

Amonya, Fred David (2018) Excitation of a dynamical system: public-private partnerships in the non-ergodic Uganda. PhD thesis. SOAS University of London. <http://eprints.soas.ac.uk/26172>

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EXCITATION OF A DYNAMICAL SYSTEM

**Public-Private Partnerships in the
Non-Ergodic Uganda**

FRED DAVID AMONYA

Thesis Submitted for the Degree of PhD in Public Policy

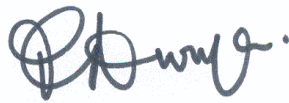
2017

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Abstract

This thesis conceptualises policy space as a dynamical system. It identifies stresses within the system, and synthesises structures that reduce the stresses.

To broaden, the thesis is a case study of PPP policy in Uganda. The policy space of Uganda is defined as nodes by Common Man's Charter (CMC) and Structural Adjustment Programme (SAP). Drawing in the constraint of the institution and the excitation of global effects, the policy space is shown to be dynamical system and non-ergodic using calculus. This single conceptual framework dictates the adoption of 'case study' – an ontology of complexity, a methodology of variety, and an epistemology of explication.

The dynamical and non-ergodic character of the policy space is illustrated in the explication of two PPP projects – Bujagali Hydropower Project (BHP) and Rift Valley Rail concession (RVR). These projects show price stress reflected in the enterprise segment of the population (industrial and agro processing). To sustain PPP in the country, the structure appeals to remoulding, and the thesis identifies three fronts. These are the process of PPP, its corporate structure, and the frame of knowledge refinement.

Using the analytic-synthetic approach, the thesis provides improvements on the three fronts. On the first, Capability Search replaces Competitive Dialogue as the trunk process of engaging the state and private sector. On the second, a prototype Sub-National PPP (SN-PPP), which includes public equity, is presented. The third front examines the interdisciplinarity of PPP, and argues for Joint Research Model in place of the traditional Donor Dependency Model.

Therefore, the thesis illuminates a composite policy object (PPP) striking a dynamical and non-ergodic space (Uganda). Incorporating the three syntheses will make PPP more robust in the complex policy space of the country.

Acknowledgement

I am grateful to the faculty and library staff of Imperial College and SOAS. Not less, I appreciate the assistance offered by Library Services of the Parliament of Uganda, the Parliamentary Archives of the UK and the British Library. In addition, my appreciation of the need for case study approach (particularly in Africa) was developed during my visits to universities across the continent in 2009/10 under Transport Knowledge Partnerships of the Department for International Development (DFID). I am grateful to the universities and the DFID programme. However, the questions of this research emerged during my MSc in transport engineering and policy at the University of Birmingham (2003/4), the subsequent work at the UK science incubation centre attached to the University of Nottingham, and my enquiry in structured finance at Harvard University 2007. Further, my work with the Team of PPP Specialists of UNECE and the privilege of chairing the committee of Transport Systems Economics of the World Road Association was motivating. The salience of dynamical system in many of the 122 member countries of WRA has given impetus to this work. I have benefitted from similar stimulus analysing PPP policy across Africa for development finance organisations (particularly AfDB and the World Bank).

This thesis appreciates the organisations identified above but does not in any way impute responsibility for the arguments herein to those organisations. The responsibility falls on me alone.

To all the colleagues, the reality is clearer, albeit a dot on the vista of knowledge. However, the conceptualisation of policy space as a dynamical system renders the dot bright.

Style and Orthography: Many instances of this thesis focus on product not agency. In those situations, the thesis uses passive voice and even hidden verbs. While those two may cause discomfort to many readers, they serve a functional role that also reflects the interdisciplinary nature of the thesis. On orthography, the alternative spellings (US-UK variants) will be discomforting to certain readers – but the structure of the thesis should alleviate such discomforts. The thesis presents three platforms of access – text, mathematical expressions, and block diagrams. In addition, the thesis presents chapter (and section) summaries that will relieve discomfort with the formalisms of mathematics.

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Abbreviations

ASP	Analytic-Synthetic Process
AU	Africa Union
BHP	Bujagali Hydropower Project
BWO	Bretton Woods Organisations
CD	Competitive Dialogue
CMC	Common Man's Charter
CS	Capability Search
CSF	Construction-Structure-Function Framework
DDM	Donor Dependency Model
DFID	Department for International Development (UK)
DIF	District Infrastructure Fund
DP	Democratic Party
EAC	East African Community
ECOWAS	Economic Community Of West African States
EPRC	Economic Policy Research Centre
FDI	Foreign Direct Investment
H-D	Hypothetico-Deductive Approach
IBRD	International Bank for Reconstruction and Development
IMF	International Monetary Fund
IRC	Institutional Rational Choice
JRM	Joint Research Model
LIG	Local Infrastructure Group
MIGA	Multilateral Investment Guarantee Agency
NDP	National Development Plan
NPM	New Public Management
NRC	National Resistance Council

NRM	National Resistance Movement
OECD	Organisation for Economic Co-operation and Development
PEAP	Poverty Eradication Action Plan
PERD	Public Enterprises Restructuring and Divestiture
PFI	Private Finance Initiative
PPIAF	Public – Private Infrastructure Advisory Facility
PPP	Public-Private Partnerships
RVR	Rift Valley Railways
SAP	Structural Adjustment Programme
SN-PPP	Sub-National Public-Private Partnerships
SPV	Special Purpose Vehicle
SSA	Sub-Saharan Africa
TES	Time, Equity and Structure
UEB	Uganda Electricity Board
UEDCL	Uganda Electricity Distribution Company Limited
UETCL	Uganda Electricity Transmission Company Limited
UNECA	United Nations Economic Commission for Africa
UNECE	United Nations Economic Commission for Europe
UNRA	Uganda National Roads Authority
UPC	Uganda People’s Congress
URC	Uganda Railways Corporation
WB	World Bank

Definitions

Public policy is a ubiquitous terminology. Moreover, the language of public policy straddles everyday life. The attended terminologies are used in a variety of ways even in scholarly works. To avoid confusion, the main terminologies in this thesis are summarised below. Moreover, the thesis discusses each of these terminologies along its flow. However, the set of definitions below will limit the need for cross-referencing – making the thesis more readable.

Case Study	Case study is an empirical enquiry that investigates a bounded phenomenon, in a longitudinal and rigorous way, using both qualitative and quantitative techniques. It does not seek generalisations but rather illumination of the phenomena. (Flyvbjerg 2006)
Dynamical System	A rule for time evolution of a state space. Where 'state space' is a complete capture of the condition of the system at a point in time. Emphasis is on the abstraction (the rule). Consequently, the terminology dominates formal (mathematical) research on evolution of systems compared to 'dynamic systems' that is less exacting. (Credit: Meiss 2007)
Ergodic System	A mechanism whose average over the time of evolution is the same as the space average. In the context of PPP, this means that the mechanics of a project over say 30 years, can be deduced from the present mechanics. A more formal (mathematical) definition is presented in Section 1.3.
Government	Management agents of the state, who periodically change at the discretion of the voter or stay perpetual at the acceptance of the citizens. In the context of Uganda, it refers to the president and his cabinet. (North 1990 and Weber 1978)

Institutions	Humanly devised constraints that shape human interaction, which includes rules, norms and practices. This definition includes formal [written] and informal rules, and their mechanism of enforcement. (North 1990, and Ostrom 1991 and 2005)
Market	The broad structure encompassing actors of capital and labour, and the organisations that seek to reduce the transaction costs of the two. (Weber 1978 and Williamson 1979)
Organisations	Structures developed to take advantage of opportunities created by institutions in meeting specific objectives (North 1990).
Policy	Product of science and politics. This structural definition borrows from the foundational work of Francis Bacon (1974), and appreciates that while the use of science will be compromised by politics, policy must still be primarily driven by science.
PPP	Public-Private Partnership is a cooperative arrangement between the public and private sectors that aims to mutually manage project risks and share ensuing rewards. Consequently, PPP allocates risk to the party better positioned (within the joint structure) to manage the risk. Furthermore, risks that appeal to PPP are associated with long-term projects – hence PPP is often long-term. (HM Treasury 2012 and Amonya 2016a)
Science	A product of systematic and logical reasoning that is grounded on evidence. The definition also applies to the methodology associated with the product (Kuhn 1979 and 1991).
Society	A people constrained on a set of Northian institutions. This definition draws on Weber (1978) and North (1981 and 1990).

Chapter 1.0 Research Motivation and Design

1.1 Overview

The 17th century brought science¹ to politics. In the reflections of Francis Bacon (1624), the state should not be run by individuals ‘not well mingled with [persons] grounded in learning’.² The force of the Enlightenment pulled agency of the state from constructs of autocracy to arguments of science. Policy was born as a product of science and politics, and the new normative basis for political competition. Policy replaced instruments of the military and quasi-deity of the monarchy.

Two centuries later, the new world enlightened by science would destroy itself in the two Wars. Springing from the ashes of war, an urge for efficiency would direct the reconstruction effort. The tallest flagbearer of that effort was Robert McNamara, and particularly his period at the World Bank (1968-1981). See Meltsner (1972) for the early thrust of McNamara.

McNamara would transform the policy space of the low-income world.³ Under his guidance, on 5 February 1980, the World Bank launched structural adjustment loan programme (SAP). It was in response to the economic crisis of 1979.

The new force of SAP created a second node on the policy space of Uganda. Earlier in 1968, the then president Obote had launched the Common Man’s Charter (CMC), which sought to move control of economic activity to Ugandans following independence. Between SAP and CMC, the country experienced dictatorship and international isolation under Amin.

Today, a new force of policy is evolving in the country. It is public-private partnerships (PPP). The object of PPP is complexity of delivering public service and the attendant need for finance. The consequence is long timeframe [of PPP

¹ Recall, science is used in the Kuhnian sense.

² See the 20th century edited work (Bacon, 1915: II-3)

³ Kapur et al. (2011) offer a deep analysis of the McNamara regime.

projects].⁴ Consequently, the main challenge of PPP is, borrowing from WDR 2017, ‘making sure the contract’s terms are consistent over time’.⁵

This thesis brings rigour to the challenge above. First, it recognises that policy is not made in a vacuum – as does WDR 2017. Policy space is an interconnected and dynamic web of actors and issues evolving within a boundary of rules. The thesis calls these rules ‘institution’.⁶ However, distinct from WDR 2017 and a string of literature identified in Chapters 2 and 3, the thesis conceptualises this policy space explicitly as a dynamical system.

Moreover, the thesis shows that snapshots of the policy space of Uganda (since independence) would emerge as different structural constructs.⁷ A transverse (time) average of the policy space is significantly different from each of the snapshots. It is a non-ergodic space.

Expounding on non-ergodicity, consider the interaction of the state, market and society. In situations approximating to ergodicity, the state fulfils its Weberian functions – protection of property rights and monopoly over instruments of violence (North 1990). The market⁸ is subjected to forces of demand and supply, and it is open – it clears. In addition, society has direct influence over agents of the state (government). Moreover, the institution⁹ respects and expects the mechanics described.

The thesis presents a country whose state is young and moulding. Over its 55-year history,¹⁰ the Ugandan state has encountered continual distress and virtual collapse. The market is young – it is formative. The society is fast evolving and responding to distresses of the state. In tandem, the institution is changing.

⁴ Typically, 25-30 years

⁵ World Development Report (World Bank) 2017, p.164.

⁶ This is a definition drawn from North (1990)

⁷ This is a stylisation of phase space. The character of this space is discussed in Chapter 4, and illustrated using project empirics in Chapter 5.

⁸ Note the broad definition of market – the space of production including firms, labour and financial infrastructure.

⁹ Recall, the institution refers to local values, norms and practices.

¹⁰ This is typical age of the state in SSA – the last such a large collage of societies to suffer imperial rule.

Moreover, the interaction above sways significantly with external economic and political effects. This is a non-ergodic policy space.¹¹

Non-ergodicity of policy space implies the project paths are intractable (cf. consistency in WDR 2017). Moreover, PPP (an excitation effect on this space) is a composite structure.¹² In response, the thesis uses an incremental and recursive approach to synthesise three components of PPP that are better suited to the policy space.¹³

Looking back to Francis Bacon, his effort contributed to the creation of policy as a determinant of politics. However, policy occupies a complex space. The study of that space (as a science) appeals to the calculus of dynamical systems. This thesis makes that effort culminating in the three synthetic products.

Finally, the process leading to this thesis instructs an explication of the pertinent Regulations:

...form a distinct contribution to the knowledge of the subject and afford evidence of originality by the discovery of new facts and/or by the exercise of independent critical power. [University of London, Regulations for PhD 2014/15, Sec 6.1 (d)]

The thesis labels the two paths above ‘new facts’ and ‘critical power’. The thrust of this thesis is not a quest for ‘new facts’ of history. Rather, it is a ‘critical’ examination of the policy space of Uganda and the excitation of PPP. This critical effort has yielded the three structures. The underpinning arguments of all the three structures (i.e. the conceptual framework of the thesis) as well as their operational attributes have been subjected to double-blind peer review. The associated papers are identified in Chapter 6.

¹¹ Notably, this assessment is relative. Recall, the characterisation of this space is substantiated in Chapter 4, and illustrated by the empirical project data of Chapter 5.

¹² It comprises many disciplinary dimensions, and these are intertwined.

¹³ The new structures are laid out in Chapter 6.

1.2 Research Questions and Motivation

Box 1 presents the research questions. To appreciate these specific questions, we need to place them in a context of two questions (contextual questions). First, how do we illuminate complexity? Secondly, what do we see in the complex phenomenon?

The first contextual question is an important epistemological challenge in its own right. However, the second is more dominant in scholarship. It appeals more to the exigency of ‘discovery of new facts’. That appeal seems to explain the orthodoxy of the hypothetico-deductive (H-D) approach (see Sec 1.5). On the other hand, the path to that ‘discovery’ is just as important – unless the reader assumes an inertial frame. If the inertial frame is removed, the reality of complexity comes to bear, and consequently the importance of the first contextual question. This reality of complexity motivates case study as a methodology and an epistemology. Moreover, the methodology and epistemology of case study finds justification in the ‘exercise of independent critical power’.

When faced with a complex and novel phenomenon like PPP (see Sec 3.3), the motivation of the first contextual question comes to light, and hence the first research question of Box 1. This first research question leads to the overarching framework of the research, that is, policy space as a dynamical system. The structure of this overarching framework is introduced in Section 1.3, and in Chapter 2, the overarching framework is analysed in the context of literature on policy-making.

Box 1: Research Questions

1. PPP is complex and nascent. Therefore, we must first ask, what framework can we use to investigate policy waves striking new policy spaces?
2. What is the origin and mechanics of diffusion of PPP?
3. Being a new wave of policy, how do compositional structures of PPP interact with the reality of the policy space of Uganda?

Questions 2 and 3 look at the phenomenon itself – through the lens of the overarching framework (dynamical system). Question 2 considers the origin and

Excitation of a Dynamical System

diffusion of PPP. However, PPP is a new policy wave, as discussed in Chapter 3. Therefore, PPP in Uganda does not have a rich repository of empirical data for attempts at H-D generalisations. The emerging empirical strands are captured in Chapter 5, following an examination of the policy space in Chapter 4.

However, the wave of PPP hitting Uganda is composed of structures that can be analysed against the reality of the policy space of the country. That analysis is the essence of Question 3, and the concern of Chapter 6.

1.3 The Conceptual Framework: Dynamical and Non-Ergodic Policy Spaces

1.3.1 The Core Argument

This thesis is anchored on the single overarching conceptual framework captured in Figure 1. The concept is policy space as a dynamical system, and more specifically, non-ergodic dynamical system.

It must be emphasised at the outset that the overarching conceptual framework binds the entire thesis, as the terminology suggests. It is translated across the thesis to forms that allow deeper illumination of the specific issues. However, the overarching conceptual framework still holds in those situations.

As the wave of PPP strikes Uganda, it does not find a policy vacuum. The thesis identifies and analyses two main nodes of the policy space. They are Structural Adjustment Programme (SAP) and Common Man's Charter (CMC), and the two nodes encompass local strands of the state, society and market. In addition, external effects continue to feed, or excite, the policy space.

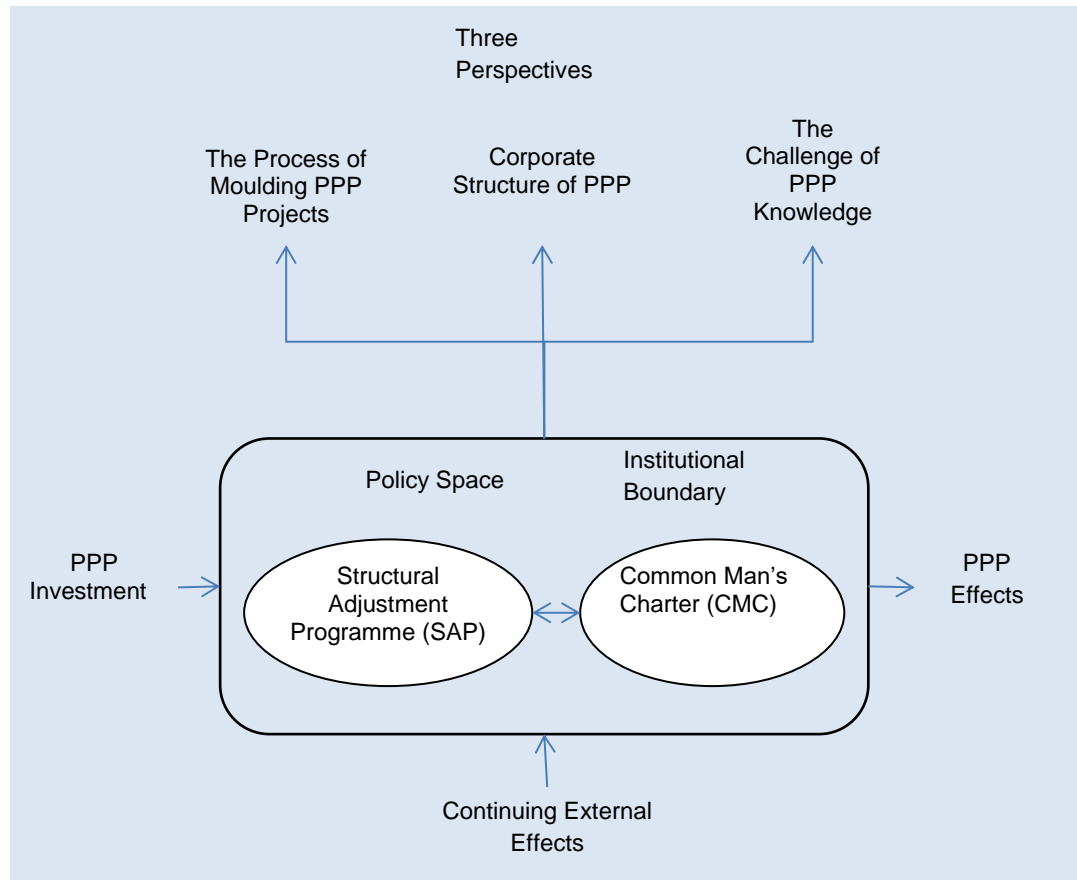


Figure 1: The Overarching Framework - Policy Space as a Dynamical System

Let us denote the system in Figure 1 as follows:

- PPP investment as an input vector \mathbf{p}
- Policy space (\mathbf{S}) comprises the two nodes (SAP and CMC) and three main cords - the state (σ), society (χ) and market (κ)
- External effects \mathbf{e} is a vector of technological and socio-economic forces striking the country
- Northian institution, τ
- Output \mathbf{y} is a vector of socio-economic effects of PPP.

