ideas and actions, and encourage their adoption in an environment that is non-competitive and where the state is often the monopoly

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[215] Andrews, Pritchett, and Woolcock, *Building State Capability*, 38.

provider. The four PDIA principles of focusing on identifying "good" problems to solve, gaining the necessary authorization to work with positive deviation, iterating and adapting through a solution space, and engaging with a broad set of agents provide a basis for building effective state capability in these circumstances.

c. The aspects of a project that involve design and utilize the PDIA method actively search for variation at each step; looking for available solutions to the local challenges that need to be overcome to proceed towards the goal[216]. The step-by-step process of discovery, and its requirement to adapt to found realities on the path of discovery, holds the process of executing an initiative open to opportunities for change

2. Expression in the DLEG application of PDIA

   a. The DLEG technical team was diverse, comprised of Liberians (local, and from the diaspora) and nationals from Ghana and South Africa.

   b. DLEG was "intentional about encouraging [female ICT leads] in project initiatives"[217], although female participation was often poor. Average female representation in the project governance can be gauged by attendance at PAC meetings in the FY2019, where it was 9.9%, and in the CIO council 12.9%[218].

   c. DLEG facilitated the training of an additional 46 GOL personnel, selected from across 30 GOL institutions[219], in the skills required to be a CIO, broadening and diversifying the pool of talent available to the core state technical institution responsible for ICTs.

   d. A diverse selection of e-Initiatives was selected for support. They were diversified in the type of initiative[220], in the number of MACs that were affected[221], and in scope and complexity

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[216] "a key principle of PDIA is to look for and experiment with multiple alternatives", cited in Andrews, Pritchett, and Woolcock, *Building State Capability*. Change agents are encouraged to crawl the design space of ideas (see Figure 10)

[217] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY 2019," 70.

[218] IBI & Chemonics, 91.

[219] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Final Report," 5.

[220] An analysis by the type of each e-Initiative is provided in Figure 20, showing initiatives ranged from designing or deploying a digital service offering (DSO), designing or executing a strategy, or building a capacity

[221] An analysis by the number of MACs involved in each e-Initiative is provided in Figure 21, showing that 6 initiatives were focused on one MAC, 5 on a few MACs (2 or 3), and 11 on many MACs

e. All GOL entities were encouraged to submit concept notes[222], proposing eGovernment initiatives, to the CIO council and PAC throughout and beyond the life of the DLEG activity. The development and submission of concept notes, being ideas for new ICT investments, is part of the ongoing flow of the eGovernment strategy implementation.

f. Digitising a business process does not necessarily replace the previous implementation; it may offer an alternative mechanism, in which case it has increased variation.

3. Discussion

a. Building the capacity of the ICT technical teams developed their technical ability, but also their acceptance by the institution to play a leadership role in guiding technical developments. This developed voice of the technical teams can alter ICT-related decisions historically made by non-technical but institutionally powerful leadership

b. There is a tension between improving bureaucratic performance, and the CAST goal of increasing variation in organizational functioning. If the bureaucratic processes are effective, the bureaucratic organization will encourage its members to conform to these processes.

c. The inertia within GOL will be to maintain "traditional" silo-based organizational forms. Given GOLs inability to resource the ICT sector and provide strong leadership[223], and with limited donor support available, this inertia may overcome the reforms.

d. ICT is a male-dominated sector in Liberia. MOPT tries, through efforts such as Girls-in-ICT day to change this perception[224]. This will take time to correct.

4. Conclusion

a. There is good evidence that diversity is being encouraged. There are many more opportunities to further enrich the diversity.

FC1.2.2: On finding the nexus of interaction and giving it resonance

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[222] CIO Office Government of Liberia, "E-Liberia Proposal to Implement an e-Government Initiative (E-INITIATIVE)."

[223] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Final Report," 27.

[224] The New Dawn, "Liberia: Post & Telecommunications Celebrates Girls in ICT in Bomi County," Allafrica.com, 2019, https://allafrica.com/stories/201904240375.html.

> Goldstein recommendation: Increase the depth and quality of communication and flow of information through the organisation. Encouraging interaction resonance between people helps create meaning. Provide tools and encourage a culture for people to have rich interactions and safely express and amplify difference and novelty.

1. Expression in the DLEG application of PDIA
   a. The inception and development of the TWG, and then CIO Council created a forum for information sharing and knowledge co-creation amongst GOL ICT practitioners. This was a core DLEG project and seen as key to the successful execution of the National eGovernment Strategy. This forum and community of practice encouraged ICT practitioners to share their plans and experiences and to contribute to the generating of ideas and solving problems outside of their institutions.
   b. The CIO Council and the PAC were integrated into GOL's processes of formulating and implementing ICT initiatives.
   c. DLEG provided technical assistance to support GOL's eGovernment Strategy. Early in the activity DLEG helped MOPT to develop operational strategies, in collaboration with ICT practitioners and other stakeholders, necessary for the successful design and implementation of e-Initiatives. Operational strategies were developed for four areas, being change management, management of information systems, communications and in budgeting for ICT systems. Collaborative strategy development required many conversations and engagement with affected stakeholders[225].
   d. The development of an eGovernment Communication strategy provided messaging and tools that promoted the benefits of initiatives and helped stakeholders to understand their role
   e. These stakeholders were also involved at a more holisitic level, in the development of the new national ICT policy, and in the review of the eGovernment strategy.

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[225] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY2018," 47 lists many workshops, learning forums, training and events involved in developing these fundational strategies.

f. Their participation in the development of overarching, as well as operational strategies, offered institutional leadership and technical practitioners a rich understanding of the field, and their possible roles and responsibilities in it.

g. Liberian ICT practitioners participate in formal and informal social networks related to their field.

h. DLEG fielded technical assistants in PITs to guide their activities, including communications

i. Broad stakeholder events were held to share activity progress and encourage feedback.

2. Discussion

a. An appropriate organizational culture will be required to provide the psychological safety necessary for the full expression of difference and novelty. There is no evidence in the available data that such a culture is in place

3. Conclusion

a. There is good evidence of an increase in the depth and quality of ICT-related information flow through GOL. The CIO council was an important nexus of this flow, but also with strategy and capacity development programs. Much of the flow is generated by donor-driven interventions, such as DLEG-supported activities

FC1.2.3: On pursuing coevolution through symbiotic relationships

> Goldstein recommendation: Develop strategies for co-evolution of the organisation with outside elements, and between elements (people, workgroups and other units) within the organisation. The integrity of each element should be maintained, but increased integration and "even fusion" with other elements will increase their repertoire of capabilities to achieve specific goals.

1. Expression in the DLEG application of PDIA

a. The PAC and CIO Council are centralized bodies set up with an overarching view of activities spanning across MACs, and empowered to encourage cross-dissemination of ideas and practices.

b. DLEG supported GOL with the "Build eLiberia PMO capability" e-Initiative. The eLiberia PMO was envisaged by the eGovernment Strategy with the role of "implementing the central e-Government projects as well as supporting entity level initiatives", and also play a "critical role in the capacity building and knowledge management across various Ministries/Agencies[226]. In recognition that GOL and its institutions did not have the specialist ICT skills required for ICT reforms, the PMO was designed to fill the gap. The PMO was intended to provide specialist ICT-based skills, including project and change management and MIS, to institutions wishing to implement ICT initiatives, especially those that had no internal capacity. They were to host and provide shared services across multiple government departments. DLEG assisted with the professional development of the PMO leadership; however by 2018 the entity was "not adequately staffed with the requisite level of skills to perform [its] function" and as a result its impact was "limited"[227]. In 2019 it is recognized that GOL was "not able to implement" the intended PMO design of 7 skilled personnel providing the planned services[228]. GOL was not able or willing to allocate the necessary resources to capacitate the PMO. The PMO

c. To overcome individual institutional constraints, DLEG supported institutions undertaking reforms to draw in other key institutions to "conversations and problem-solving efforts"[229].

d. DLEG's stated aims were to "identify and encourage participation of relevant stakeholders, including inter- institutional and inter-disciplinary participation"[230]

e. E-Initiatives were developed to identify and GOL's key ICT resources and competencies, encourage transparency and sharing of these resources, and to encourage "sharing of ICT skills capacity, systems and resources"[231].

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[226] Republic of Liberia e-Government Strategy (2014-2018).

[227] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY2017," 23.

[228] IBI & Chemonics, "Digital Liberia and Electronic Government (EGov) Activity: Annual Work Plan Oct 1, 2018 to Sep 30, 2019," 2018, 57.