Change in policy space (\mathbf{S}) resulting from PPP investment (\mathbf{p}) depends on the state (σ), society (χ) and market (κ), and the excitation function comprising external effects (e) and Northian institution (τ).¹⁴ Formally:

$$\begin{cases} \dot{\mathbf{S}} = \mathbf{f}(\sigma, \chi, \kappa, \mathbf{p}; e, \tau, t) \\ \mathbf{y} = \mathbf{g}(\mathbf{S}; e, \tau, t) \end{cases} \quad 1.3.1$$

In keeping with convention, lower-case bold type denotes vectors.

Let us consider a textual geometry of 1.3.1. Imagine a screen of the two nodes of the policy space (CMC and SAP) and a third developing – PPP. Further, draw an institutional strand through the three nodes. Chapter 4 shows that the institutional strand has suffered continual jerks of tension since the state was born (i.e. since independence). The evolution on the screen (imagined) shows non-ergodicity, which is illustrated by the projects of Chapter 5. If we were to take snapshots, for example every five years, and placed the slides along the track of time, the individual slides would be different from the totality of the trajectory.¹⁵

Look forward another half century. An institutional strand that brings stability to the non-ergodic situation above is yet to emerge. Consequently, analysis of PPP in Uganda should recognise and embrace non-ergodicity. Moreover, calculus instructs us to watch for moments of stability, and adopt an incremental and reflexive approach in pursuing policy. That strategy guides the syntheses of Chapter 6.

¹⁴ This inclusion of the Northian institution is better appreciated under the Lagrangian formalism where the institution features as a non-holonomic constraints (see Sec 3.4.3).

Note, the admission of the Northian institution in a dynamical system removes the convenient premise of Markovian property. Consequently, it leads to the acceptance of intractability [of policy path]. The thesis embraces this intractability in adopting the conceptual framework of non-ergodicity. It uses the conceptual framework to illuminate the complex policy space of Uganda, and synthesises structural components of PPP better suited for the complex policy space.

¹⁵ Formally, the ensemble average is different from the time average.

A reader might wonder how the situation above is different in other countries. In the more mature states, submission to law (for example), provides a stabilising institutional strand.¹⁶

To conclude this textual geometry, let us reflect on the place of mathematics as a tool. Mathematics illuminates and orders reality. It does not create it. Moreover, social reality resides in history. Therefore, we have to bring mathematics to history. That imperative of interdisciplinarity¹⁷ motivates this thesis. To illustrate, history provides us the nodes of policy. Sociology defines the institutional attributes. Finally, non-ergodicity as a conceptualisation comes from the duality of calculus and physics. Without this conceptualisation, the rigour of the diagnosis (the incremental and reflexive approach) would be lost, and so would the syntheses of Chapter 6.

Let us take a more formal view of the essence of the non-ergodicity concept and the imperative of interdisciplinarity. The Noetherian frame will be instructive.¹⁸ History is a platform for searching Noetherian symmetry. When symmetry exists, we deduce an underlying [time invariant] conservative law, which allows us to project symmetries of history. That way, we can confine in history and discuss the future reasonably. However, when we cannot find symmetry in history – as is the case with non-ergodicity – we need to start with a conservative underlay and create symmetry (or history). Seen that way, the institutional mechanics of this thesis is a rendering of a conservative law. To sum up, history needs physics (with mathematics embedded) when facing non-ergodicity. The syntheses of Chapter 6 require that interdisciplinary package, and hence the conceptual structure of this thesis.

¹⁶ Note that these countries will have developed the stabilising strands over many centuries (cf. note on the Magna Carta in Sec 4.2.2). The dynamical situations they experience are of lower amplitudes (cf. Sec 2.4.4, Figures 7 and 8).

¹⁷ One of the strongest affirmations of this imperative of physics and mathematics comes from Paul Samuelson (North 1999: 2), 'if the world is not ergodic, economics is not a science'. This thesis contributes to the caution on limits of applied frames of physics in the analysis of social space – even as the thesis affirms the imperative of physics.

¹⁸ Noether's work (e.g. in Kastrup 1987) is engaged more in Sec 1.3.2. Otherwise, symmetry refers to invariance of reality.

Here is a summary of the discussion on conceptualisation 1.3.1 placed in a context of classical statistics:

1. The dynamical system in 1.3.1 is non-linear. Therefore, the output function (Equation 1) is unstable. In other words, any attempt at generating a stable set of socio-economic impacts of PPP would be futile.
2. The irrationality of the time-variant Northian institution implies non-ergodicity. Therefore, realisations within the policy space are not independent and identically distributed (i.i.d.). In other words, effects pertaining to the three cords of the policy space (i.e. the state, society and market) would not be i.i.d.
3. The absence of the i.i.d. condition renders the two canonical prerequisites of classical statistical modelling inapplicable, and the two are the law of large numbers (LLN) and central limit theory (CLT).
4. How then can we improve the comprehension of the dynamical space, and hence add to knowledge (as argued by Polanyi 1962)? The thesis picks the three fronts (or windows) of the dynamical space shown in Figure 1 and makes a critique of the existing structures of PPP embedded in the input vector \mathbf{p} .

The thesis calls the approach to illumination of reality (addition of knowledge) captured in Points 1-4 above Analytic Synthetic Approach (ASP). The structure of ASP is shown in Figure 2.

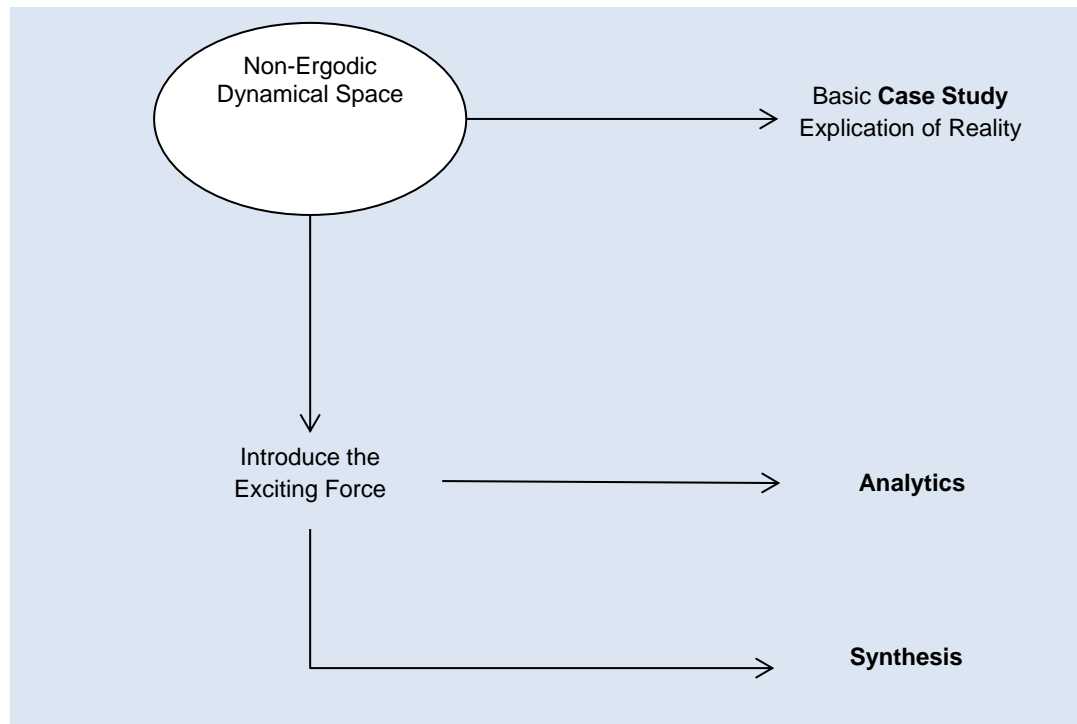


Figure 2: Analytic-Synthetic Approach

Figure 2 is not a new concept. It is merely an abstraction of Figure 1 and the accompanying text. As always, abstraction allows space for clarity, and this is the purpose of Figure 2.

To recap, non-ergodic dynamical systems are intractable. We must therefore ask, how do we illuminate these spaces? The answer is case study. It seeks explication of the dynamics of the phase space without attempting a generalisation (or trajectory). That explication is an end in itself as discussed in Section 1.5. The explication improves our comprehension of a capsule of reality.

More formally, the H-D frame would set out an evolution function captured in the hypothesis and seek to fit realisations of the policy space on the evolution function.¹⁹ Case study, anchored on non-ergodicity of policy space, recognises that the evolution is not stable. Consequently, case study identifies the elements of a phenomenon and illuminates its mechanics – in this instance using the conceptual

¹⁹ Using the frame of statistics, and the premise of ergodicity is most vivid in time series analysis of nonlinear dynamical systems. Moreover, view the evolution function as discrete changes in time.

frame of non-ergodicity. The thesis calls this improved comprehension of the phenomenon an epistemology of explication.

Note, the force of PPP is introduced as a model of the interaction of the state and private sector. Moreover, the operational attributes are specific, for example, competitive dialogue (see in Figure 1). Since the structure of the PPP force is defined, we can analyse it, and hence the middle layer in Figure 2. This is constitutive analysis.

Further, we look at the components of the PPP force against the dynamics of the phase space. This examination will yield a structure better suited to the reality of the policy space. It is a synthesis. This synthesis is the subject of Chapter 6.

Formalisation of Analytic-Synthetic Approach (ASP):

Let us look at the country's dynamical policy arena as a probability space $(\Omega, \mathcal{F}, \mathbb{P})$.

Where:

Ω is sample space of all realisations (outcomes) from the excitation of the space by the force of PPP

\mathcal{F} is the σ -algebra, a set of events containing the realisations of PPP

\mathbb{P} is the probability function of the events.

Non-ergodicity arising from the irrationality of the Northian institution implies that for any subset E of the σ -algebra, the symmetric difference E and its inverse transform is not a null set. In other words, the transformation is path dependent.²⁰

$$E \subseteq \mathcal{F}: \mathbb{P}(T^{-1}(E) \oplus E \neq 0) \quad 1.3.2$$

Where: T is a measure-preserving transformation (MPT) in ergodic processes.

²⁰ Put differently, the process does not follow a conservative law and the empirics do not show Noetherian symmetry (see Sec 1.3.2).

Premising on institutional rational choice (IRC), ensemble averages of the probability of PPP realisations will not equal the time averages, and hence Equation 1.3.2.

Let us move to the middle layer of Figure 2, the analytics. Here, PPP is a composite exciting effect. We can look at this decomposition challenge as a Fourier problem and apply the attendant analysis (cf. Sec 2.4.4, Figs. 7 and 8). Alternatively and more intuitively, we can imagine a continuum susceptible to strain. Formally:

$$\varepsilon_{ij} = -s_{ijkl}\sigma_{kl} \quad 1.3.3$$

Where:

ε_{ij} , is the Cauchy's strain tensor, a depiction of the tendency to alter the structure of the model PPP in the face dynamical nature of the policy space;

σ_{kl} , which captures the burden on the PPP model due to the new dynamical policy space;

s , the fourth-order compliance tensor, is inverse of the second-order stiffness tensor.

The synthesis of Chapter 6 is an effort at providing PPP structures with better compliance tensor. Further, note the change from the non-ergodicity of Equation 1.3.2 to the deterministic character of Equation 1.3.3. We move from a situation where a trajectory cannot be defined to a situation where, for a given phase space, we can make deterministic assessments in respect of the exciting force.

Moreover, a common concept in public policy is adaptation. The syntheses of this thesis do not belong in this adaptation frame. Adaptation is an evolutionary phenomenon. Scholarship on this phenomenon of biology applied to policy science includes Dunn (2015) and Parsons (1995). Here is the argument formalised:

$$\dot{\varepsilon} = -s'\tau \quad 1.3.4$$

Where:

$\dot{\epsilon}$ is strain rate tensor, which captures the rate of change of the PPP structure in the neighbourhood of the attendant point in the policy space;

s' is compliance rate tensor;

τ is viscous stress tensor, which captures forces within the model PPP due to the rate at which PPP is adopted.

Equation 1.3.4 describes a structure that is changing internally. The new structure will be viscous, less susceptible to rupture but compositionally unchanged. It is an adapting structure. On the other hand, the syntheses of this thesis are compositionally different from the model PPP.

Further, the adaptation in the neighbourhood of the policy point captured in Equation 1.3.4 will continue as long that point remains smooth. Otherwise, a sudden change (typical of non-ergodicity) would lead to rupture. Given the non-ergodicity of Equation 1.3.2, the use of the model PPP structure in policy spaces similar to Uganda, would lead to a few adaptations and sporadic failures. This thesis does not attend to such cross-country performance of PPP. However, this observation provides a research offshoot, and underpins the epistemological value of case study addressed in Section 1.5.

In closing, a pedagogical note is due. The synthesis stage of ASP allows us to make actionable statements albeit at the margin (in the neighbourhood of the phase space). In a pedagogical world continually seeking generalisation (actionable statements),²¹ this synthesis is comforting.

²¹ An attribute of the ubiquity of the H-D approach
Excitation of a Dynamical System

Note that the primary objective of the thesis is not to show that the policy space is nonlinear and non-ergodic.²² Rather, the thesis uses the conceptual framework to illuminate the policy space of Uganda. The non-ergodic effects shown in the analysis of the two PPP projects in Chapter 5 merely illustrate that fact of calculus. Moreover, the appreciation of non-ergodicity enables the three structural syntheses of Chapter 6.

1.3.2 Non-Ergodicity on the Disciplinary Raft: A Bedding Review of Literature

Ergodicity is rooted in physics. However, the terminology has spread and now feeds many disciplines including the social science ones – and most prominently, economics.

In this thesis, the negation of the terminology (i.e. non-ergodicity) feeds policy science. However, given the emerging prominence of non-ergodicity in economics,²³ it is prudent to bring out the most salient economics literature attending to the concept.²⁴ That way, this section provides a bedding for the main literature review in Chapter 2.

Arguably, the most important advocate for non-ergodicity in economics is Douglass North, see North (1999). Other scholars include Davidson (1991). The scholarship on non-ergodicity in economics became strong in the nineties. However, the root of this scholarship traces back over a decade. A beacon on that journey is the 1993 Nobel Prize to Robert Fogel and Douglass North.²⁵

North was inspired by the failure of macroeconomics to explain growth around the world. However, his explanatory strand ('the institution') was not confined to macroeconomics. For example, the reality of the institution underpins the work of Elinor Ostrom leading to her Nobel Prize in 2009. She addressed microeconomic issues. See Ostrom (2009).

²² Non-ergodicity immediately follows the admission of Northian institution.

²³ The dating of the literature that follows justifies the use of 'emerging'.

²⁴ In a way, literature from economics provides an interface with policy science. The institutional economics of North (1999) is an example.

²⁵ The presentation speech recognised the two for 'combining economics with history'. North in particular was noted for bringing 'institutions' to economics. Details at www.nobelprize.org

Therefore, at the centre of the negation of ergodicity, we find the institution.²⁶ We must ask, how did ergodicity emerge in economics?

Paul Samuelson is the proper vantage point for examining the ergodicity argument in economics.²⁷ Let us turn back to the Nobel platform, and appreciate first that the prize giving ceremony would offer any scholar a space to dredge out his or her deeper thoughts. Against that background, the Nobel lecture of Samuelson (1970) can be summed in one word – symmetry. To that end, a tragedy embodies the lecture – Samuelson fails to mention the most important name in ‘symmetry’ as a subject of physics and mathematics. The name is Emmy Noether.²⁸

Let us look closer at this weaving of symmetry and ergodicity held in the work of Samuelson. Symmetry is the existence of an invariant structure across physical interaction. Noether proved that symmetry is associated with an underpinning conservative law.²⁹ The symmetry of least action of the Lagrangian-Hamiltonian systems motivated the efforts Samuelson, and this subscription to classical physics is seen in Samuelson (1971). That paper draws in statistical mechanics and illuminates Samuelson’s [desperate] hold on ergodicity as he ponders the ‘razor’s edge’.

We must look deeper at Samuelson (1971). It captures the author’s thinking on ergodicity, and is a luminary to the stream of ergodicity economists over the past half-century.³⁰ The paper is anchored on the Lotka-Volterra (L-V) equations of prey-predator interaction. These equations are shown in 1.3.5 and 1.3.6 below.

²⁶ Reflect on the overarching concept in equation 1.3.1.

²⁷ We are reminded of the famous statement attributed to Samuelson, ‘if the world is not ergodic, economics is not a science.’ (North 1999: 2)

²⁸ It is reasonable to argue that this omission is part of a gender bias that shrouded the development of science in the late nineteenth and early twentieth century. However, even this year (2017), gender concerns were raised during the award ceremony for the economics prize. See at www.youtube.com/watch?v=x-f_6zhUOPQ (media questions, viewed 9 October 2017).

See Kastrup (1987) for the influence of Noether on Albert Einstein, and as the reader might rightly guess, Einstein finds a place in Samuelson’s Nobel lecture.

²⁹ For a translation of Noether’s 1918 paper *Invariant Variations Problems*, see Noether (1971)

³⁰ Though, we must ask if the concerns of Joan Robinson (1953) apply today. She noted that too often the leading economist had been hurried to become a professor without the opportunity to dig into the foundation of their work – such as ergodicity. Consequently, might it be the case that a broad raft of scholarship starts by testing different ‘equilibrium models’ without questioning the physics of the equilibrium?

$$\dot{X} = X(\alpha - \beta Y) \quad 1.3.5$$

$$\dot{Y} = -Y(\delta - \eta X) \quad 1.3.6$$

Where:

X denotes the prey, and in the expounding of Samuelson, ‘deer, rabbits and labourers’³¹

Y is the predator, ‘tigers, foxes and capitalists’

\dot{X} and \dot{Y} , as usual, denote time derivatives

$\alpha, \beta, \delta, \eta$ are real positive parameters of the interaction.

Samuelson examines these equations and ends up with the ‘razor’s edge’ configuration, which is a conservative phase space of limit cycles.