[229] As an example, recognising MOPT does not have the ability or acceptance to deliver its mandate to drive the National eGovernment Strategy, DLEG "takes pains" to include MFDP, LRA and PDU in planning, as cited in IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY 2019," 53.

[230] IBI & Chemonics, "Digital Liberia and Electronic Government (EGov) Activity: Annual Work Plan Oct 1, 2017 to Sep 30, 2018," 6.

f. As an example of coevolution through symbiotic relationships at project-level, in 2017 the GSA was not able to fund the annual licencing costs of the AMIS. DLEG was able to encourage the LRA, who had identified the need for a digital asset management system, to adopt the AMIS as their preferred solution. In deploying the system, the LRA funded the base licencing costs for the GSA and other institutions. This provided LRA with a satisfactory application, while commensurately allowing the GSA to renew its efforts to roll-out the application to other MACs. The LRA Asset Management team became participants in the GSA's efforts. The GSA was able to field an implementation team to assist LRA with the successful rollout of the AMIS into LRA[232]. The AMIS software vendor also demonstrated adaptability towards a symbiotic relationship by offsetting outstanding licence fees against pre-paid professional services fees[233].

g. The national eGovernment strategy encourages a key role for the private sector in its implementation[234], with a recognition that the government will "never have sufficient capabilities and resources" to "implement and operate" initiatives. The private sector was at heart of DLEG-supported activities, providing the government connectivity infrastructure to host many of the initiatives, technical know-how and solutions[235]. DLEG assisted GOL to build its capability to recognize and work with the private sector[236].

2. Discussion

a. Efforts to engage with the private sector were limited to a few e-Initiatives. Given the critical role acknowledged by the eGovernment strategy, GOL

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[231] The initiative to "Secure ICT assets during transition" was to identify all of the key GOL ICT systems, their key credentials and documentation. The initiative to "Develop a register ('Yellow Pages') of key GOL ICT assets" was to "develop and maintain an up-to-date listing…for individuals with ICT skills, key information systems, and/or ICT resources and assets belonging to the GOL". The listing would be online for use by the CIO and PAC. IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY2018," 10.

[232] IBI & Chemonics, 20.

[233] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY 2019," 27.

[234] Strategic Outcome 6 of the eGovernment strategy is "Increased Private Sector Participation in e-Government Government" cited in Republic of Liberia e-Government Strategy (2014-2018), 24 .

[235] DLEG descibes the "overarching problem for the project is 'connectivity and the related capacity to utilise it effectively'" cited in IBI & Chemonics, "Digital Liberia and Electronic Government Activity Final Report," 1.

[236] For example, the "Project Support to cSquared rollout" initiative [see Figure 22] developed the capacity of MOPT to project manage GOL's role in the implementation of fibre optic metropolitan-area-network infrastructure in Monrovia by the private-sector cSquared consortium

efforts will require improved symbiosis between the public and local private sectors

3. Conclusion

    a. There is evidence of GOL initiatives experimenting productively in novel arrangements with outside elements. Strategies for building internal symbiotic relationships were playing out with some evidence of success at individual e-Initiative level. Resource constraints limited the development of centralized competencies such as shared-service-centres, that were identified as critical to a whole-of-government approach.

FC1.2.4: On preparing for disequilibrium, and a multi-level ride

> Goldstein recommendation:
>
> - Find and embrace disequilibrium in the organisation. It is the "precursor to coevolutionary change".
> - View and understand the organisation from all levels; from the interaction of an individual and her peer, through increasingly higher levels to the organisations interactions with outside stakeholder groupings and beyond.

1. Expression in the DLEG application of PDIA

    a. The DLEG activity's objectives were to improve GOL performance by using ICTs to improve decision making and management. In working towards this goal DLEG performed desk studies, fielded technical assistants, supported multiple e-Initiatives with project and change management, communications and capacity development, spreading its efforts across 30 government institutions. Much of these efforts were to assist GOL to identify areas where there were weaknesses and disequilibrium in its structure and operations, and where ICTs might help to address these issues. Many of these found issues could not be addressed within DLEG[237], but remain part of the context in which reforms need to be initiated

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[237] Contextual issues that were identified include the "binding financial constraints [that] impact on all GOL

    b. DLEG PDIA-based project management (as previously described) is adapted to multi-level understanding and operation. At the top-level it has a whole-of-government view, increasing its focus to project-level views, then project step-level and finally step-activity level. Each of these integrated views has accompanying governance, and operational tools and techniques. Knowledge also flows up, down and across the structures of the project management through the convening of all project teams at the CIO Council, by reporting to the PAC, by external representation on the PITs and by the involvement of DLEG technical assistants at all levels of the intervention. The project management approach traverses the hierarchies and organizational units

    c. DLEG supported MIS training for 30 ICT practitioners[238]. The discipline of MIS helps GOL reformers to understand how systems can be developed that provide decision makers with the information to make effective decisions, facilitate communication within and outside the organization, and keep records of documents and records. The training would empower practitioners to develop a better understanding of their organisations and to identify weaknesses and opportunities for improvement in their systems.

2. Discussion

    a. DLEG's PDIA-based project management approach sets out to provide common scaffolding that allows reforms to emerge and traverse within and across the diversity of institutions and their functional units. It provides willing reformers with a set of fora, common tools, and principles that they can use to initiate, compose and propel their reform ideas

3. Conclusion

    a. There is evidence that GOL was developing its capability to understand and act at multiple levels, and to integrate its actions between those levels. The development was in its early stages, with modest opportunity to practice its new capabilities, and was vulnerable without adequate resourcing and strong leadership.

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plans to improve performance through the use of ICTs", GOLS failure to resource the centralized competencies required by its eGovernment Strategy, and that "MOPT has been unable to exert its authority in the ICT sector", cited in IBI & Chemonics, "Digital Liberia and Electronic Government Activity Final Report," 26.

[238] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY2018," 49.

F2: How were CAST principles on taking advantage of the cusp of change expressed in the PDIA approach of the DLEG activity?

Goldstein recommendation:

- Link external opportunity with the novel internal responses that are generated internally when the organisation faces disruption during criticalisation. This enactment of the response drives the need for further response, increasing disequilibrium. When opportunity tension and informational differences increase sufficiently, a point is reached where a *new* stabilizing conception of the organisation (or sub-unit) emerges distinct from the now unstable *old* conception

- Act to help resolve the tension and encourage movement towards the preferred conception (integrate elements of one with the other if desirable)

- Help choose the pace and nature of the transition

1. Expression in the DLEG application of PDIA
   a. In 2019 GOL began a process of "salary harmonisation" of civil and public servants. The result was that salaries were reduced by up to 60% and many staff "were not paid for several months" resulting in a "trickle down effect on the operations, effectiveness and sustainability of service delivery and operations across government"[239]. These effects would have added to the criticalisation of effective MAC performance.
   b. Criticalisation occurred in the "Deploy Asset Management Information System" e-Initiative in 2017, with the AMIS software licencing due to expire, and GOL not having made provision in the GSA budget for the renewal. Without a paid licence the functioning of a critical system would be impaired and government assets unmanaged. The challenge to organize a renewal was compounded by "the ongoing elections[240] and unavailability of …personnel". DLEG facilitated a response to the 2017 crisis that included negotiating a "2

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[239] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY 2019," 20.

[240] The 2017election season was a long one. General elections were held on 10 October 2017, with a presidential run-off held on 26 December 2017.

month grace period" with the software vendor, and then (as described above) drawing other parties into a synergistic arrangement that resolved the licencing issue for a further year[241]. The resolve that emerged, and was supported by DLEG, was for MFDP to include the AMIS licencing and maintenance costs in the GOL Public Finance Management Strategy for 2018-2012[242]. In 2018 GSA confronted the funding challenge, and a perceived lack of authority and commitment to implement the automated system by presenting the system to the heads of 22 GOL institutions in a 2-day workshop, and so gaining the commitment of key public finance institutions of MFDP, GAC and PPCC to implement the system[243]. The funding challenges remained as in the following year GSA settled the annual licence using novel means by offsetting the fee against prepaid professional services fees due from the vendor.[244]

c. The Concessions Information Management System[245], hosted by the National Bureau of Concessions (NBC) provided a "centralized GIS and record store for concessions-related data across all agencies". NBC was unable to pay the licence fee, "limiting the functionality of the system, and raising the risk of data being compromised without the maintenance and security updates". GOL, with DLEG support, was able to negotiate a novel arrangement with the software vendor where it waived outstanding licence fees, together with a commitment by UNDP to resource the system for a period of 2 years.