Conservation is key. Otherwise ergodicity cannot hold. Ergodicity dictates that the ensemble average be equal to the time average. In respect to policy space, a snapshot of the policy space should capture all the canonical information of the space. Formally:

Let $(\Omega, \mathcal{F}, \mathbb{P})$ be the policy space. Where:

Ω is a set of all policy realisations (outcomes)

\mathcal{F} is the σ -algebra, including all events pertaining to a policy action

\mathbb{P} is the probability function of the events.

Let T be a measure-preserving transformation. For an ergodic process: $E \subseteq \mathcal{F}$: $\mathbb{P}(T^{-1}(E) \oplus E = 0)$. [Qualifications of the algebraic abstraction of ergodicity is a feature of any standard textbook like Petersen (1989).]

Let us turn back to equations 1.3.5 and 1.3.6. The interests of the labourer as ‘prey’ are not completely separate from the interests of the capitalist (the ‘predator’). A structure traverses the two. That structure is the institution.

John von Neumann features prominently in Samuelson’s Nobel lecture. It demonstrates the influence of pre-War statistical mechanics on Samuelson and hence ergodicity in economics.

³¹ Emphasis mine

Consequently, the parameters of the two equations are not realistic. In place of the growth-decay parameters, we have functions of the environment, the institution and time. This new complex yet realistic form points to the conceptual framework 1.3.1. It is a non-ergodic world.

However, what happens when a sheath of institution is so strong that it binds nearly the entire ecosystem – almost all labourers and capitalists (e.g. subscription to law)? It induces stability. It makes the ergodic premise more realistic. However, the phenomenon of this thesis, placed on the longitudinal view of Chapter 4, does not draw close to the ergodic setting. See the illustrating project empirics of Chapter 5.

We face non-ergodicity yet must make decisions. How? Calculus instructs us to do two things. First, we must identify points (in time) of stability. These times allow framers of public space to modify and embed holonomic institutions.³² Secondly, the attendant policy actions must be incremental and reflexive.³³ This prescription underpins the syntheses of Chapter 6.

In summary, scholarship of the sixties and seventies pulled in statistical mechanics from the pre-War era, and placed economics on ergodicity. Samuelson provided the intellectual leadership.³⁴ The more nascent discipline of policy science (see Sec 2.3) is searching for an underpinning frame, and at a time economics is struggling to hold onto ergodicity. North has led that challenge to economics. This thesis addresses the broader policy space. To that end, Chapter 2 reviews literature on policy science, asking: How does scholarship address the dynamical reality of policy space?

³² These holonomic institutions dominate and traverse the policy space, allowing linearisation of the space. Management of policy space then becomes a continual exercise of creating these holonomic institutions, and unfortunately, these times of stability follow severe human distress. This argument is illustrated in Chapter 4.

³³ This is adherence to the instruction of calculus on solving dynamical systems at fixed points.

³⁴ Note that Samuelson starts his quest at the conservation end of the Noetherian duality of symmetry and conservative law. Two decades later, scholars led by North could not find the requisite symmetry of the conservation premise of the Samuelson school. Macroeconomic data emerging from the computer revolution did not present the symmetry. Then, the dagger was pulled out for the ergodicity argument of economics, and the struggle continues. The more recent scholarship includes Allington et al. (2011).

1.4 Layout of the Thesis: The Orthodox Perspective

The process leading to this thesis required this perspective to be laid out. It is a perspective that fits the thesis on the orthodox linear layout typical of H-D work (Bryman 2008). However, it is worth stressing that the triangulation of case study does not fully admit the linear structure. Patterson (2006) also makes that observation in his doctoral thesis:

There are two types of literature review used currently in academic research: the self-standing literature review, which takes the form of a whole chapter or section of a chapter; and the integrated literature review, where the literature is introduced where it is relevant throughout the study. The latter type is used in this thesis. (3)

Inevitably, the present thesis draws in and reviews literature along the exposition of the case. However, a core body of literature is reviewed in Chapter 2 in respect of the 'self-standing' approach, which is a trait of the H-D approach.³⁵ That literature focuses on the mechanics of policy-making, which is the nucleus of the research. No confusion: the phenomenon is conceptualised as a dynamical system (cf. Figure 1), and the subject is mechanics of policy. Moreover, this Chapter 1 presents the conceptual framework instead of the hypothesis of the H-D approach. The subsequent core literature review (i.e. Chapter 2) places that conceptual framework in the context of policy mechanics, and defends the non-ergodic characterisation of the dynamical system.

Chapters 3-5 lay out empirical material while drawing in relevant literature. Observe the flow captured in Figure 1: Chapter 3 considers empirical data on the origin and diffusion of PPP, which is the excitation force of the dynamical system. Chapter 4 looks at empirical data on the policy space of the country. Focus is on the two nodes – CMC and SAP. However, within this space, there are emerging PPP projects. Chapter 5 considers the most salient projects with the objective of

³⁵ Let us reinforce the textual geometry of this argument. H-D starts at a defined point (the hypothesis) and seeks a defined end (the testing and deduction). It is linear. On the other hand, while case study also starts at a defined point (the conceptual frame), it proceeds into complexity (many interwoven strands of the phenomenon). Consequently, the end of case study is not a defined point. The endpoint is a triangulation (multiple links) of the explication. It is nonlinear. Therefore, literature review should feature along the links of the triangulation.

actuating the policy-level observations that could appear too abstract. However, note that these are merely emerging projects. The effects of these projects will play out in the years ahead. However, at the moment, the thesis argues that the reality of non-ergodicity will instruct those effects.

In Chapter 6, the thesis analyses compositional structures of PPP. The interaction of three compositional structures of PPP and the empirical realities of the policy space of Uganda is analysed using the overarching framework (i.e. non-ergodic dynamical system). The first structure pertains to process (read, procurement). Competitive Dialogue (CD), which is the structure for managing the most complex situations of PPP, is analysed. This analysis leads to the synthesis of Capability Search (CS), and the thesis argues that this new structure (CS) is more suitable for the situation of Uganda.

The second compositional structure is the organisational arrangement of PPP anchored on the Special Purpose Vehicle (SPV). The analysis yields a prototype arrangement for Sub-National PPP (SN-PPP) that addresses the challenges of equity in the country while exploiting the sociological nuances of the policy space.

The third structure pertains to knowledge development.³⁶ The thesis exposes the donor-dependency structure of scholarly research and synthesises Joint Research Model, which better appreciates budding local research, and is more likely to propel the development of a local research community.

All the three syntheses have been presented in peer-reviewed journals.

Chapter 6 presents concluding remarks on the phenomenon of PPP in Uganda conceptualised as an excitation of a non-ergodic dynamical system.

³⁶ Recall that policy is a cross-product of science and politics. That is an axiom illuminated by Bacon (1915). Therefore, the refinement of science (knowledge development) must be at the core of policy. Every policy will imply a structure of knowledge refinement. This thesis explicates the structure of knowledge refinement in the PPP policy of Uganda.

1.5 Strategy and Methodology

1.5.1 Case Study and Dynamical Systems

Non-ergodic dynamical systems do not submit to the canons of classical statistics (LLN and CLT).³⁷ The asymptotic objective of investigating these systems is to tease out the behaviour of the evolutions. Along the way, we must seek to understand the origin and elements of the system, and hence the three questions of Box 1. This pursuit is consistent with case study (as a methodology), which borrowing from Mabry (2008) and Flyvbjerg (2006), is defined as follows:

Case study is an empirical enquiry that investigates a bounded phenomenon, in a longitudinal and rigorous way, using both qualitative and quantitative techniques. It does not seek generalisations. Rather, it seeks illumination of the phenomena.

In policy science, the empirical object is policy as captured in manifestos and actuated in legislation. These objects of policy are not a peg of consensus. In a democracy, they are a crystallisation of diverse views across the populations. In an autocracy, they are a domain of an individual. Common to both fronts is the lack of consensus, and the absence of a deterministic link between the actors and product of policy (discussed in Sec 1.5.4).

Therefore, this thesis as a case study investigates the empirical objects of policy while recognising that local (and external) actors will hold differing views on the value or even legitimacy of the policies. However, these differences do not negate the empirical reality of the policies.

In summary, a case study should capture capsules of reality. All scholars accessed in this research agree on that ontology (see Sec 1.5.2). However, the driving epistemology, and hence methodology, of case study is a subject of vigorous debate. For completeness, the most salient threads of this debate are captured in Section 1.5.2.

³⁷ The Law of Large Numbers and Central Limit Theory
Excitation of a Dynamical System

1.5.2 *Taxonomy of Case Study*

The sternest challenge to case study research is the ubiquity of the terminology. The variety of use of the terminology lends itself to the trap of inertial frame. That is, the reader is susceptible to being enclosed in his or her understanding of the terminology, and consequently attempting to reduce the explication of a case to that understanding.

To mitigate the risk of inertial frame, this section sketches the track of perceptions of case study, and places a few scholars on that track. Therefore, this section does not attempt an exhaustive capture of nuances on case study, and the objective of the section does not require such exhaustiveness. The objective is to facilitate the reader out of his or her [probable] inertial frame by drawing the width of understanding of the terminology.

The width stretches from the H-D approach to the explication epistemology of Flyvbjerg (1995) and kindred scholars.³⁸ Let us call the latter EE for smoother orthography.

A review of over eighty PhD theses detailed in Section 1.5.3 reveals a struggle to conform to H-D. At the end, the theses typically attempt to draw generalisations typical of H-D. Therefore, it is reasonable to consider the neighbourhood³⁹ of H-D one end of the track and EE the other.

An important ‘misunderstanding’ of case study (borrowing from Flyvbjerg 1995) is that it is removed from the finality of knowledge. Eisenhardt (1989) represents this trapped view:

This type of work is highly complementary to incremental theory building from normal science research. The former is useful in early stages of research on a topic or when a fresh perspective is needed, while the latter is useful in later stages of knowledge. (Eisenhardt 1989: 549)

³⁸ Includes Johansson (2013) and Stake (2000 and 1995)

³⁹ The definition of this neighbourhood is part of the struggle of scholars tending to H-D (cf. Lin et al., 2001).

The 'later stages' is the road to a finality of knowledge. However, when complexity is seen through the calculus of nonlinear and non-ergodic systems, first, a long-term⁴⁰ trajectory cannot be drawn. Secondly, even if a trajectory existed, it would be unreasonable placing a higher value on the end of such trajectory. The complex phenomenon in its nascent existence would be as important an appeal to illumination as would the end of the trajectory. In the words of Polanyi (2006:6), it is the same appeal to 'comprehension of reality'.

In summary, the terminology 'case study' is complex and contentious. The thesis is exacting in using the terminology, and while the definition is not exclusive, it is defensible and defended. This research argues for the calculus of EE in its definition of the terminology. Moreover, it uses an analytic-synthetic approach to develop three structures that subscribe to the specificity of the H-D school.⁴¹

1.5.3 The Dilemma of Time and Space: Case Study in Doctoral Research

Should case study necessarily be longitudinal, or can it take the cross-sectional route? The overarching objective of case study is illumination and ordering of complex phenomenon.⁴² That means a drift along space (i.e. cross-sectional analysis) is likely to reduce the intensity of the case (see Figure 3). A longitudinal focus brings intensity. On the other hand, the import of data, models and frames (i.e. a shift along space) has the potential of illuminating aspects of the phenomenon.

⁴⁰ Throughout the thesis, consider timeframe in light of PPP projects, typically over 25 years.

⁴¹ The process precedent to this thesis demanded deterministic trajectory (or 'concrete findings').

⁴² Cf. the preceding Section 1.5.2

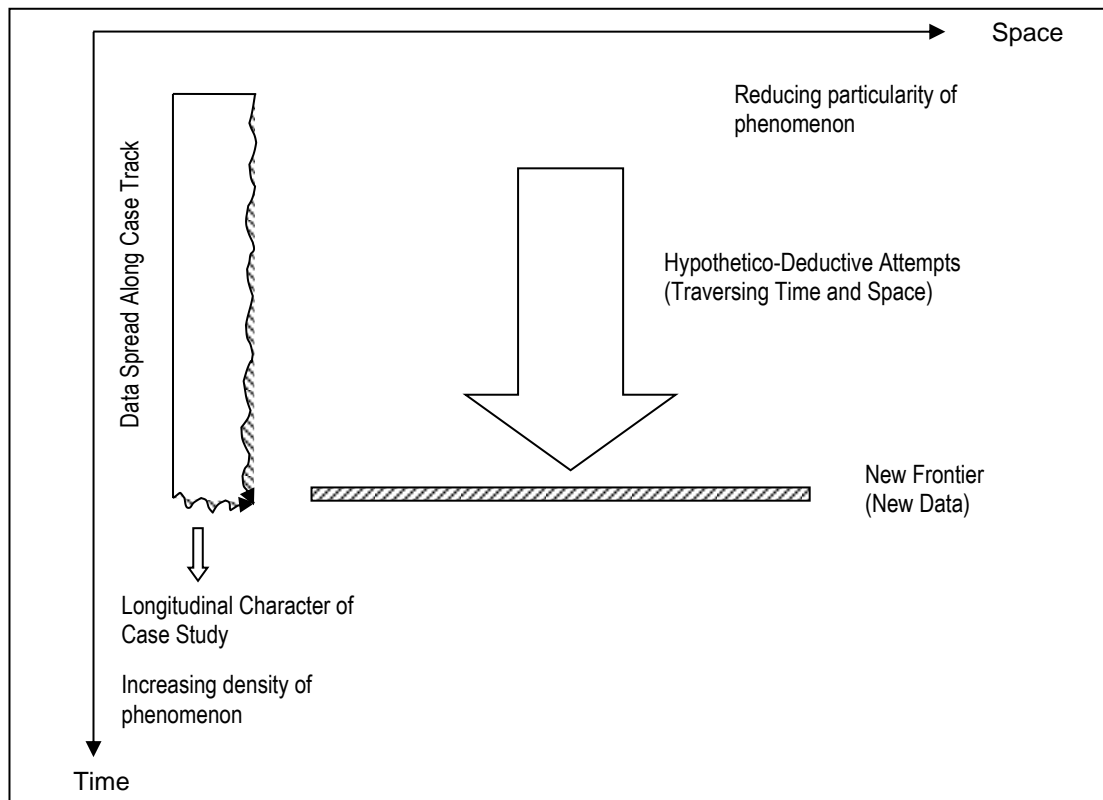


Figure 3: Case Study in Time and Space

So, how should case study proceed? This research argues that cross-sectional considerations should be specific in objective, seeking to draw in elements of reality that illuminate the longitudinal explorations (the case). On this function of case study, we find claimants to the case approach struggling to conform to H-D. This research surveyed eighty doctoral theses awarded by British, American and Canadian universities over the past five decades (see Appendix A). The theses were accessed on search platforms Ethos of the British Library and ProQuest of Michigan. All the theses claim to employ case study research. The search was narrowed to capture those relevant to Uganda, public policy, infrastructure and interdisciplinary – key strands of the instant research. The study was done between 2008 and 2013.

The findings were surprising. Less than five percent of the theses sought to discuss the position of case study in epistemology. Moreover, nearly 20 percent drifted to cross-sectional analysis. Most of the theses mixed longitudinal and cross-sectional analysis, with no apparent guiding frame [of the essence of case study].

The exploration of this section demonstrates an overwhelming attraction to the H-D school. The analytical base of this research relieves it from the burden to conform to the H-D structure.⁴³

1.5.4 Archival Data and Policy Science

Data are the closest capture of reality. They allow patterns to be developed leading to information. In physical science, the capture is often sensory and in a controlled environment, leading to the most reliable representation of reality. However, the situation is different in social science. The object of focus is not physical. It is the relationship between human beings and their environment. Therefore, the assurance of sensory capture is not available.

Against that background, which is the closest we can reach and capture this non-physical reality? The natural answer is, access the human and environmental objects that form nodes of relationships of social science. That answer underpins the prowess of interviews, and particularly the ones carried out in a semi-controlled environment. Interview, as a research strategy and tool, allows ‘meaning-making’ (Seidman 2013: 7) as the process moves from one node to another. The process premises on the existence a social stratum, which underpins the actions and perceptions of the individual (the nodes) interviewed. Therefore, the challenge of the researcher is to identify the best representative set of nodes (the sample), and after, process the ensuing data in search of the underlying stratum [of stability]. The latter is predominantly statistical (for the nuances, see Patton 2005).

However, what should we do when the lag in time is so deep that the physical nodes (primary human actors) do not exist – as is the situation in longitudinal tracings [case studies] of policy science? Secondly, is it plausible that the interconnected observations do not reduce to an underlying stratum of stability?

Again, the natural answer to the first question is, access recordings and artefacts from the focal time in history. That is the essence of archival data in policy science.

⁴³ Admittedly though, and as stated in the preceding section, the thesis had to extend to the analytical-synthetic approach so as to produce the specificity of outcome akin to H-D. The force that caused this thesis to succumb to specificity of outcome (beyond the precise reality of non-linearity and non-ergodicity) appeals to enquiry on the Northian institution of scholarship. This is rich fodder for future research.

It is the reason many scholars consider archival material primary data (see Hill 2014 and 1993, Ventresca and Mohr 2002, and Ellis 1992).

The second question pertains to the deductive part of the ‘meaning-making’ – the first concerned the inductive aspect. The premise of a stable stratum allows the import of classical statistics. This platform (classical statistics) rests on two canonical struts and one assumption. The first is the law of large numbers (LLN) and the second, central limit theory (CLT). These two are hinged on the assumption of independent and identically distributed (i.i.d.) data points – for a deep look at these struts, see Cecconi et al. (2014), Nishimura et al. (2012) and Peng (2007). If the combination of LLN, CLT and the i.i.d. could not be established, there would be no basis for statistical inference. In other words, there would be no underlying stable structure binding the interviews.

So then, can we employ the i.i.d. hinge (at the level of the individual) in policy analysis?

Policy is a product of decisions of individuals, at least in a democracy. The individuals make their choices from a set of options, which use science as support. The seminal work of Arrow (1951) tells us that there is no rule of democratic decision-making that can be used to justify policy choices. For such a rule to exist, the option of individual preference would have to be removed. Stated otherwise, a common identity is required for the existence of a defined preference function (i.e. the rule). However, this situation is impossible [in a democratic setting], which explains the resilience of Arrow’s label, ‘impossibility theorem’.⁴⁴

In summary, interviews [over policy space] do not provide i.i.d. data. This observation becomes clearer when we borrow the taxonomy of Parsons (1995). The author divides policy analysis into Analysis of Policy and Analysis for Policy, with Policy Monitoring and Evaluation sitting between the two segments. To this end, let us do the back analysis, interviews do not inform the ‘of’. There is no stable structure between individuals and policy as a product. Conversely, the forward look (the ‘for’), does not have a defined path. Therefore:

⁴⁴ Note: Arrow’s argument can be seen in the dynamical system conceptualised in the ‘N-body problem’ (common works, for example, Meyer et al. 2008).