2. Discussion

a. GSA's efforts to sustain its AMIS in the face of criticalisation are demonstrative of the Goldstein et al. approach to taking advantage of the cusp of change. Usually MACs would have a line item in their approved budget to resource their key information systems; however through the duration of the DLEG project GOL was unable or unwilling to provide this[246]. GSA's response to the criticalisation has been to draw the support of other important

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[241] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY2018," 7.

[242] IBI & Chemonics, 7.

[243] IBI & Chemonics, "Digital Liberia and Electronic Government (EGov) Activity: Annual Work Plan Oct 1, 2018 to Sep 30, 2019," 12.

[244] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY 2019," 15.

[245] IBI & Chemonics, 16.

[246] IBI & Chemonics, 18.

institutional actors (LRA, MFDP, GAC), and to gain approval for the system to be resourced centrally from the GOL PFM budget. This transition is not complete by the end of the DLEG project. Similar licencing and resource challenges confront the sustainability of other key digital systems deployed in MACS, such as the CIMS, that provide services to other MACs.

b. Institutions responses to the crisis of their core information systems failing can learn from the efforts of GSA to resolve their AMIS licencing issue, and the NBC with their CIMS through the CIO Council; it creates the potential for moving to towards a "*new* stabilizing conception of the organization…distinct from the now unstable *old* conception". The DLEG approach aligns with Goldstein et al. whereby "novel internal responses" are linked with "external opportunity" when faced with the disruption during criticalisation. Actions were taken to help resolve the "opportunity tension" and encourage movement towards a "preferred conception", being a novel arrangement comprising elements of the old and new.

c. The GOL ICT landscape is an uncomfortable one. The ICT sector is resourced starved, does not have strong leadership, and is not resourcing its own reform agenda[247]. The country faced a strong shock with the advent of Ebola in the country in 2015 causing personal and collective suffering and a significant economic shock. This set back government development plans. A new administration was elected and put in place in 2018. There is no evidence that GOLs ICT arrangements have responded to these significant events. Subsequently operational budgets were reduced and salaries cut. These issues compound the stressors on the ICT arrangements. Can GOL "take advantage" of this possible cusp of change? Capabilities and systems will fail without the necessary resources. Is this the "precursor to evolutionary change"?

3. Conclusion

a. There is evidence that at an e-Initiative level, some institutions are able to be creative and adapt to criticalisation. There is no evidence of this ability at the central levels of the MOPT, CIO council and PMO, which are institutional custodians of the eGovernment strategy. The presented evidence also demonstrates the key role that the donor-funded intervention, being DLEG,

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[247] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Final Report," 27.

played in the process. There is no evidence in the data of GOL being able to "take advantage" of criticalisation independently of DLEG

F3: How were CAST principles on leading emergence expressed in the PDIA approach of the DLEG activity?

> Goldstein recommendation: Facilitate the process of emergence through the four stages of 1) disequilibrium conditions, 2) amplifying actions, 3) recombinations, and 4) stabilizing feedback to improve chances of positive emergence

FC3.1: On disequilibrium conditions

> Goldstein recommendation: Consider "turning up the heat" in the areas that could benefit from emergence by knowledge creation, extending social networks, or unlocking technological advances. Consider increasing diversity and opportunity tension (where an opportunity is dangled in front of a unit)

1. Expression in the DLEG application of PDIA
   a. DLEG supported the creation of new knowledge in GOL by fielding specialist technical consultants to develop capacity building exercises, lead technical studies, and provide technical assistance to e-Initiative project implementation teams. This included:
      i. The co-creation and implementation of a range of foundational capacity-building courses for the community of government ICT practitioners, in areas that included change management, project management, communications, management information systems and the budgeting and financing of ICT in government[248].
      ii. Performing analytic and diagnostic exercises to gain insights and understanding, and sharing the findings within government. Examples

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[248] described in tne DLEG reporting, as well as in Monitoring and Evaluation reports in IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY 2019," 75.

include reviews of 1) the state of ICT in GOL[249], 2) government financing of ICT, 3) key government assets and resources, 4) the draft of the new National ICT Policy[250], and the National eGovernment Strategy

    iii.   Development and implementation of a CIO training program, enabling practitioners to gain the necessary certification to become institutional CIO's[251]

    iv.   Fielding of technical assistants specialized in Change Management, Communications, Capacity Development, Project Management and MIS to perform these roles on e-Initiative project implementation teams[252].

b.   Social networks were extended by:

    i.   the enactment of the centralized forums that gathered ICT practitioners from across government (such as the TWG that eventually transformed into the CIO council),

    ii.   by the convening of PITs that included members from outside of host institutions

    iii.   the creation of new forums for the GOL ICT actors to engage with stakeholders in new and purposeful ways. Examples include the convening of the first ICT Sectoral meeting in the new administration, efforts to convene a donor working group for ICT[253], the gathering of MACs committed to executing the new National ICT Policy, as well as more sectoral gatherings, such as those to develop a national GIS strategy[254].

    iv.   Encouraging the use of social media, such as Facebook and Whatsapp groups.

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[249] IBI & Chemonics, "Digital Liberia and Electronic Government (EGov) Activity: Annual Work Plan Oct 1, 2017 to Sep 30, 2018," 25.

[250] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Final Report," 8.

[251] IBI & Chemonics, 7.

[252] An analysis of e-Initiatives supported in the 2018/19 is provided in Figure 23. 77% of e-Initiatives received support in Change Management, 62% in Communications, 69% in Capacity Development, 31% in Project Management and 31% in MIS

[253] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Final Report," 8.

[254] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY 2019," 16.

c. The promotion of technological advances was at the heart of DLEG activity. While many of the supported e-Initiatives were focused on developing policy to encourage the adoption of ICTs by GOL, and the modalities of its implementation, others introduced and enacted such technological advances. These included the automation of business processes in the post office system, the migration of MOH onto a common email platform, the deployment of cloud services and help-desk applications.

d. The offer of DLEG support to a resource constrained government ICT sector created opportunity tension, in that institutions would be attracted away from their existing practices if they wanted to take up the new opportunity. To receive support they were required to define and motivate proposals using National eGovernment guidelines, and to win the approval of the CIO Council and PAC[255]. Criteria for selection and implementation included "strategic fit with the GoL eGov [sic] strategy, authorization by the stakeholders to proceed with the e-Initiative, acceptance by the stakeholders that it is a desired change, and the ability of the stakeholders to sustainably implement the e-Initiative."[256]

e. Opportunity tension was increased with the adoption of a performance-based approach to selected e-Initiatives. If initiatives met their agreed "next-step" targets then DLEG support would be ongoing. Repeated failure to achieve targets would result in support being withdrawn[257].

f. Opportunity tension was created through the PDIA-style incremental step-by-step approach to crawl the solution space on the journey towards designing and implementing initiatives. The ongoing process before each step of collectively identifying problems, gathering information, reviewing options and designing the next action encourages ongoing awareness and adaptation

2. Discussion

a. As described in other research questions, challenges in the ICT sector are caused by inadequate funding, poor incentives for technical staff and lack of

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[255] The approved templates for the development of concept notes and selection criteria is shown in CIO Office Government of Liberia, "E-Liberia Proposal to Implement an e-Government Initiative (E-INITIATIVE)."

[256] IBI & Chemonics, "Digital Liberia and Electronic Government (EGov) Activity: Annual Work Plan Oct 1, 2017 to Sep 30, 2018," 1.

[257] CIO Office Government of Liberia, "E-Liberia Project Information Systems & Performance Management," 1.

strong ICT leadership at cabinet and at heads of institutions. This creates disequilibrium as the technical staff builds capability and knowledge, but struggle to implement planned reforms because of the challenges.

    b. Donor support has improved the development of ICT-based reform capability, but also reduces tension for GOL to address the core challenges which only it can overcome. There is a danger that donor support, by softening the impact of GOLs shortcomings, delays GOL from making the adjustments necessary to build effective capability and sustain reforms

3. Conclusion

    a. There is good evidence that the heat was being turned up on disequilibrium conditions, but in a context characterized by stultifying inertia. DLEGs support to GOL improved knowledge creation at all levels, extended social networks amongst the ICT practitioners, and achieved modest technological advances. An increase in diversity was evident in the participation of people and in the selection of reforms. Limited opportunity tension was created with the support offerings of DLEG.

FC3.2: On amplifying actions

Goldstein recommendation: Encourage and welcome experimentation by affected people in response to the tension evoked by the threat of change. Acknowledge and ease their "discomfort and ambiguity"

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1. Expression in the DLEG application of PDIA

    a. DLEG was contractually required to develop a "change management" capability in GOL for "implement[ing] and institutionaliz[ing] digitized processes and procedures"[258]. DLEG developed and implemented a Change Management Plan (CMP) based on the PDIA approach[259] to inform this process. The CMP was attested to have guided all 12 of the 12 e-Initiative

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[258] IBI & Chemonics, "Digital Liberia and Electronic Government (EGov) Activity: Annual Work Plan Oct 1, 2017 to Sep 30, 2018," 1.