1. We cannot deduce or justify policy from interviews.
2. However, interviews serve a semiotic purpose in a vector field of policy. They give direction to archival data.⁴⁵
3. Archival data and contemporary policy documents form the backbone of this research.

1.6 Chapter Summary: Cohesion, Integration and Epistemology

The thesis makes an epistemological contribution at this stage, even before examining the empirical details of the research. The literature available to this research, of which the most salient are reviewed above, all consider case study as in-situ examination of complex phenomena. However, none of them conceptualise a dynamical system under excitation. To that end, the thesis presents a frame that will benefit many researchers to follow.

In particular, while the theory-building scholars of case study are concerned implicitly about the H-D mechanics of the theories, the world of policy faces structured objects embedded in the waves of excitation. These practical objects appeal for analysis. The thesis analyses three of them, and presents attendant synthetic structures more suitable for the complex realities of the policy space. We should not hurry to the epistemological contributions of these synthetic structures, and forget that the analytic path to the models stands on its own as a contribution to knowledge. It is a methodological contribution.

⁴⁵ Further, it is reasonable to argue that the efficacy of interviews as a tool of social science is diminishing. Human behaviour and thinking is becoming increasingly available as data points captured by tools of information technology. The challenge of social research then reduces to the analysis of these data points. The challenge shifts from interviewing to improving the structuring of Gaussian elimination. That way, social science is moving closer to physical science. Still, this research uses interviews as a semiotic tool, particularly in Chapter 5.

Chapter 2.0 Anchor Literature: Policy and Non-Ergodicity

Policy is not made in a vacuum. The policy space comprises many connected and moving parts. It is dynamical. Moreover, the irrational and pervading institution can make the space significantly non-ergodic. How does scholarship address the dynamical and non-ergodic reality of the space? This section reviews leading literature on policy space. The literature shows a range of appreciation of the dynamical reality, and yet none of the literature explicitly conceptualises policy space as dynamical and non-ergodic. This thesis does, and that dimension alone constitutes an epistemological contribution to policy science.

2.1 Fundamental Axioms

Policy does not play out in a vacuum. More formally, policy develops and actuates in topological spaces with fields (structures). The space is not a null set. Therefore, to illuminate the space of policy, we must seek to understand the mechanics of the space. First, let us refresh by placing this chapter in the context of the entire thesis.

This chapter considers literature that attends to the mechanics of policy space, whether implicitly or explicitly. This chapter is followed by a review of literature on the wave of PPP striking policy space in Chapter 3. Naturally, Chapter 3 seeks literature that recognises that PPP develops in a mechanistic space, which space was shown to be dynamical in Chapter 1. Following literature review on the science of policy space and the excitation of PPP, Chapter 4 is specific to Uganda. It considers the institutional empirics of the policy space of Uganda, which illustrates the institutional parameter of the overarching concept of the thesis laid out in Chapter 1. Chapter 5 follows with empirics on PPP effort in Uganda, and this chapter illustrates the dynamical structure of the policy space. Chapter 6 is a synthesis. From the body of PPP (the analytics), the chapter picks specific strands and moulds structures better suited to nonlinear and non-ergodic dynamical space. Chapter 7 concludes the thesis. That is the layout refreshed. It is simple though it attends to a complex subject.

Let us turn back to the science of policy space. The ordering of that space must draw from knowledge of the physical world. It must draw from physics, as does the wider body of social science. To this end, for example, heat equation provides a space for the analysis of capital assets in financial economics (see Black and Scholes 1973). As another example, Lau (2014) uses the Hamiltonian structure to investigate returns on capital goods. Even the more abstract spaces of physics like the wave equation have been used to investigate explicit social challenges like traffic congestion, see the seminal work of Lighthill and Whitham (1955). These examples all show frames of physics providing spaces for enquiry in social science beyond the Newtonian foundation.

This thesis is yet another ordering of policy space using frames of physics beyond the Newtonian foundation.⁴⁶ The space is conceptualised as a dynamical system, and shown to be non-ergodic in Section 1.3.

Therefore, the literature review in this chapter seeks to place the conceptualisation of the thesis on the tapestry of scholarship on policy science. The review imports frames of physics – whether they are presented explicitly or not. However, the review does not seek to be a heavy redundant collection of authors. Prominent authors on a strand of argument have been excluded to avoid redundancy. Their inclusion would not add significant value to this fundamental look at policy space.⁴⁷

Further review that follows in Chapter 3 looks at the excitation of PPP. This time focus is on how literature appreciates policy as a dynamical space. Again, the review searches for foundational arguments – omitting authors who do not bring new perspectives on policy space as a dynamical system nor do they present views that serve as a critique of this conceptualisation.

Before delving into scholars of policy, we need to set the stage further. The next section looks at strategies of literature review.

⁴⁶ Often, this foundation features quietly in policy discussions. We see it captured in words like ‘force’, momentum etc.

⁴⁷ Here we are asking a fundamental question: How do we view the space of policy (against a background of dynamical systems)? Many prominent authors on social and public choice have been excluded. Adding them would not add value to the address of this fundamental question. It would be a repetition. Note that the question then narrows down to PPP in Chapter 3.

2.2 Literature Review – Competing Strategies

Literature review in case study appeals more to the integrated approach, where the review weaves along the triangulation of the case. The approach contrasts with the orthodox H-D approach. That approach entails writing a standalone chapter covering literature review. The literature chapter then sits neatly in the H-D frame. This logic of literature review was discussed in Section 1.4, which cites Patterson (2006). However, the issue is pivotal to the thesis and hence worth refreshing at the outset of this section.

The logic of the integrated approach above notwithstanding, a standalone section of literature review is herein presented – prompted by the process leading to this thesis.

Let us have a more concrete look at the discussion above. Policy space is a reality. This thesis considers the policy space of Uganda in light of the force of PPP. In that space, the thesis identifies the nodes of CMC and SAP, and the controlling strand of the institution. The space is shown to be dynamical and non-ergodic (see Section 1.3). Before illuminating this non-ergodic space, let us step back and note that the thesis is an addition to policy science. Consequently, this section considers how the conceptualisation (i.e. non-ergodic dynamical space) interacts with scholarship on policy spaces.

With the background above, let us look at the emergence of policy as a science.

2.3 Emergence of Policy Science: The Core Truss

Policy is a terminology that has evolved over time. In Machiavellian times, policy was a strategy for realising the goals of power-holders. It consisted in political illusion and duplicity. The distinction between policy and politics was blurred, as *the end justified the means*. Still, a key thinker of the time, Machiavelli (1469-1527) believed that power could not be sustained without knowledge. A century later, Francis Bacon (1561-1626) would pronounce progress as the fusion of knowledge and power, and the quest for causality as a requisite for the statesman:

And for matter of Policy and Government, that learning should rather hurt, than enable thereunto, is a thing very improbable: we see it is accounted an error to commit a natural body to empiric physicians, which commonly have a few pleasing receipts whereupon they are confident and adventurous, but know neither the causes of diseases, nor the complexions of patients, nor peril of accidents, nor the true method of cures: we see it is a like error to rely upon advocates or lawyers, which are only men of practice and not grounded in their books, who are many times easily surprised when matter falleth out besides their experience, to the prejudice of the causes they handle: so by like reason it cannot be but a matter of doubtful consequence if states be managed by empiric Statesmen, not well mingled with men grounded in learning. (II-3)

Both the Machiavellian and Baconian views of policy is that which is strategic, rooted in knowledge, and directing the actions of government. The two views, however, differ on how the predicating knowledge should be generated and how it should direct government action. Bacon elevated policy knowledge from an instrument of duplicity to an underpinning of political power.

Let us formalise the Baconian view of policy above. Policy is a cross-product of politics and Kuhnian science. That is:

$$\mathbf{u} = \mathbf{v} \times \mathbf{w}: \mathbf{u} \in S \rightarrow \mathbb{R}^3 \quad 2.1.1$$

Where:

\mathbf{u} is a realisation of the policy space (cf. equation 1.3.1)

\mathbf{v} and \mathbf{w} are vectors of politics and science respectively.

Parsons (1995) argues that the Enlightenment changed the concept of policy knowledge. The problems of human society were deemed similar to the problems of nature. They could therefore be tackled with the same procedural tools as the challenges of nature.⁴⁸ Drawing from developments in Newtonian laws of planetary motion, the notion of policy science was formed. Interest in public knowledge and

⁴⁸ Recall the Noetherian frame in Sec 1.3.2

the policy process surged post the World Wars. Keynes (for example) brought to prominence the use of economics as policy knowledge. Alongside the science feeding policy, leading authors like Lasswell (1971) and Simon (1957) brought to the fore the challenge of framing the policy process. At the same time, think tanks like the RAND Corporation and Brookings Institution starting mushrooming.

Today, the science of public policy is recognised as an interdisciplinary field in the research-based university. It appeals to areas like public health, education, the environment, economics, and transport. What then is the contemporary definition of public policy? In the context of this research, it is a science-driven framework for developing and managing public service. Policy is a product of science and politics. Under multi-party democracy, the manifesto of the ruling party is the primary policy. Legislation is an actuation of policy.

2.4 Existing Frames of Policy

2.4.1 Taxonomy of Policy Frames

Public policy is always a culmination of an idea [developed in a human mind]. This statement is foundational. Secondly, both the origination and propagation of policy-defining ideas is influenced by the social settings that underpin the process. The degree to which social settings influence the origination and propagation of ideas may be debated, but not the existence of social influence. This sprawling social setting (structure) is termed 'institution' (North 1990).

Since institutions influence policy paths to different degrees, a clear taxonomy of policy-making is not possible. There are infinite possibilities. However, an order or structure is required to guide this enquiry, as would be the case for any effort at refining knowledge. It is against this background that the Bound Frames (BF) and Iterative Diffused (ID) dichotomy was constructed.

Bounded Frame, which includes institutional rational choice (IRC), recognises stability in the policy process. IRC emphasises the strength of the institution. To succeed, individuals inhabiting policy ideas drive them along relentlessly, picking support and withstanding opposition. However, they do so bounded by values,

norms and practices of the society (the institution). If they do not succeed in delivering policy themselves, these individuals will pass on the challenge to another person or team.

Iterative Diffused metaframe, on the other hand, focuses on the start (the actors, issues and platform) and appreciates the end (the policy). The frame holds that the process is unstructured. If a policy idea were a ball, then the policy entrepreneur throws the ball in this vibrating conduit. The ball could be stuck. However, at a later indefinable stage, this ball could be forced forward by another ball [policy idea] thrown later. At the same time, the dynamic nature of the conduit could force the ball backwards.

The two categories (and the attendant scholarly works) are discussed below.

2.4.2 Bounded Frames

2.4.2.1 Institutional Rational Choice

The quest for the mechanics of policy leads to a basic question: Is policy a product of only rational decision-making? If not, policy is influenced by structures removed from the policy maker. The latter stream (i.e. structuralists) belongs to a broader school of thought, which argues that layers of stability underlie local variations in social phenomena (see Piaget 1970 and De George 1972). This school of thought is a wide raft from which various disciplines (sociology, anthropology, linguistics and others) draw motivation for their own offshoots of argument (for detail, see Sturrock 1979).

The institutional structuralists argue that the underlying layer of stability comprises a sediment of values, norms and practices. Ostrom (1991, 1998 and 2005) is a leading proponent of this stream of argument. The argument is aligned to North (1984, 1990 and 1994) as regards the definition of 'institution' and Simon (1957) in respect to the bounding action of institutions. This research borrows from Ostrom (1998) in calling this school of argument Institutional Rational Choice.

Institutional Rational Choice comprises models that provide for the influence of the institution on otherwise rational policymakers. Therefore, it includes the key tenet of rational choice theory. That is, individuals make decisions after comparing the costs and benefits of different courses of action (cf. Arrow 1959 and Ostrom 1991). In this light, IRC challenges rational choice not to ignore institutions or dismiss them as holonomic constraints.

Let us formalise the argument of IRC. Consider a vector space of policy Ω on a field K and subject to policy transformation T . IRC identifies a subset S of rational choice, providing:

$$T: S \rightarrow \mathbb{R} \mid S \subset \Omega$$

$$\exists \alpha \in K: \alpha \mathbf{v} \in \Omega \mid \mathbf{v} \in S \quad 2.1.2$$

Expression 2.1.2 is kindred to the argument of Simon (1957). The author posits that rationality of individuals is limited by the information available, access to this information (cognitive limitations), and time available to make decisions.

Implicitly, IRC challenges the generalised coordinates of rational choice. Formally, faced with k constraints, rational choice premises on the action of n policy actors reducing to the following mapping:

$$\mathbb{R}^n \rightarrow \mathbb{R} \mid k \rightarrow 0 \quad 2.1.3$$

In effect, 2.1.3 allows the institutional parameter of the overarching conceptual expression 1.3.1 to be reduced to a holonomic type. Consequently, equilibria can be sought. However, institutional changes of Uganda (laid out in Chapter 4) show a vortex that challenges the rational choice premise. The same argument holds against public choice theorists, led by Buchanan (1994).

The dominant genre of IRC is Institutional Analysis and Development (IAD) framework championed by Ostrom (2005). An adaptation of IAD framework is shown in Figure 4.

The framework in Figure 4 is politics-driven (detailed in Amonya 2010b). It premises on a decision arena dominated by political actors who are informed by science agents. The political actors, however, make decisions on an institutional framework. That is, they are constrained by the norms, values and practices of that social environment. Science agents then bring the output of the decision arena (the policy) to review and revision. This review and revision link raises two key questions. First, what ignites the review? Secondly, how do the findings of the policy review come to the attention of the political agents? As these questions are addressed, and time passes, the institution remains largely unchanged creating a linear formation.

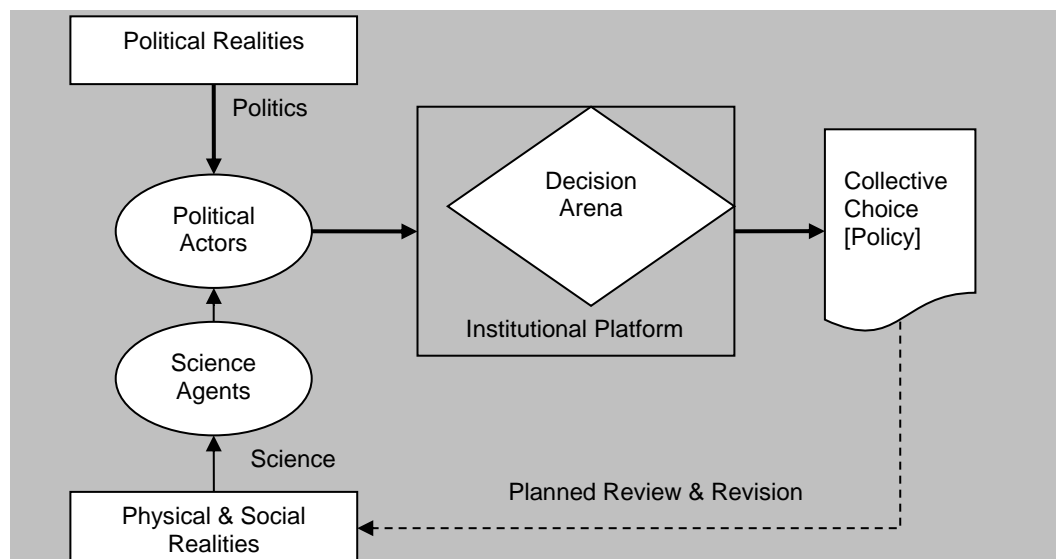


Figure 4: Politics-Driven IRC Framework
Source: Adapted from Ostrom (2005)

2.4.2.2 Institutional Rational Choice and Realities of SSA

As a frame,⁴⁹ IRC identifies elements of analysis. It does not predict the interactions within any capsule of reality. Models do that. Of particular pertinence to IRC, is the frame of human interaction comprising the self-interested *homo economicus*. Consequently, that frame precludes the need for institutional consideration (detailed in Anderson 2000).⁵⁰ The IRC frame offers a counter

⁴⁹ A nested view is important at this point. A frame may nest other frames becoming a meta-frame. The point to underline – all these frames lean to description not prescription. Models address the latter.

⁵⁰ A deeper view though will reveal that this construction of *homo economicus* is a search for Noetherian symmetry (cf. Sec 1.3.2).

argument – institutions matter. However, IRC is not a prescribing structure – it is not a model. Therefore, IRC has a broad sweep, and its application is not spatially constrained. While Ostrom's 'workshop' at the University of Indiana can lay claim to the frame, the American base is not a constraint in the application of the frame, because it is a frame.

The IRC frame espouses the strictures⁵¹ and opportunities of institutions in the mechanics of policy. To that end, Beck (2000) contrasts institutional controls with mechanical government regulation in wildlife conservation in Uganda. The doctoral study shows that developing and employing societal norms and values of conservation [i.e. institution] is more effective than state regulation divorced from institution. The rational choice frame would argue that the country comprises utility-seeking individuals. Therefore, when the control of common resources (like game parks) cannot engage the dynamics of the market, the [small] state should employ its monopoly of violence [enforcement], which is in contrast with IRC. These contrasting perspectives highlight the essence of frames (such as IRC). They are lenses. They are not prescriptions to be tested [i.e. they are not models].

Other researchers employing the IRC frame in exploring realities of Africa include Little (2010). The author explores HIV/AIDS in Africa pivoting on knowledge as a common resource. This perspective situates on the institutions of the commons (Ostrom 2008), which is an illustration of IRC. Further, Bunsilver (2007) explores the tensions between the institutions of the Maasai of Kenya, and the economic forces of modernity. Yet another work guided by IRC is Fenske (2010). The author traces trade pattern and property rights in West Africa. It emerges that the contemporary policy and practices of trade still depend on pre-colonial institutions, which underlines the resilience of these institutions.

On a methodological note [and this is an aside], the doctoral works identified above, employ a multitude of tools. That is not surprising but it deserves emphasis (because of the ubiquity of the orthodox H-D approach). The complexity of phenomena that appeal to institutional thinking requires an assortment of tools. Consequently, in tandem with the doctoral works identified above, this case

⁵¹ For comfort, the thesis means 'strictures'. This is not a typo.

employs quantitative and qualitative tools – not in a search for a grand deduction or argument, but in an effort to open up the phenomenon.⁵² Moreover, the doctoral works all appeal to the ‘integrated literature review’ – borrowing of Patterson (2006:3). In this approach, literature review flows with the archaeological dig thorough phenomenon. The identification of forces and mechanics of case studies demand a drift from the more orthodox ‘self-standing literature review’.⁵³ However, the self-standing literature review suits well the hypothetico-deductive approach, which seeks to develop models (generated in disciplinary silos).