[259] CIO Office Government of Liberia, "Digital Liberia & EGovernment Change Management Plan," 2017, https://eliberia.gov.lr/download/7216/.

implementations that progressed in 2018/19[260].   A full-time change management advisor was fielded through the life of the DLEG activity, participated in CIO council and PAC meetings, and was deployed onto many of the e-Initiative project implementation teams.

b. The PDIA approach "encourage[s] and welcomes" experimentation as an approach to developing change, in contrast to the adoption of "best-practice" or immediate solutions. Andrews et al. propose methods for encouraging the process of "experimenting and learning", such as deconstruction methods with the "5 why" technique (see Figure 6) and the fishbone diagram (see Figure 7). "Iterative incrementalism" provides a method to guide the application of these techniques, where the "crawling of the design space" seeks to encourage ideas gleaned from diverse sources, being existing practices, latent practice, positive deviance, and external best practices.

c. The adoption and application of these principles and methods would encourage and amplify creative experimentation by the ICT staff and institutional leadership in their response to the tensions provoked by reform and change[261].

d. DLEG recognized the critical importance of change not being driven and navigated by external advisors, but by local actors with "[d]eep understanding of local context, heightened situational awareness, appreciation of local behaviors, local memory, tacit knowledge and trusted relationships, and 'skin-in-the-game'"[262].

e. Within e-Initiatives there is evidence that the PDIA process allowed PITs to experiment with responses to change. For example, GSA set overly ambitious targets for the rollout of its AMIS into other MACs. When it became apparent they would not meet these targets, GSA was able to successfully pivot to a new strategy, showcasing the system to heads of institutions, and attempting to win agreement and authority from MACs before committing to targets[263],

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[260] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Final Report," 29.

[261] The CMP acknowledges the consequences of the uncertainty of the process of change: "The idea behind PDIA is that we will falter, fail, pick up the pieces, adapt and try again" CIO Office Government of Liberia, "Digital Liberia & EGovernment Change Management Plan."

[262] IBI & Chemonics, "Digital Liberia and Electronic Government (EGov) Activity: Annual Work Plan Oct 1, 2017 to Sep 30, 2018," 6.

[263] IBI & Chemonics, 20.

2. Discussion

    a. The adoption and endorsement of the PDIA process by the PAC and CIO council provided cover for experimentation from the governance bodies.

    b. The public sector is a major employer. The economy offers few prospects in the formal sector, and difficult prospects in the informal sector. So government jobs will be coveted and guarded. This will inform the organizational culture and is likely to encourage "play-it-safe" attitudes to work choices. In such a context, an approach could be to develop bounded pockets where experimentation can be safely conducted. The ICT reforms can be seen as such an attempt

    c. As detailed in the responses to other research questions, there is evidence across a range of e-Initiatives[264] that experimentation and trial-and-error were part of the process of building reforms.

3. Conclusion

    a. There is good evidence that experimentation was being used within some of the ICT reform initiatives.

FC3.3: On recombinations

> Goldstein recommendation: Identify the proposals for recombining old and new ideas into hybrid solutions as a way forward, and support those mobilizing broad support.

1. Expression in the DLEG application of PDIA

    a. The PDIA approach adopted by DLEG seeks to uncover many novel ideas, sourced from existing, latent and external practice and positive deviance, in each step in the search towards solutions, as discussed above. An implementation team considers these ideas to determine a preferred course of action.

    b. The GOL CMP adopts a PDIA approach of selecting a course of action, where consideration is given to the PDIA "triple-A" heuristic (see Figure 8) where options are evaluated for "change readiness"; whether "the authority to act, the

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[264] E-Initiatives that manifest experimentation as a method include: "Build CIO council capability", "Build eLiberia PMO capability", "Deploy Asset Management Info System", "Rollout of Service/Help Desk", "Mainstream ICT Policy & eGov Strategy"

acceptance by the stakeholders to implement an intervention, and the abilities to implement the intervention" are in place[265].

c. The step-by-step iterative nature of identifying and deconstructing problems, generating ideas, selection and design, implementation and review, encourages the development of hybrid solutions. At each stage in the implementation of the reform an idea can be taken from a different area of the design space, meaning that the eventual outcome could be a composite of many old or new, internal or external ideas.

d. Action-orientation is encouraged by the requirement that when a new step is designed accompanying performance targets are set[266], with the implementers holding themselves to account for their achievement. These allow for the evaluation of progress and attainment of targets[267].

e. The DLEG project management approach, where report-backs are given by the implementation teams to the institutional leadership, as well as the CIO Council and PAC provide opportunities to evaluate their level of support for proposed combinations of ideas, and to confirm their role in authorising ongoing activity.

f. Recombination is demonstrated in the emergence of a GOL CIO Council from the efforts of the "Build ICT Council capability" e-Initiative, which is described in detail in the "Analysis of DLEG using a PDIA evaluative framework" section of this report (Analysis of DLEG case using a PDIA evaluative). The hybrid solution that emerged was very different from GOLs original plans for a CIO Council. Original plans were that the CIO Council would comprise fully certified CIOs, employed as CIOs at their institutions in senior positions reporting to the institution head. All CIOs were required to be certified through accredited training institutions providing classroom training against an approved syllabus. The CIO Council that emerged from the e-

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[265] CIO Office Government of Liberia, "Digital Liberia & EGovernment Change Management Plan," 12.

[266] Peformance target attributes could include "Evidence of approval of the ... target by relevant stakeholders,...evidence of participation in attainment of a stage, ...evidence of agreement...that a stage had been... achieved" CIO Office Governent of Liberia, "E-Liberia Project Information Systems & Performance Management," 4.

[267] The templates used to present proposals, evaluate suitability and track implementation show that performance targets are defined for each stage, with completion dates. These are reviewed by a panel. CIO Office Government of Liberia, "E-Liberia Proposal to Implement an e-Government Initiative (E-INITIATIVE)," 4.

Initiative reform effort comprised heads of ICT units at the MACs, who report to deputy ministers or representatives of the hierarchy. CIO development was provided to interested practitioners as blended online and classroom training by DLEG technical assistants and GOL specialists. Certificates of completion were provided at either CIO, or CIO-associate level. The attainment of a certificate did not change the employment status of the recipient, and did not provide any eligibility for inclusion in the CIO Council. GOLs final solution for the CIO Council was to use available resources, being the ICT units that exist in the MACs, to fulfil the council role and to provide them with training opportunities, developed by available and 'free' expertise, to develop their CIO skills.

g. Another example of recombination is in the e-Initiative to "Develop Artisinal Mining Registration System". The requirement was to develop a system that would allow the compulsory registration of all "class-C mining license holders, diggers, brokers, inspectors, mining agents and co-ordinators" as part of a GOL intention to better regulate mining activity. DLEG was asked to propose a software solution to the Ministry of Mines (MoM), which they did and which was accepted. However, the Ministry of Mines eventually identified the existing GOL National Identity System as a suitable and preferred platform for the registration, and repositioned the DLEG proposal to guide their reporting requirements of "monitoring and management of mine activity". In a novel and creative arrangement MoM adapted an existing internal system, being the National ID system to their registration needs, and separated the reporting requirements into a separate system[268].

2. Conclusion

a. There is good evidence that hybrid solution are being developed as part of reform efforts, at all levels

FC3.4: On stabilizing feedback

Goldstein recommendation:

• Stabilise the emergence by creating new routines and procedures to support the new

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[268] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY 2019," 32.

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conception.

- Build legitimacy for the new conception by creating supportive coalitions and partnerships.

1. Expression in the DLEG application of PDIA
    a. Reform ideas that have emerged and been manifested in their e-Initiatives are presented to the host-institutions leadership, and the CIO Council and PAC, which are the whole-of-government governance and oversight bodies of ICT-based reforms, as well as forums for knowledge dissemination and development with peers and other invited parties. These bodies endorsement, either acknowledged or informal, of the emerging ideas can help not only to amplify them, as discussed above, but to stabilize them and encourage their acceptance and adoption.
    b. DLEG reforms are intentional. The DLEG activity and project management provided a method for GOL to identify desired reforms and pursue their attainment. The process is purposeful; identifying desirable outcomes and then pursuing an iterative method towards achieving them. Ideas are generated and manifested to navigate towards the outcome.
    c. Selected ideas and patterns that emerge within e-Initiatives become composite of the final solution, and so are acknowledged and stabilized. The ideas could be manifest into procedures that become embedded into the routine of the institution.
    d. An example is the emergent idea that a good solution for institutional email is to migrate to a hosted cloud-based system, rather than using private email accounts, in-house or local shared-service email system. The "Adoption of Institutional email system for MOH" e-Initiative resulted in the migration of 200 mail accounts onto the Google Apps suite[269]. The idea is manifest and stabilized, illustrating its performance to correspondents and observers.
    e. A further example is the deployment of a service that has been piloted and proved successful in one institution into other institutions. This was done with

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[269] IBI & Chemonics, 9.