In summary, IRC challenges the rational choice framework without dismissing it entirely. The effects of rational choice should be considered within the strictures of institutions. For societies at the margins of economic progress like SSA, the urge for economic growth [and the attendant institutions] is greater than the more developed world. Consequently, the existing institutions will likely resist the institutions of economic change (varying degrees for different societies). That means any attempt at exploring the institutions of economic progress in SSA would be ill equipped with only the rational choice frame. The IRC frame is a more penetrating tool. Finally, note that the ‘institution’ of IRC instructs the conceptual framework in Section 1.3. However, IRC lacks the prowess of calculus of dynamical systems (as a conceptualisation of policy space).

2.4.3 Iterative Diffused Frame

The iterative diffused (ID) cluster of models is presented in Figure 5. The ID cluster pays close attention to actors outside politics and the bureaucracy of government. These actors include the media and special interest groups. This group of actors shape the broad policy agenda such as health, transport or education policy in an informal iterative process. Notably, the contribution of science is minimal at this level. The bounded cluster of models, on the other hand, premise on rational selfish actors who use science in laying out the initial policy agenda, and the structure of enquiry is more linear.

⁵² This statement must be qualified. The introduction of the analytic-synthetic process (ASP) leads to ‘concrete’ products (structures) in Chapter 6. This step was taken to conform to the demands of the process leading to this thesis. However, we remain under the conceptual framework of policy space as a dynamical system.

⁵³ Ibid. Sec 2.2.

After laying out broad policy intentions, policy formulation follows (Figure 5). This stage refines policy intentions. Policy actors use science⁵⁴ as a guide in decision-making. Science at this stage answers three fundamental questions (Nakamura and Smallwood 1980). The first question pertains to problem definition. What are the contours of the policy intentions (issues)? The dynamics of the issues are assessed. Changes in the significance of the issues are examined, and the reasons are laid out. The second question traces past attempts at solving the problem. What programmes and projects were previously initiated, and how did they perform? The third question explores the future. Based on the knowledge of past attempts, how should the identified policy intentions be ranked [prioritisation]?

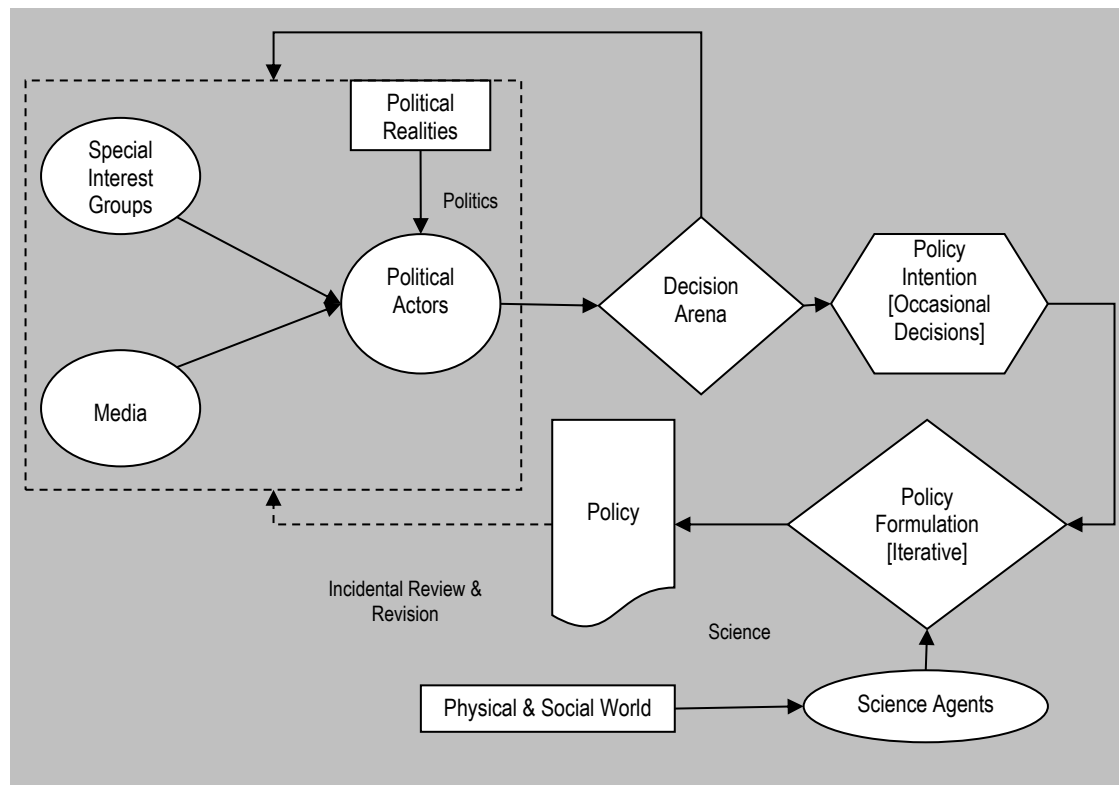


Figure 5: Iterative Diffused Model

Source: Developed from Rist (2000)

Three genre of policy research, founded in different empirical settings, have been identified as worth placing under the ID cluster.⁵⁵ First, Hofferbert (1974) presents a model of policy formulation that identifies and positions the role of different

⁵⁴ Recall, this is Kuhnian science.

⁵⁵ Recall, throughout, the thesis identifies authors as proponents of specific arguments, which provide contrast and insight to the conceptual framework of the thesis - policy space as a nonlinear and non-ergodic system. The thesis does not attempt to build up a big collection of authors. Repetition is avoided.

variables in policy-making. The author argues that socio-economic composition and mass political behaviour are primary drivers of policy formulation. The influence of these two variables, it is posited, is controlled by government institutions and elite behaviour. The research uses policy-making in the United States. The systems-level approach of this model leaves it vulnerable in deep micro policy assessments.

Secondly, Kingdom (1984) presents a model that appreciates the role of serendipity in policy-making. Summoning earlier work by Cohen et al. (1972), popularised as Garbage Can Model of organisation decision-making, Kingdom argues that public policy is the outcome of three streams variables that confluence in a 'window of opportunity'. This model leaves one question begging: How is this policy-enabling window created?

The third model is by Sabatier (1991). This model blends many aspects of the three models discussed above. The model is pivoted in the strength of agency (advocacy coalition) that promotes core values of the group. Hence, policy-making is influenced primarily by competition amongst advocacy coalitions. The model identifies two other influences. First, exogenous socio-economic effects that attempt, over time, to change core values of the advocacy coalitions. Second, the stability of the [institutional] structure on which advocacy coalitions operate. Note though, the institution is relegated. It is a factor, but not the main influence on the discourse.

All the three strands of literature appreciate nonlinearity of policy space. However, unlike this thesis, the discussion is removed from the fundamental calculus of nonlinearity. This fundamental base is required for illumination of the more intense complexity of PPP as an excitation function on a space of higher energy.⁵⁶

⁵⁶ The stage of state moulding of Uganda compared to the USA allows this statement. As a starting point, the two points of state creation are separated by two centuries. Nonetheless, these strands of policy literature are important to the case of Uganda. Recall, we are examining mechanics of policy (the nascent science). This is a deeper view than common heuristics. The abstraction of this depth allows the thesis to be placed on a global platform of policy science leading to a distinct improved comprehension of this global reality (read, addition to knowledge).

The authors import geometry (channel, window, can etc.). They then fit policy realisations (empirical observations) in the objects of geometry. The result is nonlinearity within the confines of the objects. At this juncture, two choices emerge. We can question the nonlinearity – asking, why? Alternatively, we can accept the geometrical layouts as the endpoint of enquiry – the accepted mechanics of policy. This thesis follows the former. It asks, why? That Socratic question leads to the conceptual framework (policy space as a dynamical system).

2.4.4 Reflexive Look at Social Choice and Public Choice Theories

Note, this section attends to the fundamental frames that underpin these theories. It does not concern policy prescriptions that are categorised under the two schools of thought. In other words, the question is, how do these schools order (organise) the space of policy? We are looking at how that deeper organising frame relates to the conceptualisation of the thesis (policy as a dynamical system).

At first look, the critique will question the space of this consideration – asking how the two theories can be contained in a sub-section. This is not, obviously, a comprehensive review of these theories. Such a task would challenge the space of a book, see the attempt of Arrow et al. (1997) on social theory. This survey is specific. It is a search for how these theories conceptualise policy space, whether explicitly or implicitly.

Further, it is worth observing that the two theories view policy space from a perspective of mainstream economics. The frames of foregoing sections lean more to political economy. This difference is important. It provides good latitude for different views on the reality of dynamical systems.

Let us look at social choice theory. This is a nest of models and frames. However, the central concern is aggregation of social preferences across a population n to a measurable ranked set \mathcal{L} . Formally:

$$T: \mathcal{L}^n \rightarrow \mathcal{L}$$

2.1.3

Arrow (1951) pioneered this effort, picking on the work of Condorcet. The core argument of the author is the impossibility theorem. That is, in a democratic setting, when the n voters in 2.1.3 face a multitude of alternatives, no ranked voting system can lead to \mathcal{L} . Insertion of dictatorship to Arrow's impossibility theorem is equivalent to introducing a new constraint on the conceptual expression 1.3.1. That new constraint reduces the degrees of freedom of the system to one – the coordinate of dictatorship.⁵⁷

The dilemma in Arrow's work would lead to a plethora of research that fall under social choice theory. Perhaps the most notable of these lines of research was led Sen (particularly, 1977 and 1999). Before looking at Sen, it is worth pondering that all this research was in the aftermath of the Second World War. That observation will trigger deep questions on scholarship and the War, which subject is outside this research.⁵⁸

Let us turn back to Sen. The author was facing a challenge of dynamical system implied in Arrow's impossibility theorem. This relentless pursuit of an escape route is captured in his Nobel Prize lecture: 'Arrow's powerful "impossibility theorem" invites engagement, rather than resignation' (Sen 1999: 365).

However, the only way to generate closed-form solutions of nonlinear dynamical spaces is to introduce a constraint. The constraints could be a new element leading to a generalised coordinate with one or two degrees of freedom—in the language of Arrow, accept dictatorship. Alternatively, introduce a time-constraint. The frame of this constraint may be a Taylor-Euler linearisation at steady state, or a search for an asymptotically stable state and employing Fourier analysis to simplify the harmonics of the dynamical space.

Sen chooses the explicit introduction of constraints, and warns that failure to appreciate dynamical complexity of policy space risks being deemed 'intellectually despotic'. The scholar affirms the need for explicit constraints this way: 'We have to

⁵⁷ This dominant constraint is holonomic.

⁵⁸ This is another epistemological offshoot of case study.

get on with the basic task of obtaining workable rules that satisfy reasonable requirements'⁵⁹ (Ibid. 354).

Another scholar of Arrow's dilemma takes the vantage point of the USA and asks: 'Why so much stability?' (Tullock 1981). The author was a prominent voice of public choice theory. This school of thought reduces the dynamical space of policy to a generalised coordinate of utility maximisation (cf. Buchanan 1984, and Shepsle and Weingast 1981). Sen provides a bridge between the two schools by calling for recognition of 'situational differences'.

Let us bring social choice and public choice theories together, along with the bridging of Sen. They all appreciate the dynamical space of policy but not explicitly. This research does. The specificity of the case facilitates explicit import of nonlinear and non-ergodic systems (as a concept).⁶⁰

Consequently, let us look at the policy space of Uganda and the USA against a background of the 2007/8 recession. Figure 6 shows current government expenditures of Uganda and the USA. The chart includes the UK, and this inclusion is justified for historical reasons – the state of Uganda derives from the UK structure and the state is only half-century old.

⁵⁹ (Sen 1999: 365).

⁶⁰ cf. project empirics in Chapter 5

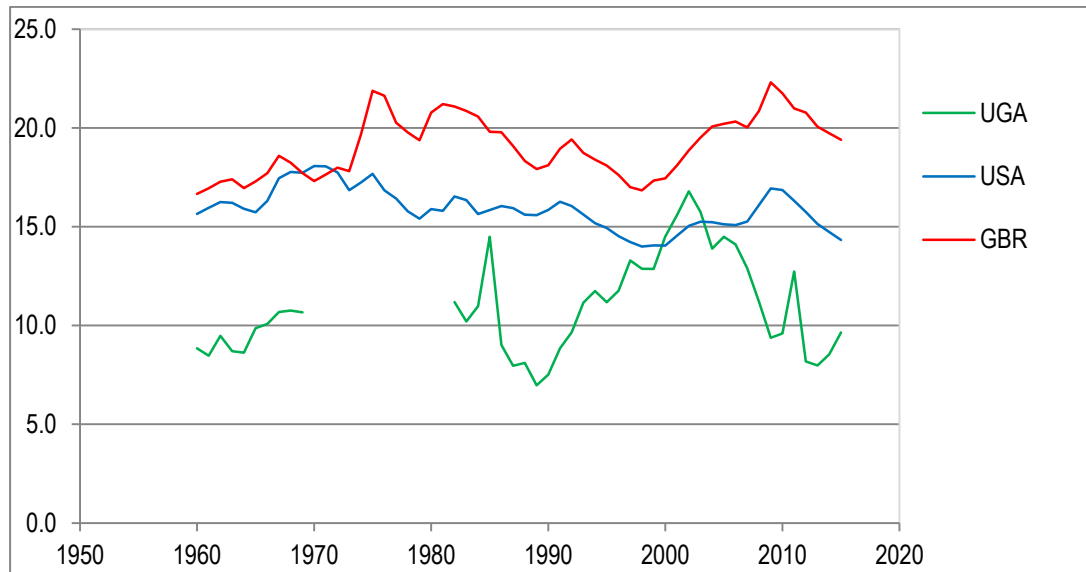


Figure 6: General Government Final Consumption Expenditure (% of GDP)

Notes:

Source: World Development Indicators (World Bank)

The data includes all government current expenditures for purchases of goods and services (including compensation of employees), and expenditures on national defence and security, but excludes government military expenditures that are part of government capital formation.

Government current expenditure relative to the production capacity (GDP) is a proxy for capacity of a state. Moreover, even if the proxy were weak, variations in expenditure over time reflects variations in state capacity. Therefore, without looking deeper, the amplitude of Uganda shows a more dynamic (less stable) structure than the USA or the UK.

Let us look closer at the sinusoidal space of Figure 6. A single harmonic Fourier series of the Uganda data is shown in Figure 7. The plot shows a gap across the seventies. Unsurprisingly, this period covers the turmoil of the Amin regime discussed in Chapter 4.

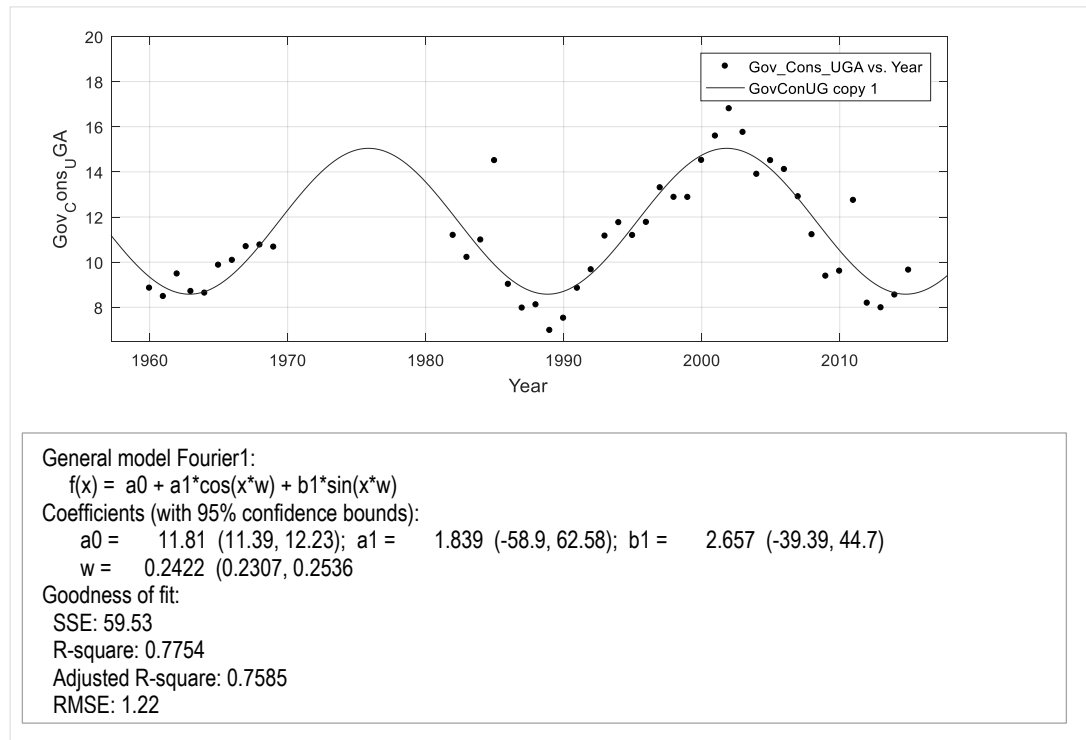


Figure 7: Government Consumption, Uganda: Single Term Fourier Fit

Note: This is Fourier analysis using Matlab.

Moreover, Figure 7 is complemented by a plot of eight harmonics of the data, and the results are plotted in Figure 8. We must then identify frequencies that have the most impact on the policy space, and compare these frequencies with the US data. We must not lose track of the big picture. This analysis seeks to illuminate the underlying mechanics of the two policy spaces (Uganda and the USA), and provide an appropriate context for the social choice and policy choice debates – and more specifically, the ‘impossibility’ struggles of Arrow.

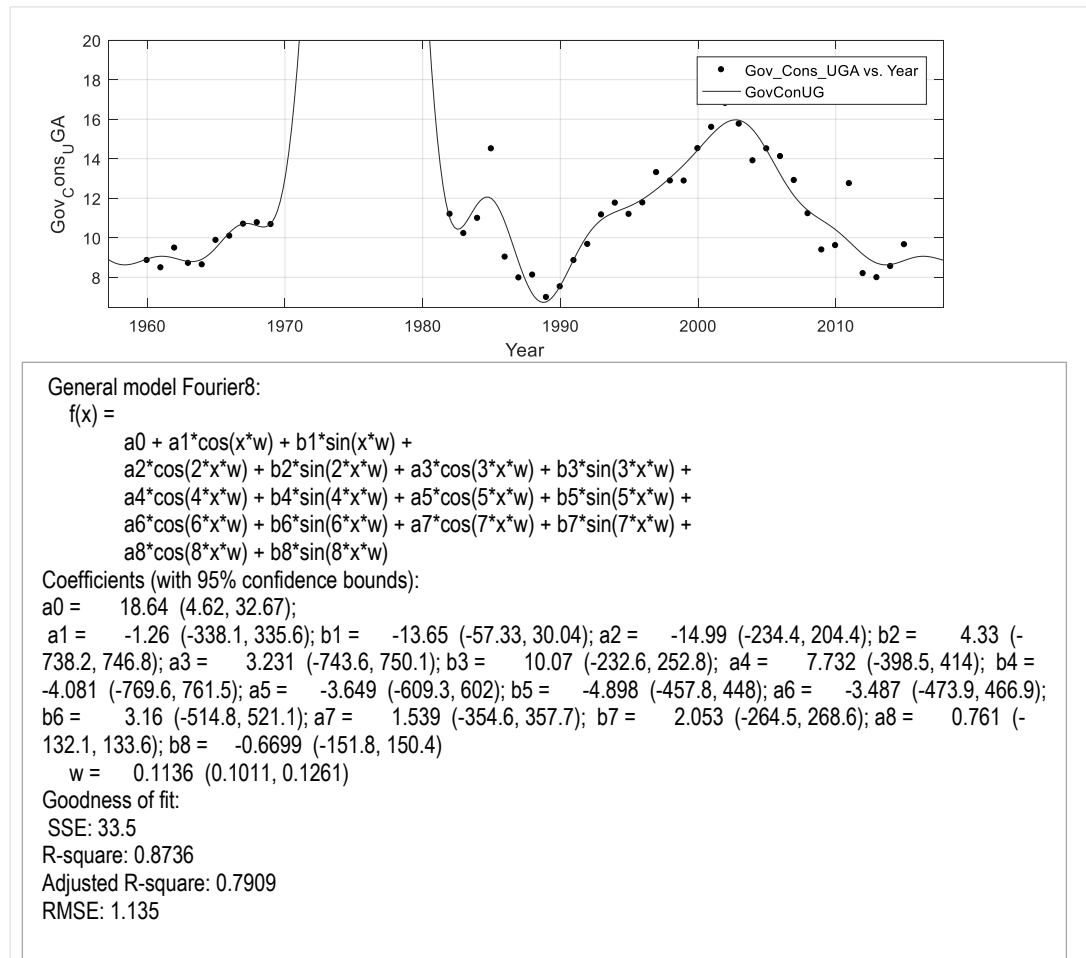


Figure 8: Government Consumption, Uganda: 8-Term Fourier Fit

The framework for the analysis of frequencies is Rayleigh's identity, which traces back to the fundamentals of Newtonian and Hamiltonian conservative energy fields – a principal framework for social science (cf. Sec 2.1). The framework of Rayleigh is captured in Equation 2.1.4. For details, see the seminal work of Bracewell (1965).

$$\int_{-\infty}^{\infty} |x(t)|^2 dt = \int_{-\infty}^{\infty} |x(\omega)|^2 d\omega \quad 2.1.4$$

Where: $x(\omega)$ is Fourier transform of $x(t)$.

Framework 2.1.4 tells us that the total energy of the system is the sum of the energies at the frequencies of Fourier transform. This framework offers us a space to search for the most impactful frequencies of Figure 8. That analytical search will draw on the Fourier series for the USA shown in Figure 9 and Figure 10.

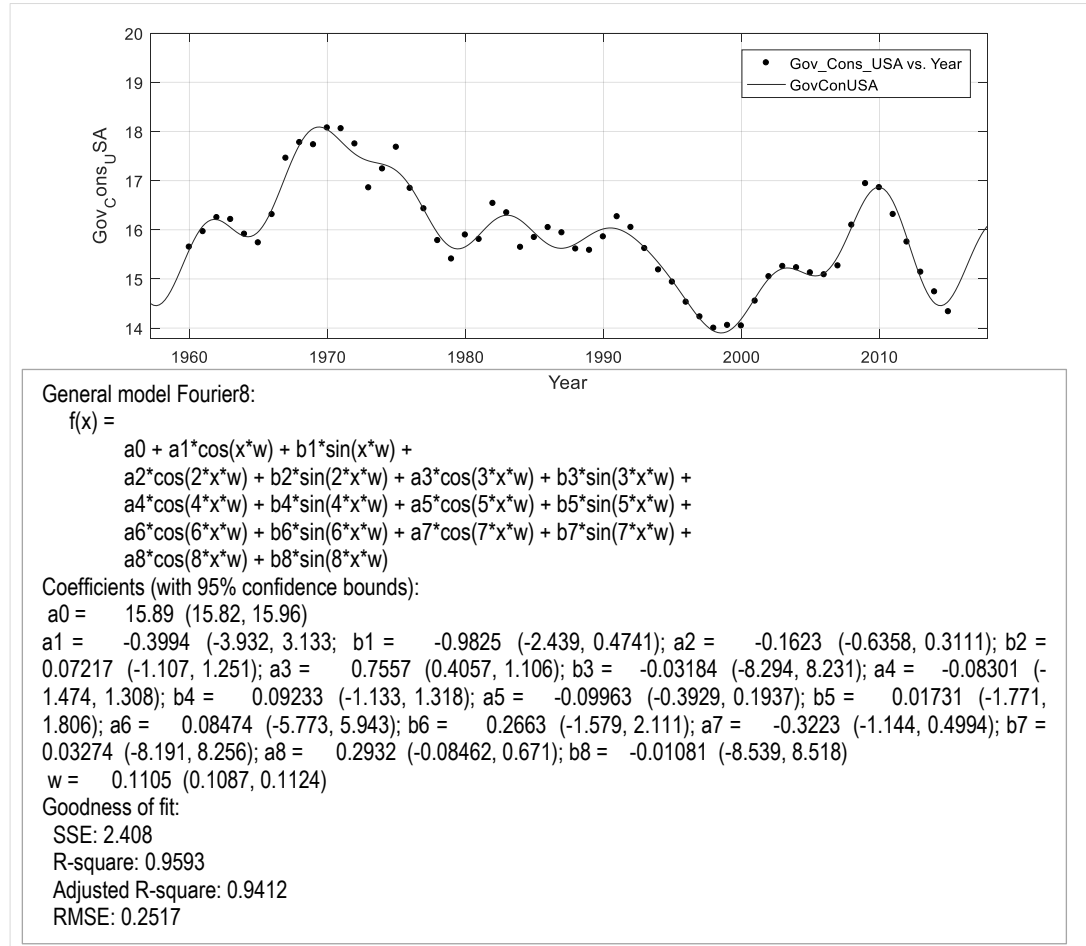


Figure 9: Government Consumption, USA: Single Term Fourier Fit

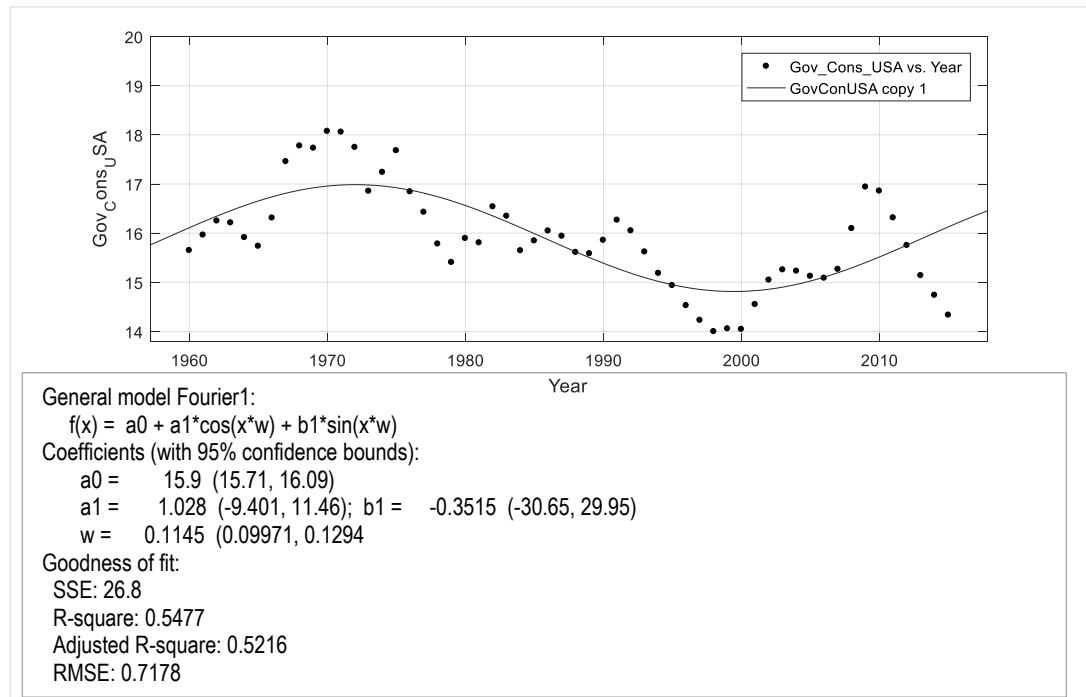


Figure 10: Government Consumption, USA: 8-Term Fourier Fit

Here are observations of Fourier series of Uganda in comparison to the USA:

The most impactful changes in state capacity in Uganda have a period of approximately seven years. That estimate is derived from $2\pi/(n \cdot w)$, and it represents the eighth harmonic. For a similar fit (R-square), the USA period is 20 years, and it is achieved in the third harmonic.

Therefore, the fundamental dynamics of the policy space of Uganda is distinctly different of the dynamics of the USA. The Ugandan space comprises many short-duration yet high-impact changes.

Consequently, when Tullock (1981) of public choice school asks, 'Why so much stability?', that implied observation is constrained. It is not a strand of empirics, unconstrained by time and space. Moreover:

- i. A critic [of Tullock] might argue that heuristics tell us that the two spaces are significantly different. For response, a decomposition of the space dynamics using the implied Fourier series affirms the heuristics. More significantly, the analysis brings to question the school of thought that

posits the existence of a layer of stability underpinning the super-structure of instability, including political turmoil (cf. Fukuyama 1989).

- ii. In identifying the differences between Uganda and the USA, the thesis is more sympathetic to Sen (1999). That is, Arrow's 'impossibility' must be recognised while noting situations where generalised coordinates can be established without causing social disharmony.
- iii. However, unlike Arrow and Sen, the thesis takes a mechanistic view of public space, which is only implied by the two authors. Arrow, in particular, considers realisations of public space with respect to the electoral process. However, the author does not explicitly use dynamical systems as a concept.
- iv. All the points above are on realisations of public space, and the thesis shows analytically that this space is nonlinear and non-ergodic (Sec 1.3).

2.5 Chapter Summary

This summary section will be clearer by starting with the overarching conceptual expression 1.3. The reality of the institution, and its irrationality, secures the non-ergodicity argument. To argue against this non-ergodicity requires that the institution be dismissed as either non-existent (an implication of rational choice) or holonomic.

Ostrom's IRC complemented by the 'impossibility theorem' of Arrow present a tapestry of scholarly defence on the existence of the institution, and the time variation of the institution assures it is non-holonomic. Note, the time variation of the composite institution of Uganda is discussed in Chapter 4.

The place of this chapter is unique when viewed against a background of PhD theses on public policy – Section 1.5.3 summarises over 80 theses. It is unique examining the space of policy in a mechanistic way.

Avoiding explication of policy space may seem a way to ‘concrete findings’ but it is merely escapism from reality. Therefore, starting with an empirical argument on PPP and ‘testing’ it by interview, for example, escapes from addressing the [deeper] structure of policy space. Instead, this thesis embraces the complexity of policy space, and moulds structures in response to nonlinearity and non-ergodicity (Chapter 6). However, these structures are a secondary contribution to knowledge. The primary contribution of the thesis is the challenge it poses to scholarship to take a deeper view of PPP. That view must seek to understand the mechanics of policy space, and Chapter 3 reinforces this point.

In closing, all the frames of policy reviewed in this chapter highlight the indisputable – that policy space comprises many parts, which are interconnected and moving. It is a dynamical system. However, the frames reviewed do not explicitly use that conceptualisation. This thesis does. However, note the inspiration leading to the explicit use of dynamical systems. First, the most onerous (financially) PPP projects are long-term.⁶¹ Secondly, the space of focus (Uganda) is a young high-frequency policy environment.⁶² Therefore, the appeal of robust enquiry finds a natural home in the conceptualisation – policy space as a dynamical system.

The next chapter investigates the origin and diffusion of PPP. However, it starts with an examination of literature on PPP – asking how the authors view policy space and how their views instruct the analysis of PPP. As expected, the investigation proceeds on a background of the overarching concept of the thesis.

⁶¹ Typically 25years

⁶² Cf. the preceding Fourier analysis and the project empirics of Chapter 5

Chapter 3.0 Origin and Diffusion of PPP

3.1 Motivation of the Section

This section provides empirical data on the origin and diffusion of PPP. The section opens with a review of literature on PPP. The review seeks literature that captures PPP playing out on a dynamical platform. Note, the core of the thesis is structure and mechanics of PPP in Uganda. However, that structure has an origin, which defines it. Moreover, the emergence of PPP in Uganda has a track. Therefore, we need to investigate its mechanics of propagation.

3.2 Taxonomy of Literature on PPP

3.2.1 *Organising Framework*

The subject of PPP is awash with literature. Which literature is relevant? It is tempting to rely on citation. That approach would have two problems. First, it succumbs to popularity, which is not always an accurate measure of value. Secondly, PPP interweaves issues. Therefore, the collection of literature based on citation would lead to a confused body of works. Consequently, this section uses the three coordinates of the policy space (the state, market and society) in the search for literature. Moreover, as in the previous chapter, the thesis avoids redundancy of authors. That is, the review focuses on strands of argument. It avoids high stacks of authors [founded on the same appreciation of policy space].

3.2.2 *The Basis of the State*

This section focuses on literature on PPP written from a vantage point of the state. In other words, literature that looks at the interaction of state structure and the concept of PPP.⁶³

⁶³ To better appreciate this literature, it is necessary to go back to the strengthening of the state around the War period, and the subsequent challenge to the prowess of the state in the Thatcher-Reagan era (see Sec 3.3).
Excitation of a Dynamical System

Savas (2000) presents a common challenge in the analysis of PPP from a vantage point of the state. The author considers PPP a softer and 'less contentious term' for privatisation (p.2). In other words, PPP belongs to the same track seeking minimal state. That is a narrow, and potentially misleading, view of PPP. Let us call it the privatisation track.

The concept of PPP rests on the challenge of complexity in service delivery, and the need for a welded approach (by the state and private sector) in addressing this complexity, detailed in Section 3.5. Therefore, the foremost concern is not reducing the size of the state but efficacy and efficiency of service delivery by jointly working with the private sector. On that argument, a strong state is necessary in the joint relationship, which may mean increasing the size of the state. Let us call this line of thinking the joint track.

Hart (2003) presents a line of thinking kindred to Savas (2000), i.e. the privatisation track. However, unlike Savas, the author limits PPP to the purchase of services (in contrast to physical facilities). Similar to Savas though, Hart misses complexity, and the attendant risk management, as the essence of PPP – and hence the need for a welded structure captured by the special purpose vehicle (SPV). Hart does not explore the joint track.

Other researchers including Skelcher (2005) start close to the joint track but then drift off to the privatisation track. The researcher moulds PPP as a combination of 'resources of government with those of private agents...to deliver societal goals' (p.347). However, the author follows with a painting of private agents 'substituting' government. This shows a poor appreciation by the author of the complexities that require the state and private actors to work jointly in mitigating the attendant risks of service delivery. Let us note though – the banner of PPP may be raised on projects that are less complex, and where the state could withdraw to remain solely a recipient of service. However, such overflows should not detract us from the core goal of managing complex projects jointly.

The link between the state and the rest of the world has attracted considerable scholarship. Börzel and Risse (2005) view this link as a subject of international relations (IR), noting:

...we argue that conceptualizing the issue as “private actors on the rise” and as “the demise of the nation-state” is empirically questionable. (195)

The authors subscribe to the joint track. PPP must not be seen as a substitution of the state by the private sector. It is a joint effort by both sectors to manage complexities of public service. Other scholars of the IR track include Schäferhoff et al. (2009). While these authors challenge the minimalist-state view of the privatisation track, they fail to appreciate the dynamical system of PPP. They posit that, given appropriate frames, we can define the trajectory of effectiveness of PPP. This is a primary point of departure with the present research: The space of PPP is a dynamical system, and in policy spaces like Uganda's, the system is non-ergodic and hence irreducible to a trajectory (see Amonya 2016).

Drawing the strands – summary: The review above demonstrates the expected. Looking at PPP from the vantage point of the state will result in different images (more formally, manifolds). Time is crucial. A dip into history unearths what Hodge and Greve (2007:33) call ‘an understanding of PPP as a phenomenon rather than a single technique’. By implication, PPP is complex and dynamic – as formally presented in the conceptualisation introduced in Section 1.3. However, the exigency of transactions will tend to reduce PPP to a procurement ‘technique’ and a financing option. This tendency is exposed in Section 3.2.3. Moreover, when the tension between depth and immediacy comes to resolution on a platform of politics, the latter will likely prevail. For depth to be appreciated, a strong pull of the electorate is required. To this end, think tanks (including university research centres) must be active in the debate on PPP (see Amonya 2010).

3.2.3 The Basis of the Market

From a vantage point of the market,⁶⁴ how do scholars view this complex and dynamical phenomenon called PPP? First, a reminder is due. Any scholar would view PPP in all the three dimensions. However, different scholars will have different emphases – attempting to resolve PPP on specific coordinates. This

⁶⁴ Note the broad definition of the market - encompassing actors of capital and labour, and the organisations that seek to reduce the transaction costs of the two.

section teases out the fundamental arguments of scholars who emerge from the market.

The market is transactional. Therefore, it necessarily delimits time to the interests of an exchange. At the same time, interests of society and the state (as structure) are perpetual. This difference creates a tension. Consequently, this section seeks literature that addresses this transaction tension field.

Literature on PPP transactions revolve around risk. The deepest of this literature employ fuzzy logic and the Delphi technique. To sift the array of literature, the research resorts to the spatial organisation of block diagrams (Figure 11). Let us stop briefly at this point and pay specific attention to block diagrams. Complex and interweaving issues can be captured using algebra. However, often algebra is too abstract and devoid of intuition. However, geometry rescues [the more recent] algebra leading to calculus. The prowess of block diagrams traces back to geometry, and Dorf and Bishop (1998) offer an illustration of the space-creating (simplifying) effect of block diagrams.