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the "Assist LRA adoption of AMIS" and "Rollout of Service/Help Desk" e-Initiative. The open source digital help-desk solution was piloted at MOH, and subsequently deployed to CSA, MOE and MGCSP[270].

f. In GOL a powerful method of stabilizing feedback is to have it expressed it in government policy. The DLEG activity supported a major policy development, being the "Complete new ICT Policy development" e-Initiative, which resulted in the adoption of a new 5 year ICT policy for Liberia[271]. The policy's formulation and adoption required comprehensive consultation and agreement across government. This policy becomes the guiding document for all ICT initiatives. The articulation of emergent ideas in this document provides a powerful legitimizing effect.

2. Discussion

a. The larger context has not reached a resting point for long. Large external shocks can challenge recent stabilization. Stabilisation of reform efforts would have been set back by the serious impact of the Ebola epidemic (2015), followed by a change of administration (2017), austerity budgets, and very large salary cuts and payment delays for civil servants

3. Conclusion:

a. There is evidence that emergent reforms can be stabilized, especially at a local level within e-Initiatives. MOPT, as ICT sector head, and hosting the CIO council and eLiberia PMO has some tools to aid stabilization, such as the development of supporting policy and procedure, and legitimizing and replicating success. Ongoing changes to the context, such as growing austerity in operational budgets, threaten further disequilibrium and an ongoing search for solutions that fit.

4. Conclusion:

a. The PDIA approach, as applied in the DLEG support, provided a mechanism to encourage emergence through "recognition, amplification and dissemination" of novelty, and through the "rigorous containing, constraining and constructional operations"[272] of generative leaders

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[270] IBI & Chemonics, 13.

[271] IBI & Chemonics, 42.

[272] Goldstein, Hazy, and Lichtenstein, *Complexity and the Nexus of Leadership: Leveraging Nonlinear Science*

F4: How were CAST principles on generating experiments in novelty expressed in the PDIA approach of the DLEG activity?

Goldstein recommendation:

- Emphasise differences and stop "group think" by building teams rich in diversity across all dimensions
- Increase the frequency of experiments
- Make the most of weak signals; identify and pay close attention to weak signals, generated from the periphery, the isolated and marginalised
- Develop network intercohesion by identifying a set of cohesive workgroups that have proven capability, along with characteristics of homogeneity, such as having worked together for a long time. Mix these members to a degree, so that the workgroups are linked together into a broader network. This provokes a creative tension that stimulates the flow of ideas and resources across boundaries, and into the capable hands of strong-tie teams that can execute on novel ideas.

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1. Expression in the DLEG application of PDIA
   a. DLEG's PDIA-based approach to "[e]nacting an ecosystem of innovation" is described here in a previous section (see FC1.2). This describes how efforts were made in the GOL ICT ecosystem to "increase and amplify[y] differences", to find the "nexus of interaction and giv[e] it resonance", to "pursu[e] coevolution through symbiotic relationships", and "prepar[e] for equilibrium and a multi-level ride".
   b. DLEG's PDIA-based approach to "leading emergence" is described in a previous section (see F3). This describes how efforts were made to "facilitate the process of emergence" through the Goldstein et al.'s four identified stages of disequilibrium conditions, amplifying actions, recombinations, and stabilizing feedback
   c. These efforts combine to create conditions that encourage the development and application of desirable novelty.

to Create Ecologies of Innovation.

d. The encouragement of diversity, seen as key to generating difference and novelty is reflected in the DLEG's project management design and practice. Diversity of teams is encouraged in the composition of the PAC, the CIO Council, e-Initiative PITs, in stakeholder engagements, and in DLEG technical teams. The arrangements and consultations across and between these teams increase diversity. Institutional bodies played roles in generating experiments in novelty:

  i. PIT's were set up to drive the implementation of each e-Initiatives. Given the broad requirements of the e-Initiative the PIT team navigated a path towards a desirable outcome in an iterative step-by-step manner (Figure 14 - Path of an e-Initiative). The PIT would design and agree to a stage, a near-term "interim en-route goal" they would strive to achieve. Performance targets would be defined to measure their attainment of the stage[273]. The team would then cycle through an iteration of incremental action-steps to try and achieve this stage. Each step would require the team to reflect in lessons learned, gather new information and improve situational awareness, search for ideas and experiments for next steps[274], and design and action the steps[275]. When the incremental steps achieve the defined stage an evaluation is made to establish whether the stage's performance targets were met. If so, then a new stage was defined, and the process continued in a cycle until the desired e-Initiative outcomes were achieved, or abandoned if insufficient progress was being achieved. This process of small but rapid and ongoing experimentation and learning increases the frequency of experimentation. Close attention is paid to the context; ideas are generated and decisions made close to the front-line workers. PIT members are not 'external' designers, but local teams immersed in the context they are working to reform. The PIT reports back, not only to the host institutions leadership, but also to the CIO council,

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[273] CIO Office Government of Liberia, "E-Liberia Project Information Systems & Performance Management," 4.

[274] Techniques such as the deconstruction using "5-why", fishbone diagrams, and "triple-A" change space opportunities are used to generate ideas and assist in the formulation of next steps

[275] "The objective is to iteratively apply of a set of activities to evaluate a set of assertions, resolve a set of risks, accomplish a set of objectives, and incrementally produce and refine an effective solution", cited in CIO Office Government of Liberia, "Digital Liberia & EGovernment Change Management Plan," 10.

providing further opportunity for dissemination and cross fertilization of ideas.

    ii. The CIO Council is required to implement government strategy and set technical standards for ICT adoption in government. The eGovernment strategy sets out strategic outcomes and targets[276]. Within these enabling constraints the council encourages government institutions to develop ICT-related reform "concept notes"[277] and submit proposals for e-Initiatives[278]. These proposals can be seen as experiments in novelty. The proposals are presented at CIO council meetings, discussed among all participants and evaluated against criteria, set in the eGovernment strategy, of "their importance (criticality) and the ease of implementing them through electronic channels (feasibility)." Approved proposals are presented to the PAC for their endorsement. During the life of the project 22 proposals were submitted to the CIO Council and PAC, with 20, diversified in nature and scope (see Figure 22, Figure 20, Figure 21), being approved.[279]

e. Goldstein et al. recommend the development of network cohesion, where groups with proven capability and strong ties, are linked through weak-ties to themselves and other groups. GOL enacted such a model with the formulation and role of the CIO council. The council, if operated effectively, acts as a weak-tie distributer of knowledge across the network. Presentations, discussions, documents, training exercises provide opportunities to diffuse knowledge from across the network into the hands of capable teams that can act on them.

f. GOL mobilized support from the DLEG project to help build their ICT-related capabilities. DLEG provided GOL with a proven capability to execute on ideas. Many of the DLEG team members had extended experience with the Liberia public sector ICT-related context. This strong-tie, capable workgroup

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[276] Republic of Liberia e-Government Strategy (2014-2018), 22.

[277] The initial proposals are not technical in nature. The basic proposal describes the initiative, explains why it is needed, the problems it will solve and the benefits it will provide. It details the leadership and authoriser of the initiative.

[278] CIO Office Government of Liberia, "E-Liberia Proposal to Implement an e-Government Initiative (E-INITIATIVE)."

[279] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Final Report," 29.

was a resource for the GOL to link to the weak-tie network of ideas to help them build state capability.

g. GOL set out to identify areas of capability across GOL in the "Develop a register…of key GOL ICT Assets" e-Initiative. This was an effort to identify all skilled ICT personnel, key information systems and ICT resources. The goal was to publish this so that the CIO council would be able to "harness the potential of ICT"[280] by discovering what it has in terms of people and systems, and allow for the sharing of skills and resources[281]. This would allow the CIO council to build new "network intercohesion"

2. Discussion

a. The open-access available data does not include any records of PIT activity within e-Initiatives, so the study is not able to provide examples of the generation of novelty at Stage or Step-level. However, the monitoring and evaluation reports state a high utilisation of the project change management plans, described above, at e-Initiative level[282]. Project management templates are publically available that provided standard formats for the definition of e-Initiatives , their assessment by the CIO Council and PAC, and for PITs to document their stages and the activity steps within these stages[283]

3. Conclusion

a. There is evidence that the PDIA approach generated experiments in novelty at whole-of-government and e-Initiative level. There is insufficient data to fully understand how experiments in novelty were manifest at the granular level within the e-Initiatives; at the level of e-Initiative Stage, or e-Initiative Activity Step. Network cohesion between strong teams and ideas from the periphery was improved, with demonstrable beneficial outcomes.

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[280] The vision of the National eGovrnment Strategy is to "Harness the potential of ICT to bring the government closer to the people through effective governance, improved service delivery and socio-economic growth". Republic of Liberia e-Government Strategy (2014-2018), 2.

[281] IBI & Chemonics, "Digital Liberia and Electronic Government (EGov) Activity: Annual Work Plan Oct 1, 2017 to Sep 30, 2018," 11.

[282] For example, by the of reportin year 2019, the number of e-Initiatives being guided by the CMP were 171% above target IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY 2019," 80.

[283] CIO Office Government of Liberia, "E-Liberia Project Information Systems & Performance Management"; CIO Office Government of Liberia, "E-Liberia Proposal to Implement an e-Government Initiative (E-INITIATIVE)."

F5: How were CAST principles on creating more through positive deviance expressed in the PDIA approach of the DLEG activity?

> Goldstein recommendation: Identify opportunities to practice positive deviance. Use the correctly structured approach[284] to find these positive deviants and diffuse their innovation.

1. Expression in the DLEG application of PDIA

   a. The DLEG project management approach considers positive deviance at all levels of focus where ideas are being generated, being whole-of-government level (where the PAC and CIO council is developing ideas about how to progress their reform agenda), e-Initiative level (where the host institution, CIO Council and PAC are considering selection and approval of proposals), e-Initiative Stage level (where the PIT is designing a project stage to commit itself to), and e-Initiative Action-Step level (where the PIT is considering the nest steps needed to proceed towards a stage). Whenever decisions are taken the PDIA approach is to look for ideas in existing practice, latent practice, external best-practice and positive deviance (see Figure 10).

   b. GOL set up a mechanism to assist the identification and discovery of sources of ideas with the "Develop a register…of key GOL ICT Assets" e-Initiative (discussed in the research question above). In the absence of such a searchable register of existing ICT skills and resources, successful applications, systems and resources deployed within GOL could remain hidden from sight. Similarly the development of the CIO council provided a mechanism for inquisitive members to identify ideas and resources from other members in separate institutions. These mechanisms provide decision makers with an ability to search for positive deviants that have proved to be both technically correct and administratively (and politically) possible.

   c. An example of the use of positive deviance is the "Rollout of Service/Help Desk" e-Initiative. MOH deployed an open-source digital help desk system to "streamline, centralize and manage all IT-related service requests". Identifying

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[284] Goldstein, Hazy, and Lichtenstein, *Complexity and the Nexus of Leadership: Leveraging Nonlinear Science to Create Ecologies of Innovation*, 205 provide the guiding rules devised by Jerry Sternin, one of the founders of the Positive Deviance method. These rules are not included here .

and recognising the success of the MOH service through the CIO council, CSA and MOE deployed the same system in their institutions[285].

2. Discussion

    a. Goldstein et al. recommend that Positive Deviance should follow eight rules of engagement prescribed by one of its founders, Jerry Sternin[286]. The Help Desk solution given as an example of positive deviation above does not conform with his rule that "Let the groups do it themselves, from information gathering, to measurement, to identification of positive deviants, to dissemination." In this case DLEG facilitated the process, so the GOL structures did not "do it themselves". The example, however, illustrates a PDIA-based interpretation of Positive Deviance, being solutions that are technically correct and administratively (and politically) possible.

    b. We would expect more examples of exploiting positive deviance as the reform environment created by the new eGovernment arrangements has time to operate; allowing for a greater diversity of experiments and efforts to run their course and so hold themselves open for possible selection as positive deviants

3. Conclusion

    a. Mechanisms were put in place that will enhance reformers efforts to identify positive deviance, with the CIO council being a key component at sharing idas and knowledge. There is evidence of an initiative that benefited from positive deviance.

F6: How were CAST principles on creating smart networks expressed in the PDIA approach of the DLEG activity?

Goldstein recommendations

- Develop ways to integrate key individuals who are more marginal with the dense networks at the centre of the organisation.
- Bridge potentially troublesome intermediaries between networks; build direct connections or reorganize responsibilities

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[285] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY 2019," 29.

[286] Goldstein, Hazy, and Lichtenstein, *Complexity and the Nexus of Leadership: Leveraging Nonlinear Science to Create Ecologies of Innovation*, 206.

- Add redundant pathways to central nodes of the network

1. Expression in the DLEG application of PDIA

    b. Goldstein et al. see the importance in "small world networks", where efforts are made to reduce the number of nodes between members of a network[287]. This is particularly important to link the weak-signals of members of the periphery to the dense centre and sense-makers who can evaluate and act on those signals. They also recognize the negative, gatekeeper role that intermediaries can play and recommend that bridges are built over these nodes. Also redundant links should be built to key central nodes

    c. With the support of the DLEG activity, networks of interaction between the GOL ICT community, as well as their principals were improved. In the traditional bureaucratic hierarchy that GOL arranges itself, the ICT unit was nestled within a department. Formal communication is up and down the hierarchy. For one ICT department to connect with a similar unit in another institution, the communication would need to travel up the hierarchy to a sufficiently senior position, such as deputy minister, who would then need to liaise with his counterpart in the other institution, who could then enable the connection by passing the message down the hierarchy to the ICT unit, or by permitting direct communication between the units. This distanced the community of ICT practitioners from each other

    d. The reformed institutional arrangement has the CIO council at the centre of interaction between ICT units in their institutions. The council provides a forum where ICT peers convene and directly share knowledge during council meetings.

    e. MOPT also hosts the eLiberia office, which is a project management office designed to provide technical services to GOL MACs to implement their ICT initiatives. This should also provides a direct line of communication from ICT teams to a technically competent centre familiar with government ICT strategy, and empowered to connect practitioners with resources and each

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[287] Goldstein, Hazy, and Lichtenstein, 177.

other. However, MOPT was not able to maintain the capacity of the eLiberia office, being "unable to retain the requisite skilled technical staff" and by the end of 2018 it was not able to operate as designed[288].

    f. Other efforts were undertaken to develop smart networks. The "Improve eLiberia Portal" e-Initiative aimed to provide a single central web-portal (eliberia.gov.lr) as an entry point for web visitors to access all online government services. The portal was augmented to allow GOL visitors to request and download key documents, such as the ICT Handbook, and to allow the sending of requests and messages to the eLiberia office[289]. A single point of entry creates a direct link from the visitor to the resource they require, bridging mediating parties[290].

    g. The "MAC PROs to publish web content" e-Initiative developed the ability of public relations officers and communications directors to publish directly onto their institutional websites, so bridging the need for the IT units to perform this role.

2. Discussion

    a. Online social networking tools, such as Facebook, WhatsApp and IMO, will offer a powerful method for smart networks, with the potential to increase direct interaction. ICT practitioners will be adept at organizing themselves into social networks to share information. These forms of communication became more prevalent as access and affordability of devices and data improved in Liberia

3. Conclusion:

    a. A major step towards smarter networks was achieved with the emergence of a centralized functioning CIO council through PDIA-type reform efforts. This reoriented the opportunities for interaction between members of the ICT community, creating closer and lateral links across the bureaucracy. Efforts to integrate a well-functioning eLiberia PMO into the smart network were not

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[288] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY 2019," 58.

[289] IBI & Chemonics, 30.

[290] Of course, there is a risk that the centralized body, being the portal operators, undermine the advantages by for example, providing incorrect information, or by a bad user experience. This risk is offset as visitors will always have a redundant link, where they can choose to access the institutional site directly. Redundant links are available.

successful, with the PMO not able to perform its specialist role.. There was evidence that potentially troublesome intermediaries were bridged, with more direct links developed for interaction.

F7: How were CAST principles on practicing generative leadership expressed in the PDIA approach of the DLEG activity?

Goldstein recommendation:

- Every employee must enact generative leadership at all times through mutual, reciprocal influence. Generative leadership must be enacted as events rather than through persons; it is not embodied in senior managers, but in the interactions between all individuals. There should be focus on the quality and quantity of all these interactions.
- Accept that it will take time for the systemic process of building generative leadership in the organisation to show full benefit.