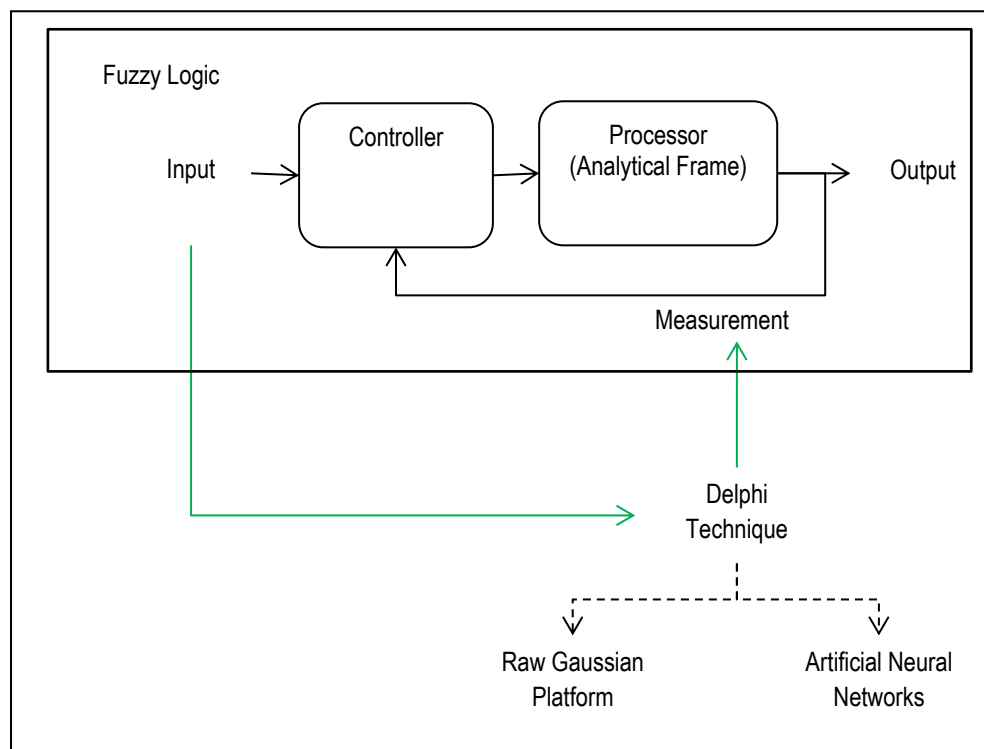


Figure 11: Fuzzy Delphi Structure

Back to Figure 11, the controller transforms exact inputs into fuzzy inputs, defined by a membership function. The fuzzy inputs then feed the most important part of the system – the processor or analytical framework. At this stage, the conceptualisation of the investment space comes to bear. The thesis argues that the space is non-ergodic and dynamical, and hence the output should be treated in an incremental way. This conceptualisation provides a background to the literature review of this section.

Further, the risks of PPP do not lend themselves to the bivalent structure of classical set theory. In a bivalent private – public arrangement, the different strands of risk belong to both, which appeals to fuzzy logic – highlighting a core argument of this research that PPP must be a welding of the private sector and the state.

Moreover, PPP is nascent. Therefore, the measurement link of Figure 11 relies on interviews of the key actors. However, to provide a foundation for the judgement of these actors, the structure of the input is provided. This approach is iterated with a view of reaching consensus – anonymously letting the interviewees know views from the previous round. That is the basis of Delphi technique (Helmer 1967).

Still, other authors miss the fuzziness of the risk strands, and hence treat the risk items as discrete and independent. This cluster of authors then apply the traditional Gaussian platform – the classical linear regression model (CLRM). Let us call these authors the [naïve] Gaussian cluster. Typically, this cluster will seek to interview a large spread of actors and feed their views into a statistical package like SPSS. While this thesis identifies these components of literature, it does not pay deeper attention to them. This cluster of authors make an implicit assumption (and likely inadvertently) that a stable structure underlies the views of the actors of PPP and all that is needed to unearth this structure is statistics. Against the background of dynamical systems of this thesis, such thinking is naïve and the thesis does not dig deeper into the attendant literature.

Turning to specific authors, Xu et al. (2010) use a two-round Delphi survey to synthesise a fuzzy model for risk assessment in China. However, the Delphi exercise does not tap the input function of the fuzzy structure. Still, this separation between the Delphi and Fuzzy structures is a less important challenge of the

research. The more important issue is the analytical framework of the fuzzy structure. That is the stage for examining the mechanics of PPP. Xu et al. (2010) and kindred authors assume the i.i.d. structure that underpins classical mechanics, which contrasts with the non-linear and non-ergodic underpinning of this thesis (see Sec 1.3). The kindred authors include Glumac et al. (2015). These authors use the Delphi fuzzy framework embedded in game theory. However, the mechanics of engagement with PPP actors is similar to Xu et al. (2010).

An emerging cluster of literature uses the Delphi technique to train artificial neural network (ANN). The researchers include Ameyaw and Chan (2016), Sharafi et al. (2016), and Jin and Zhang (2011). While ANN introduces flexibility in the analysis of PPP, this cluster of research is constrained by the latent i.i.d. assumption. That means, syntheses from the research would not treat the challenge of non-ergodicity. To tackle non-ergodicity focus must shift from attempting to define a trajectory of PPP effects to creating flexibility in the agency of infrastructure (see Amonya 2016).

Another cluster of researchers builds on the concept of transaction cost (Williamson 1979). Williamson looks at transaction cost as motivating economic flow, and differences in transaction cost being a result of technological gradients. Therefore, Reynolds transport theorem (see Lidström 2011) is an appropriate framework for reviewing this cluster of literature.

Consider the state as a control volume flowing in a technology vector field as shown Figure 12. The technology capacity of the state is Θ and this capacity is enhanced along the flow of PPP transactions. The time rate of change of state capacity is captured in Equation 3.2.1.

In other words, PPP should enhance the technological capacity of the state to deliver the more complex public services. In the absence of PPP, the technological gap between the state and the smallest units of service providers would be too

wide. Therefore, the justification of PPP is the reduction in transaction cost following the closure of the technological gap.⁶⁵

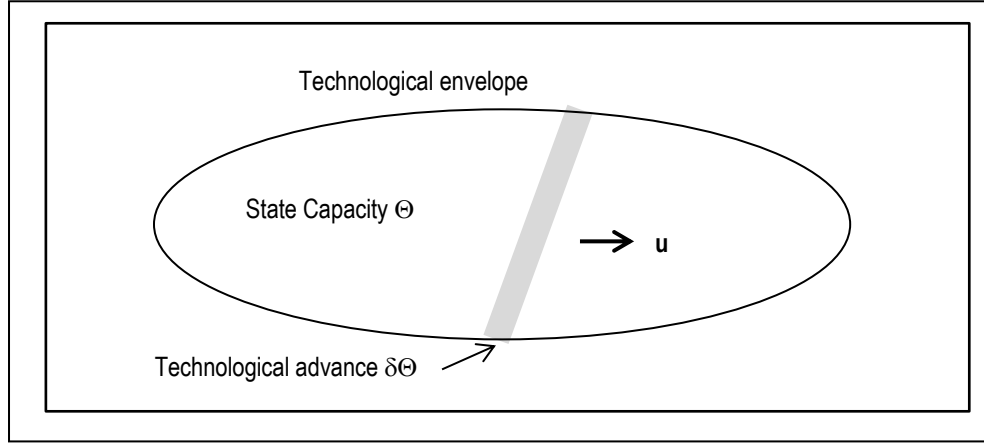


Figure 12: PPP as Technological Advance

$$\frac{D\Theta_{sys}}{Dt} = \frac{\delta\Theta_{cv}}{\delta t} + (\mathbf{u} \cdot \nabla)\Theta_{sys} \quad 3.2.1$$

Where:

$\frac{D\Theta_{sys}}{Dt}$ is macroscopic ‘material’ derivate of state capacity (or Lagrangian acceleration)

$\frac{\delta\Theta_{cv}}{\delta t}$ is the local derivative (or Eulerian acceleration)

$(\mathbf{u} \cdot \nabla)\Theta_{sys}$ is convective acceleration.

State capacity (potential for efficient delivery of service), will change in the absence of PPP. This change is the local derivative – the first term on the RHS of 3.2.1. In addition, the flow of PPP will have a convective effect. That is the second term. Note that this conceptualisation nests in the overarching conceptualisation introduced in Section 1.3.

Let us look at authors feeding this strand of argument. Many authors use transaction cost in reference to operational effects not the motivation of transition flow captured in Figure 12. For example, Parker and Hartley (2003) consider trust

⁶⁵ ‘Technology’ is used broadly to include management. See Amony 2010b.

in the procurement process. Another example is Jin and Doloi (2008). They seek the drivers of risk allocation on PPP projects. However, framework of Figure 12 and Equation 3.2.1, allows us to ask: How is the technological capacity of the state changing – as an enclosed entity (control volume) and through the convective effect of PPP? The authors do not dig to this depth. They stop at operational empirics.

Given the literature above, here is the natural question: Which literature considers the extensive property of state capacity of Equation 3.2.1? The literature review revealed close attempts and opportunities but not an explicit address of this foundational mechanics. The closest was Wettenhall (2005). The author surveys history, picking key nodes of PPP. However, the work stops short. It does not import physics to organise the empirics from history. That missing step gives thrust to this thesis as captured in Section 1.3.

In summary, this section laid out a perspective of literature on PPP from the vantage point of the market. The market is defined broadly, including the production entities (the firm or industry). The literature surveyed fall short of positioning the market on an underlying mechanics of policy space. That gap is a core motivation of the thesis.⁶⁶

3.2.4 The Basis of Society

No treatise on ‘society’ can escape the load in the word. The load was clearer (more homogeneous) in the days of Max Weber, see recent translations of the author’s work (1964 and 1978). Then, in the nineteenth century, the anti-capitalism force was distinct enough to give the word clarity. However, following what Castells (1996) calls ‘globalisation of society’, that distinction has been lost – primarily due to information technology.

Consequently, the thesis adopts a broad definition of society.⁶⁷ As a formation (of a country), it includes the economically marginalised. Therefore, this section looks at how scholarship on PPP addresses social equity. However, we should always

⁶⁶ PS: The syntheses of Chapter 6 inform the closure of this gap.

⁶⁷ Refresh: A people constrained on a set of Northian institutions. This definition draws on Weber (1978).

recall that the review is done against a background of the overarching framework – nonlinear and non-ergodic systems. In other words, the review looks for appreciation of PPP at two fronts – dynamical systems and social equity.

McQuaid and Scherrer (2010) capture the motivation of this section:

Finally, the distribution of costs and benefits of new PPPs on different parts of society is important, especially where they are funded out of public expenditure, but this has been under-researched. (30)

The authors deserve credit for identifying the ‘under-researched’ character of the subject. However, we must ask the deeper question: Why is the subject under-researched? From the foregoing exploration of literature, the focus of scholarship has been on transactions. To that end, PPP is seen as a platform of transaction, and often, merely a means of off-balance sheet financing. This view misses the impact of PPP on the state, market, and society – the concern of this section. For these deeper effects to come to the fore, the reality of dynamical space of PPP must be appreciated.

Scharle (2002) appreciates the dynamical effects of PPP. However, the author operates at the level of transactions not policy. From the basis of the market, the author explores the social effects of PPP, drawing on the road construction industry. Consequently, the author misses the deeper effects of the link between the state and society. The thesis addresses the deeper effects. The three bases of this thesis (state, market and society), situated on a more explicit conceptualisation of policy space as a dynamical system, allows the deeper state-society effects to come to the surface.⁶⁸

Kuriyan and Ray (2009) ask a deep question: ‘How might a developmental state position itself with respect to civil society under a PPP model of service delivery?’ However, the authors restrict themselves to interview results, without delving into the foundational issues of the state, market and society. The question should lead them to the dynamical system of PPP but they remain at the surface.

⁶⁸ PS: Cf. the syntheses of Chapter 6 and specifically the discussion on Sub-National PPP (Sec 1.1).
Excitation of a Dynamical System

Stewart et al. (2009) take the vantage point of disasters and resilience in looking at the interconnected space of PPP. The authors use Louisiana (USA) as a case study. van Niekerk (2015) occupies a similar vantage point as he looks at disasters across Africa. Similarly, Ndege and Singh (2010) explore resilience to disasters in urban Africa, including Uganda. All these authors appreciate that the PPP space is complex. It is interwoven with many actors and issues. Moreover, they all look for operational weaknesses. Thereafter, they suggest solution – falling short of looking at the underlying calculus. That is the distinction between this thesis and the foregoing cluster of research.

3.2.5 Focus on Uganda

A reader might be tempted to ask: Why not restrict the review to PPP in Uganda? Such a question would be oblivious of two issues. First, the reviews of this section focus on the [social] science on PPP, drawing on physical science – a foundation of social science in a broad sense. In so doing, the thesis abstracts and conceptualises the space of policy, and demonstrates that it is dynamical and non-ergodic. The foregoing review provides context to this conceptualisation, and hence the review is not country specific. Science is not country-specific.

Secondly, PPP is a nascent phenomenon in Uganda – let alone the wave of PPP being a new phenomenon across the world. In addition, the extent of scholarship focused on the country is small. To demonstrate, none of the literature reviewed above picks on Uganda, or Africa, as a case study and digs into the mechanics of PPP as a phenomenon of policy.

The two points above support the argument that epistemic contribution of case study is held in the explication of the phenomenon. That is, an explication of PPP in Uganda would be a significant contribution to knowledge – without seeking generalisation.⁶⁹ This thesis goes further than the leading proponents of this argument, such as Flyvbjerg (2006). It provides the physics to support the epistemology of explication.

⁶⁹ Cf. Section 1.5

Finally, for the reader keen on any literature on PPP in Uganda, the few pieces are largely empirical observations and they are presented in Chapters 5 and 6. This approach should remind us of the 'integrated approach' to literature review advocated by Patterson (2006: 3).

3.2.6 Summary: The Special Place of PPP as a Dynamical System

The authors viewing PPP from the vantage point of the state and society seem more likely to take a deeper and longer view. That is not surprising. The two bases (the state and society) appeal to history. Looking at PPP from a vantage point of the market leads to a transactional view. It is more short-term. It focuses on emergent project risks without much attention to the underlying mechanics.

The review of literature above reveals the need for a fundamental conceptualisation of PPP as a dynamical system.

3.3 Origin of PPP

3.3.1 Exploratory Framework

Private financing and management of public service (and infrastructure in particular) is not a new practice. It is not new in the UK (see Amonya 2006 for historical trace of the practice). Particularly, in the 19th to early 20th century, aristocrats in Britain owned roads commonly called turnpikes. Private investment in roads was not restricted to Britain. Block (1983) discusses the contribution of private finance to the improvement of the road network of the United States in 18th to early 20th century. In addition, Engel et al. (2003) discuss private financing of highways in Latin America in the 19th century.

However, the present wave of PPP is different. It is more rooted in policy. It is a philosophy of government (Grimsey and Lewis 2004). Therefore, PPP is not just a financing tool. It is a deeper policy stance, seeking to change the institution of governments (the norms and values). So, what is the origin of this wave? Literature does not pinpoint the origin of PPP. However, this research argues that this new concept sweeping the world traces back to policy arguments in the UK in

the early nineties. Specifically, the ‘partnership’ banner of the Labour Manifesto of 1997 deserves credit (see Section 3.3.2 below).⁷⁰ This argument hinges on a survey of the main forces that seem to guide the birth of PPP, and the logistic curves of Section 3.4.

Various forces seem to influence the birth of PPP. These forces are identified in Figure 13. Most significant of them is the Second World War. Following the War was New Public Management (NPM) of the eighties, the surge in asset securitisation of the nineties as well as the Third Way political philosophy of the same time. Third Way was the philosophy of New Labour in the mid-nineties (Blair 1997), and the ‘partnership’ banner of New Labour seems to be the force behind the PPP wave sweeping the world. The following sections (3.3.2 to 3.3.5) discuss these forces.

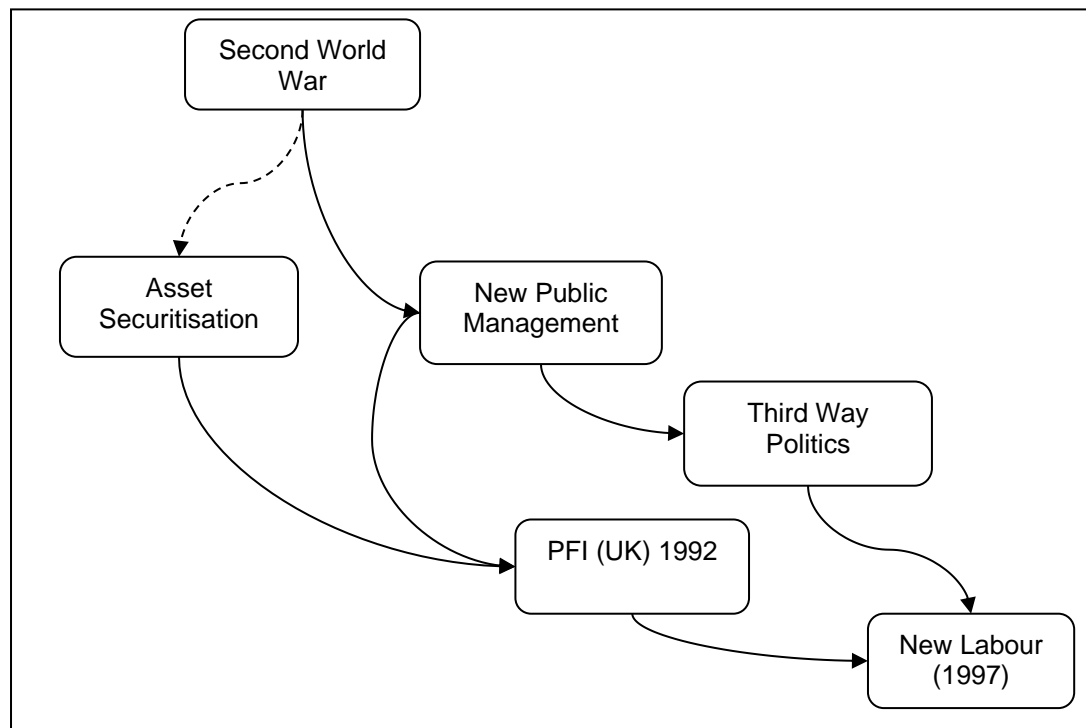


Figure 13: Birth Strands of PPP

Note: The link between asset securitisation and the War is dashed. The practice is not an institutional derivative of the War. However, the War boosted it. For details see Green and Wachter (2005).

⁷⁰ A Note of Comfort: This thesis is an examination of empirical data (numerical and textual). It is not an endorsement of any political stance – be it in the UK, Uganda or any other country.

Summary of the Birth Strands

This is an overview to Sections 3.3.2 to 3.3.5. It is a summary of the forces leading to PPP captured in Figure 13. These forces interweave.

1. The Second World War must be the start. PPP in the low-income world is motivated by a derivative of the War – the World Bank using PPIAF. Moreover, the thesis attends to institutions, and the norms and values of institutions last many decades. For example, the institutions of Article IV of IBRD that trace back to the War continue to challenge the operations of the Bank (see Sec 4.4.4). Therefore, the institutions and birth of PPP should be traced back to the War as in Figure 13.
2. Asset Securitisation has been the underpinning mechanism of PFI-type PPP projects. It allowed cash flow from the PFI projects to be sold to third parties as security. Asset securitisation started long before the War but as Green and Wachter (2005) show, the War boosted it. For details on the mechanics of securitisation under PFI, Buscaino et al. (2012) is a good start.