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1. Expression in the DLEG application of PDIA

  a. A focus of the DLEG activity was to support GOL to implement the institutional design envisaged in the National eGovernment Strategy. The design planned to transform the organization of GOLs ICT capabilities from a silo-based approach, where each institution had its own IT units, plans and operations, to a whole-of-government approach with wide availability of technical ability, centralized standards, improved collaboration between institutions, co-ordination of efforts and sharing of scarce resources.[291]

  b. ICT practitioners were previously encapsulated in their institutions with little contact or guidance from other institutions, "often stuck in the 'old' IT practices of repairing hardware, installing software, and laying cables."[292] They were now expected to participate and adapt to the developments undertaken to develop the whole-of-government ICT capability. This included the development of policy, the development and implementation of

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[291] Republic of Liberia e-Government Strategy (2014-2018).

[292] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Final Report," 9.

capacity building programs, the development of proposals to implement reforms in their institutions and the adoption of common standards in their home institutions.

c. Practitioners could be expected to attend CIO council meetings to share knowledge with counterparts, and to participate in PITs implementing initiatives in their own, and even other institutions. They may be required to share their successes and failures with other

d. With DLEG's PDIA approach to project management, the implementation teams are both designers and implementers of the solutions. These agents, embedded in the context, are expected to follow processes to collectively identify problems, search for ideas and decide on actions to take, implement their decisions, review progress and learn lessons.[293]

e. These many and varied interactions are manifestations of "generative leadership" as conceptualized by Goldstein et al. The interactions are a mutual influence of leadership, unrelated to the bureaucratic hierarchy, which is distributed through the organization. The ICT staff is transformed, from passive implementers of instructions sent from up the hierarchy, to co-creators of new knowledge and capability.

f. It is not only the ICT practitioners who are being asked to step up in contributing to generative leadership. Institution heads, and other organizational units are also drawn into interactions. For example, the development of the initiatives involves the participation and leadership of all stakeholders; certainly not limited to the ICT practitioners. For example the "Improve GOL GIS capability" e-Initiative convened a round table event of heads of institutions and technical leads from 8 institutions[294] that use GIS systems to "share information about their systems, plans, and challenges and to improve co-ordination and planning"[295]. Under the "Mainstream ICT Policy & eGov Strategy" e-Initiative an ICT sector stakeholder meeting was held "to review the outcomes from the e-Government strategy and to set new

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[293] CIO Office Government of Liberia, "Digital Liberia & EGovernment Change Management Plan."

[294] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY2018," 75.

[295] IBI & Chemonics, "Digital Liberia and Electronic Government (EGov) Activity: Annual Work Plan Oct 1, 2018 to Sep 30, 2019," 27.

priorities"[296]. 43 attendees, representing senior leadership in 10 institutions attended[297].

    g. The PAC, comprising senior (non-ICT) leadership from 9 institutions met frequently to guide, assist and oversee the efforts of the DLEG project[298]. Presentations and progress reports were often made to the PAC by representatives from e-Initiatives.

    h. The CIO Council met frequently, convening up to 41 practitioners in a meeting[299] in 2019

    i. Numerous events were held with practitioners that provided opportunity for quality interaction. In 2019, for example, DLEG facilitated training events: 22 events for the CIO training program, with up to 53 attendees, 5 events for Help Desk training at CSA and MOE, 2 events for Public Relations officers at 14 institutions to learn how to publish online. There were also numerous design workshops and planning meetings[300].

2. Discussion

    a. Maintaining the quality and quantity of human interactions in a work context is made difficult in Liberia with inadequate financing for GOL ICT operations. MOPT, for example would have difficulty hosting a CIO council meeting and providing attendees with a lunch. Incentives to recruit and retain skilled staff are inadequate. Staff salaries were cut by up to 60% in 2018/2019, with many staff being unpaid for several months. This has a serious impact on productivity and on GOLs ability to retain staff[301].

    a. Goldstein et al. recommend that there be a focus on the quality and quantity of generative leadership interactions. This study has not been able to identify detailed reports on the meetings and interactions undertaken during any e-Initiative activity. So this study will not make findings on the quantity of interactions within e-Initiatives. We note however, that the PDIA approach is to encourage teams to break down longer journeys of discovery into small,

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[296] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY 2019," 13.

[297] IBI & Chemonics, 91.

[298] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Final Report," 3.

[299] IBI & Chemonics, 91.

[300] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY 2019," 91.

[301] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Final Report," 27.

realizable steps which would translate into more frequent interactions. The iterative process of problem identification, searching for ideas, selecting actions, implementing and reviewing that is at the core of the PDIA approach requires thoughtful and active, quality interaction by PIT members and its stakeholders.

3. Conclusion

   a. There is good evidence that the process of encouraging generative leadership was advanced. The frequency and quality of interaction amongst the ICT-related personnel increased in a diversity of fora with diverse aims, such as strategy and capacity development, and with participation by all levels in the bureaucratic hierarchy. Regular meetings of the CIO council and PAC offered interactive event opportunities, on top of routine host-institution meetings. The design and implementation of reforms and e-Initiatives, enabled through the participative and creative processes of PDIA, offered many interactive events among team members and with other stakeholders and groups.

Appendix C: e-Initiatives supported by DLEG

Short Code	Description	Type
COUNCILC	Build ICT Council capability	Build a capacity
PMOC	Build eLiberia PMO capability	Build a capacity
C2M	Project Support to cSquared rollout	Build a capacity
HANDS	Develop improved ICT Handbook	Build a capacity
WEBC	MAC PROs to publish web content	Build a capacity
AMS	Deploy Asset Management Info System (AMIS)	Deploy DSO
LRAAMS	Assist LRA adoption of AMIS	Deploy DSO
HELPD	Rollout of Service/Help Desk	Deploy DSO
LC	Deploy a Local Cloud service	Deploy DSO
ICTAMC	Secure ICT assets during transition	Develop a strategy
SKILLSC	Develop capacity building programs for key skills	Develop a strategy
GISCAP	Improve GOL GIS capability	Develop a strategy
POL18	Complete new ICT Policy development	Develop a strategy
CSADB	CSA Biometric and Payroll database synchronization	Develop a strategy
KEYICTS	Develop a register ("Yellow Pages") of key GOL ICT assets	Develop DSO
POSTAL	Support automation of Postal Service	Develop DSO
MME	Develop Artisanal Mining Registration System	Develop DSO
LPORTAL	Develop National Legislature Web Portal	Develop DSO
MAIL	Adoption of institutional email system by MOH	Develop DSO
PORTALS	Improve eLiberia portal	Develop DSO
EGOVM	Mainstream ICT Policy & eGov Strategy	Execute a strategy
TLDM	Rollout of TLD across institutions	Execute a strategy

Figure 22 – e-Initiatives supported by DLEG - analysed by Type

Appendix D: Technical assistance provided by DLEG

Short Code	e-Initiative Description	Change Management	Communications	Capacity Development	Project Management	Management Info. Systems
WEBC	MAC PROs to publish web content	✔	✔	✔		
AMS	Deploy Asset Management Info System (AMIS)	✔				
HELPD	Rollout of Service/Help Desk	✔	✔	✔	✔	✔
LC	Deploy a Local Cloud service			✔		✔
SKILLSC	Develop capacity building programs for key skills	✔	✔	✔		
GISCAP	Improve GOL GIS capability			✔		
CSADB	CSA Biometric and Payroll database synchronization	✔				
POSTAL	Support automation of Postal Service	✔	✔	✔	✔	
MME	Develop Artisinal Mining Registration System			✔		
LPORTAL	Develop National Legislature Web Portal	✔	✔		✔	✔
MAIL	Adoption of institutional email system by MOH	✔	✔			
PORTALS	Improve eLiberia portal	✔	✔	✔	✔	✔
EGOVM	Mainstream ICT Policy & eGov Strategy	✔	✔	✔		
Total provided technical assistance		10	8	9	4	4
% provided technical assistance		77%	62%	69%	31%	31%

Figure 23 - Technical assistance provided by DLEG to e-Initiatives in 2018/19[302]

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[302] source IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY 2019," 24.

Appendix E - Evolution of e-Initiatives: 2 illustrative examples

E-Initiative 1: Build ICT/CIO Council Capability

In its initial meetings the PAC identified the establishment and capacity development of a CIO Council as a priority goal that required DLEG support.

The establishment of the CIO Council was long in the waiting. By way of background, the formation of a CIO Council was mandated by the National ICT Policy[303] in 2010 and its role clarified in the subsequent eGovernment Strategy[304]. GOL had made progress, with the support of a previous USAID activity[305], formalised the role of the CIO's who would constitute the council and approved classification of the position and salary at the Civil Service Agency, as well as developed a 2-phase certified accreditation course to equip CIO's with the requisite knowledge to perform their role[306].

By the end of the DLEG Activity, the CIO Council was in place and performing its role. However, the path to achieving "the establishment and capacity development of a CIO Council" was not as envisaged in the ICT Policy or the eGovernment Strategy. A year-by-year analysis of efforts illustrates this:

Year 1:

- An eGov TWG was constituted to guide the PAC on technical issues and to facilitate the technical engagement between DLEG and the government MACs. This served as a governance mechanism for DLEG

- Separately, an initiative was approved for "Building the ICT Council Capability". In a report summarising this initiative, this new ICT Council was envisioned to fulfil some of the roles of the proposed CIO Council in that it "there is a need to institute a body… who have a combination of technical and business development skills and local context, to adequately provide strategic direction for whole-of-government

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[303] Liberia, Government of Liberia National ICT Policy (2008-2018), 31 where it is referred to as a CIO Governing Council.

[304] Republic of Liberia e-Government Strategy (2014-2018).

[305] USAID Liberia Governance and Economic Management Support Project, lasting from 2011 through June 2016

[306] "USAID/Liberia Governance and Economic Management Support Project (USAID-GEMS) : Final Report, July 2011-June 2016," n.d., 83.

eGovernment Strategy and Policy development and implementation"[307]. The ICT Council differs from the idealised CIO Council in that it would "utilize existing GOL professionals", and would be a "small but focused group" whose capacity can be built towards achieving strategic skills necessary to advance the eGovernment Strategy and ICT Policy at a senior level. The hope was that it would bring to the fore "personnel capable of functioning as CIOs" while also "providing results based evidence of the value that such a group offers which can be used in justification of the business case for GoL funding for the CIO Council."

Year 2:

- The eGov TWG is "transitioned and expanded" to an "Interim CIO Council" and then to a "CIO Council", "operated and led by the MOPT CIO an e-Liberia Offices."[308] The Council is comprised of GOL senior level ICT professionals. Among other roles it provides a forum for IT Directors from MACs to share knowledge about e-Initiatives with colleagues, and to consider and approve new proposals. It continues to advise the PAC and also "accelerates the adoption of standards across all ICT initiatives in Government". This council is active and held six council meetings through the year

- The new CIO council reviewed the CIO certified training program and redesigned it to incorporate a blended learning approach of both online and classroom learning to reduce costs and limit absence from work places, while maintaining the necessary standards[309]

Year 3:

- The CIO Council is now reported as being operational and "performing many of its key duties". [310]

- An e-Initiative "Building capacity building programs for key skills"[311] has made strides in developing CIO skills. "The CIO Council with support from Digital Liberia … developed a 3-month training program to help emerging CIOs to build upon their

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[307] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY2017," 12.

[308] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY2018," 16.

[309] IBI & Chemonics, 22.

[310] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY 2019," 49.

[311] IBI & Chemonics, 30.

skills and experiences to prepare them to take on enhanced leadership responsibilities in a dynamic and rapidly changing work environment. In all, 46 IT heads and practitioners from 30 MACs were trained." There was also an associated qualification. 16 of the trainees qualified to be CIO's and 30 to be Associate CIOs.

This study interprets this as an emergent arrangement, adapted to found realities as the process unfolds.. Initially, to meet internal governance needs of the activity, a TWG is set up. The desired CIO Council cannot be sprung to life as envisaged in policy and previous plans as few personnel have the requisite skills, and the government has not made any funding available for training or salaries. So a novel arrangement, being an ICT Council, comprising existing ICT staff, is set up and operates to provide some of the services required of the CIO Council, to identify skilled personnel, and to build a case for funding from government. Within a year these plans have been adapted and the TWG and CIO Council are then merged into an operating "interim" CIO Council, and later into a CIO Council, constituted by members from across a wide range of government entities. The council considers the 2-phase 8 month certified CIO training course, which government was not able to resource, and modifies it to a more affordable 3 month blended learning approach which also limits learners absence from their workplace. There is wide participation in the training. The CIO Council, adapted from its initial design, begins to perform its mandated role. DLEG summarises the outcome: "While most CIO Council members do not have all the necessary skills for a CIO, these increasingly empowered technical custodians are best positioned within GOL to plan and guarantee the sustainability of the different IT systems."[312] A hybrid solution had emerged out of local realities.

E-Initiative 2: Asset Management Information System

The General Services Agency (GSA) has central responsibility for all government assets. GSA wished to improve the management and administration of these assets to reduce costs and risks, improve efficiencies and enable better decision-making. To achieve this it wanted to transition MACs from their largely manual asset management methods to a more centralised digital system[313]. In 2015 GSA had procured a digital Asset

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[312] IBI & Chemonics, "Digital Liberia and Electronic Government (EGov) Activity: Annual Work Plan Oct 1, 2018 to Sep 30, 2019," 70.

[313] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY2017," 11.

Management Information System (AMIS) which was successfully deployed at their institution, and was designed and scoped with the spare capacity to extend the deployment to MACs. This was approved as a priority government e-Initiative to be supported by DLEG early in the project

Year 1

- The immediate problem was that the funding obligation for the AMIS software licences was not provided for. Multiple steps were taken to understand and find solutions. The software vendor was asked to provide a no-cost extension. The Liberian Revenue Authority was approached to adopt the system at its institution and cover licencing costs. The Ministry of Finance and Development Planning was asked to include the AMIS and its licencing in the GOL Public Financial Management (PFM) Strategy 2018-2021[314].

- While these processes were unfolding GSA "struggled with developing a realistic work plan, activity schedules and deliverables…given its existing asset management staff availability and capabilities". They explored methods to supplement constraints and develop an effective project management approach, rooted in PDIA.[315]. The e-Initiative failed to meet the overly-ambitious performance targets it had set during the period

- Relevant staff were involved in a number of classroom, and on-the-job project and change management capacity building exercises

Year 2

- After the disappointments in Year 1, GSA developed a revised action plan, overcoming the problems caused by a lack of authority and commitment to the reforms during the administrative transitional period[316].

- The LRA had been persuaded to adopt the AMIS rather than procure a separate system, and with the support of the GSA technical teams, the AMIS was successfully deployed in this large and strategic institution. As part of this agreement the LRA

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[314] The GOL PFM strategy is funded by donor funds, which would provide funding certainty through the strategy period

[315] IBI & Chemonics, "Digital Liberia and Electronic Government Activity Annual Report FY2017," 12.

[316] A new government was voted into power in 2017, causing a changeover of leadership at all government institutions. Political appointees hold almost all top echelon positions in MACs

covered the AMIS licencing fees for the year, providing short-term relief for GSA's own use of the system and making deployment in other institutions possible.

- The revised action plan generated the interest of three further MACs, being MFDP, MOE and PPCC, to adopt the system.

- Efforts were ongoing to include the AMIS in GOLs PFM-funding arrangements

Year 3

- When the annual software licence paid for by LRA elapsed, and without finalisation that the MFDP PFM-funding for renewal was in place, access to the AMIS was in danger of being cut off again. The GSA identified outstanding services due from the vendor of the AMIS system, and agreed to forego these services in return for the vendor agreeing to reactivate the AMIS licenses for a one year period. This allowed continued use of the systems at GSA and LRA

- MFDP, who had wanted to implement AMIS at their institution, delayed the planned deployment pending resolution of the licencing issue[317]. Similarly MOE and PPCC did not proceed with the planned adoption of the AMIS

This study's interpretation of events is that the GSA and its partners, with limited resources, faced an ambitious desire to eventually automate asset management across all government entities. They mobilised a skilled technical team and then proceeded in step-wise, reflexive manner to forge a path forward. They identified major problems, such as the licencing issue, and continued to develop novel and creative solutions to overcome them, not least by providing a solution to LRA's asset management problems and so developing an influential (and resourced) ally. They made mistakes, such as developing overly ambitious plans that they were not able to deliver on, learned from them and adapted to propose alternatives which were well received. They were set back by a change in the government administration, but went on to rebuild an authorising environment. Beyond their own project, they also were able to feed their experience into a separate e-Initiative, led by MOPT, which undertook separate steps to better understand the funding and resource challenges for all eGovernment systems, including AMIS, and began to develop a strategy to address these issues. The pending of plans to add new

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[317] IBI & Chemonics, "Digital Liberia and Electronic Government (EGov) Activity: Annual Work Plan Oct 1, 2017 to Sep 30, 2018," 48.

MACs to the system until the financing issues are resolved should not be seen as abandonment or failure of the e-Initiative, but as a learned response to a significant threat that needs to be overcome before further progress on expansion continues.