Below are the more contemporary forces detailed in Sections 3.3.2 to 3.3.5.

3. New Labour (The 1997 Manifesto): The Labour government picked ‘partnerships’ as its banner. The new regime did not abandon PFI but widened the pursuit of partnership beyond PFI, for example, term contracts of area-wide road management. Latham (1994) and Egan (1998) discuss the intellectual impetus for this change. Consequently, with PFI safe, asset securitisation spread in infrastructure delivery.
4. Private Finance Initiative (PFI): The forces underpinning PFI have been widely debated. The literature is vast, and Pollock et al. (2002) is a good start. Note though, this thesis does not join the debate on the merits and machinations of PFI. Rather, first it recognises PFI as a product of the economic stress of the late seventies, as part of the trace of the origin of PPP. Secondly, it identifies the carrier role of PFI leading to a new wave of PPP in the UK and across the world. Under that wave we find the institutional strand of partnering, which informs the analysis of PPP projects (Uganda) in Chapter 5. Otherwise, other motives beyond efficiency may have interposed the development of PFI, for example state capture (Lawrence 2017). However, such machination of PFI is outside the frame of this research. Again, PFI is but an aspect of PPP.
5. Third Way Politics: This was a middle way between socialism and capitalism. See Giddens (1998) for details. While this is a vast subject, the thesis focuses on the political platform it provided PFI, and then PPP, during the Blair and Clinton regimes.
6. New Public Management (NPM): The economic crisis of the late seventies forced the post-War world to review the role of government, as agent of the state. The product was wrapped in NPM. Note too that the zeitgeist of NPM emerged as SAP was taking root in the low-income world (Sec 4.4). Finally, as shown in the details below, the moulding of both NPM and the immediate post-War institutions was strongly influenced by the UK.

3.3.2 *New Labour: 1997 Manifesto*

In the run to the 1997 UK elections, Tony Blair's Labour faced a country that had been transformed by the privatisation drive of Margaret Thatcher of the Conservatives. Particularly, PFI had been launched in 1992 as the new conduit for delivering major infrastructure (Lamont 1992). Would Labour undo these reforms? No, Labour chose to embrace the private sector, albeit it differently. The private sector was a partner. The 'partnership' banner dotted the Labour Manifesto of 1997. Here is an excerpt:

...Reinvigorate the Private Finance Initiative. Britain's infrastructure is dangerously run-down: parts of our road and rail network are seriously neglected, and all too often our urban environment has been allowed to deteriorate...Labour pioneered the idea of public/private partnerships. It is Labour local authorities which have done most to create these partnerships at local level...A Labour government will overcome the problems that have plagued the PFI at a national level. We will set priorities between projects, saving time and expense; we will seek a realistic allocation of risk between the partners to a project; and we will ensure that best practice is spread throughout government. We will aim to simplify and speed up the planning process for major infrastructure projects of vital national interest. (Part IV)

The logical question that follows is, why did New Labour take this stance, which is only a modification and not rejection of the PFI policy of the Conservative Party? While a thorough examination of this question cannot be accommodated in this research, the sections below attempt to paint the events and ideas subsequent to the PPP policy [of New Labour] while pointing out ancillary motivations of these ideas and events.

3.3.3 *Private Finance Initiative (PFI) 1992*

The phenomenon of PPP must be as old as the state. However, the current wave of PPP traces back to Private Finance Initiative (PFI) in the UK. In an austerity autumn speech 1992, the then Chancellor Norman Lamont announced they had a new idea for funding the construction of schools and hospitals. The new facilities would be built using private finance and managed by the private provider for up to 50 years. The public sector would pay annual 'rent' for using the facilities. Below are excerpts of the speech:

...I said in my Mansion House speech that I was examining ways to increase the scope for private financing of capital projects. ...I am now able to announce three significant developments...In the past, the Government have been prepared to give the go-ahead to private projects only after comparing them with a similar project in the public sector. This has applied, whether or not there was any prospect of the project ever being carried out in the public sector. I have decided to scrap this rule. In future, any privately financed project which can be operated profitably will be allowed to proceed...Secondly, the Government have too often in the past treated proposed projects as either wholly private or wholly public. In future, the Government will actively encourage joint ventures with the private sector, where these involve a sensible transfer of risk to the private sector...Thirdly, we will allow greater use of leasing where it offers good value for money. As long as it can be shown that the risk stays with the private sector, public organisations will be able to enter into operating lease agreements, with only the lease payments counting as expenditure and without their capital budgets being cut. (14)

This speech raises one fundamental question, why did the chancellor announce PFI at that time? While a myriad of explanations could be made, Appendix D.3 shows by 1992 the UK was creeping from surplus to deficit. Moreover, the 10-year bond yield was in steady decline, from over 10% in the eighties. To maintain this improving fiscal situation, the government needed to lower its debt burden. Consequently, the off-balance sheet character of PFI would have been attractive. Further, the spread on the UK bond compared to the US was approximately 3.2% [320 basis points], though it reduced to 2.1% in 1992. Therefore, in global terms, it was expensive for the UK government to borrow from the market anyway. Therefore, in fiscal terms PPP was attractive. Given that this was a Conservative government, political philosophy and the fiscal situation were in resonance, and supportive of the new off-balance sheet tool (PFI).⁷¹

Finally, note that PFI would influence PPIAF at the World Bank. See Section 3.4.1 for details.

⁷¹ Note scholarship that associates private financing of infrastructure to 'state capture' (cf. Sec 3.3.6).

3.3.4 Third Way Politics

Why did New Labour adapt, and not reject, PFI? In any case, critiques [of PFI] argue public accounts did not warrant PFI (Pollock 2002, below).

When first introduced in 1992 proponents claimed that PFI would lead to more investment without increasing the public sector borrowing requirement. However, the UK budget surpluses of recent years (£23bn for 2000-1 alone) have been much greater than the total of £14bn private investment deals signed in 1997-2001. The present generation of taxpayers could have funded considerably more capital investment out of existing revenue instead of displacing the cost on to future generations. (1205)

The answer to the question above should partly be in Third Way politics. First, it is important to frame the ideological forces shaping the definition of rights, responsibilities and capabilities of individuals, civil society and the market. The conceptual framework is shown in Figure 14.

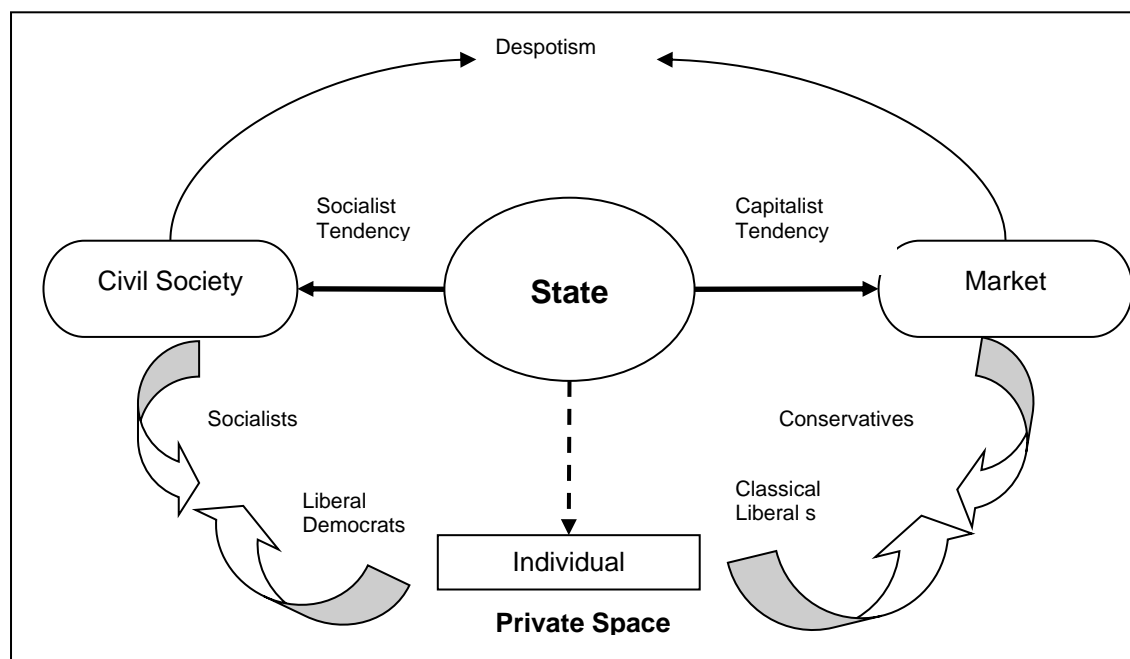


Figure 14: Forces of Politics – A Guiding Frame

Third Way contests space for capitalism. It rejects the totalitarian quest for the freedom of the proletariat that was arguably ignited by the end of the Second World War. As Giddens (1994) might put it, Third Way was a rescue for those caught in the reveries that followed Marx and Keynesianism. It tempted to

reconcile the ideals of social justice and absolute equality of the left with the reality of capitalism of the right. It might be tempting to think Third Way was simply a product of serendipity. That two men Blair and Clinton found themselves at a junction of time, trailed by conservative regimes, and the two happen to be of kindred thinking. However, Driver and Martell (2000), Blair (1998), and Giddens (1998) point to deliberate appreciation (by these political actors) of structural forces of the time. These forces trace back to the War as shown in Figure 13.

However, the trajectory of PPP would not be complete without a micro examination of government (of the West) in the seventies and eighties. Efficiency of government came under scrutiny. The result was New Public Management (NPM).

3.3.5 New Public Management

Can government, as agent of the state, operate like the private sector with its market discipline? That was the question behind NPM. This research does not delve into the mechanics of NPM. For UK empirics, see McLaughlin et al. (2002), Flynn (2001), and Ashburner et al. (1996). Across the OECD, NPM emerged in different forms in the eighties (see Kaboolian 1998 and Hood 1995). On the diffusion of NPM outside the OECD, Larbi (1999) considers Africa whereas Common (2001) focuses on Southeast Asia.

The works above affirm a significant change in public sector management in the eighties – following the economic crisis of the late seventies. That crisis seems⁷² to have created a space for the West to seek efficiency in the delivery of public service. To that end, the public sector sought the leanness, speed and responsibility of the private sector.

Efficiency of the private sector hinges on competition. It plays out in the market, which lays out options allowing choice. On the other hand, government as agent of the state operates a juggernaut structure restrained by law. Moreover, it provides service often devoid of options – monopolies. How then can government stride towards the private sector *modus operandi*?

⁷² You will see this language of science throughout the thesis. Allowance is always made for apparent causal links to be just that – apparent, avoiding rigid stances.

In pursuit of efficiency, the public sector renewed and energised the letting out of service delivery (i.e. commercialisation). In the roads sector (particularly in the UK), this practice that had started in the sixties became more pronounced in the eighties (Amony 2006). Moreover, departments of transport were devolved into legally independent [public sector] entities (corporatisation). These changes would prepare public space and train government actors for PPP. Therefore, the emergence of PPP in the UK and across Europe (early to mid-nineties) should not be surprising. The requisite ground had been prepared for the public sector to partner with the private.

The NPM wave swept across Africa (and particularly the Commonwealth countries) in the late nineties, and continued in the first few years of the new millennium (in addition to Larbi 1999, see Olowu 2005, Hope 2001, and Manning 2001). However, at best, NPM seems to have had a modest impact on the continent – compared to the OECD countries. On this front, Manning (2001) writes:

...It seems probable that the direct contribution of NPM to public sector responsiveness or efficiency outside of the OECD has been slight at best...since many providers remained in the public sector alongside their purchasers, and since in consequence there was little or no chance of judicial intervention to resolve disputes, many NPM 'contracts' were intrinsically flimsy and needed the support of a watchful public with expectations of government performance to sustain them. (298-302)

Manning argues that in the mechanics of NPM in Africa, the electorate arm was weak (cf. Section 4.4.7 on SAP). Therefore, NPM was never rooted. That relative failure means that NPM did not provide the same priming for PPP in Africa as did the OECD. However, that observation is merely an offshoot of the exploration of this section. The objective of the section is to illuminate NPM as a factor in the emergence of PPP.

3.3.6 Concluding Notes

This Section 3.3 has illuminated the origin of the PPP wave, and the role of the UK as the epicentre. The UK practice has been defined by PFI, which influenced PPIAF at the World Bank (see Sec 3.4.1).

It is worth noting that PFI has been caught in a critique of the increasing dominance of capital in public space. Thrift and Leyshon (2007) call it ‘capitalisation of almost everything’. Lawrence (2017) invokes the phrase ‘financialisation of everything’ as the author decries ‘state capture’ by the corporates. As the thesis searches surgically the formative institutions of PPP in the UK, it leaves the broad criticism of capital and privatisation for other researchers. To that end, the thesis picks institutional strands moulded from the complexity of public service and specifically infrastructure. For example, ‘partnering’ emerges from Section 3.3.2, and guides the diagnosis in Chapter 5 and synthesis of Chapter 6. Note that partnering is most pronounced in infrastructure management,⁷³ and infrastructure is the domain of the case illustrations in Chapter 5. It is also the domain of aspirations of PPP in Uganda.⁷⁴

3.4 Diffusion – PPP as a Logistic Function

3.4.1 *Mapping the Political Economy*

Today, PPP is top of the policy agenda in Africa (see Amonya 2006, 2010 and 2012), notwithstanding the poor preparation discussed in previous section. How did PPP move to the top of the policy agenda, not just in Africa, but also in developing countries? The PPP concept seems to diffuse from the Bretton Woods Organisations (and particularly the World Bank) as ‘good practice’ borrowed from the developed world, and particularly the UK (see analysis in Section 3.4.2).

In 1999, donors created Public-Private Infrastructure Advisory Facility (PPIAF) as a hub for technical assistance to countries striving to join the PPP wave. This trust fund sought to create a sound enabling environment for private participation in infrastructure. It has become the leading entity for transferring PPP models from the West to the emerging countries of Africa. That triggers a question: How can a

⁷³ Reflect on Latham (1994) and Egan (1998)

⁷⁴ Put differently, critics of capital dominance impute ‘state capture’ in the proliferation of PPP. This thesis focuses on the imperative of PPP arising from the complexity of infrastructure delivery. So, PPP is bigger than private finance, and it is not privatisation. Other researchers to follow could ride on the nonlinear and non-ergodic system illuminated in this thesis to investigate say ‘state capture’ in the high-outturn projects – and draw on power plays of corporates across the world (cf. Lawrence 2017).

concept that entails the welding of the state and private space be transferred from a stable state to an evolving one (see Figure 15)?

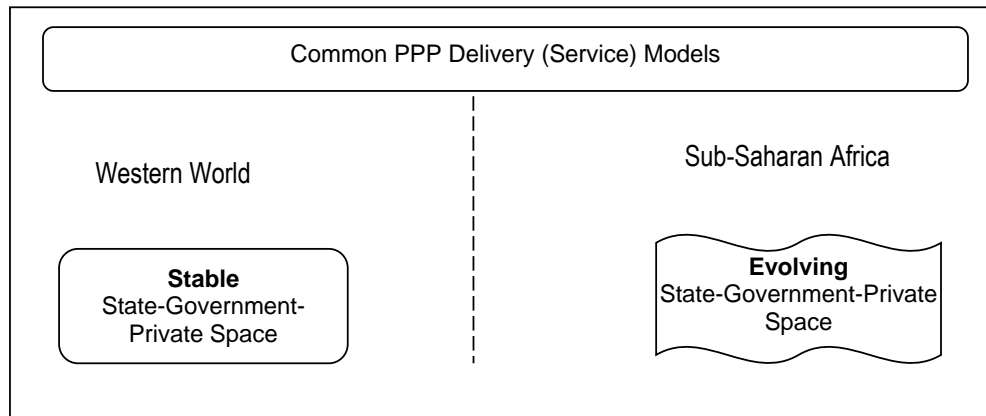


Figure 15: The Challenge of State Structure in PPP⁷⁵

To transfer models of practice from the stable regime to the evolving one would imply an understanding of the interaction between state mechanics and the delivery models. The state-service functions of both regimes should be clear. Otherwise, the attempt would be a trial-and-error hinged on serendipity. See Fukuyama (1989) for an analysis of state-service interactions across the world.

How do development organisations (and particularly Bretton Woods ones) respond to state-service mechanics across the developing world? Article IV of International Bank for Reconstruction and Development (IBRD) is pivotal to that question. The article is the institutional cord of the donor community. It prohibits the consideration of politics in decision-making (detailed in Chapter 5). However, state mechanics is a manifestation of politics. That means at the basic level, the best donor entities can do is operate at the surface, diffusing models, and entrust the future to serendipity. The auxiliary effects will be left to subsequent research. However, this research must ask: What is the remedy?

Clearly, this is a difficult challenge. The recipient countries would not want donor countries to meddle in their politics, yet the challenges and opportunities of PPP (for instance) are intertwined in politics. Therefore, it would appear the way forward is the Joint Research Model (Amonya 2010). This model advocates collaboration of donor and local research hubs. The local hubs should offer immunity to their

⁷⁵ The 'stable' and 'evolving' labels are broad generalisations

donor counterparts on political matters. It is a difficult model to construct. The institutional challenges are strenuous. However, it would seem the way forward.

3.4.2 Applying the Logistic Model

Public-Private Partnership is an emerging frontier of policy knowledge. It is innovation. The diffusion of innovation has widely been modelled using the logistic function (for examples, Mahajan and Robert 1985, and Geroski 2000).

Figure 16 plots investment in PPP in the UK and developing world using data from UK Treasury and PPIAF respectively. Further, against these plots are three logistic curves. They both represent the model in equation 3.4.1.

$$I_t = K / (1 + Ae^{(-rt)}) \quad 3.4.1$$

Where:

$$A = (K - I_0) / I_0$$

I_t is annual investment in PPP

K country's PPP capacity

r rate of investment growth.

Equation 3.5.1 above derives from the work of Verhulst (1838) on ceilings of ecological growth (see the researcher's delayed publication, Verhulst 1977). The definitional differential takes the form of equation 3.4.2 below.

$$\dot{I} = rI_t \left(1 - I_t/K\right) \quad 3.4.2$$

All notations are maintained and $\dot{I} = dI_t / dt$.

The logistic curves are defined in Table 1. Initial investment (I_0) is £1 billion for the UK (Model 1), and £10 billion and £45.00 billion Models 2 and 3 respectively (PPIAF-monitored global portfolio). Parameter K is £55 billion for Model 1, and £100.00 billion and £120 billion for Models 2 and 3 respectively. Growth rate of annual investment is 2.0 for the Model 1, and 0.5 and 0.7 for the PPIAF tracking Models 2 and 3 respectively.

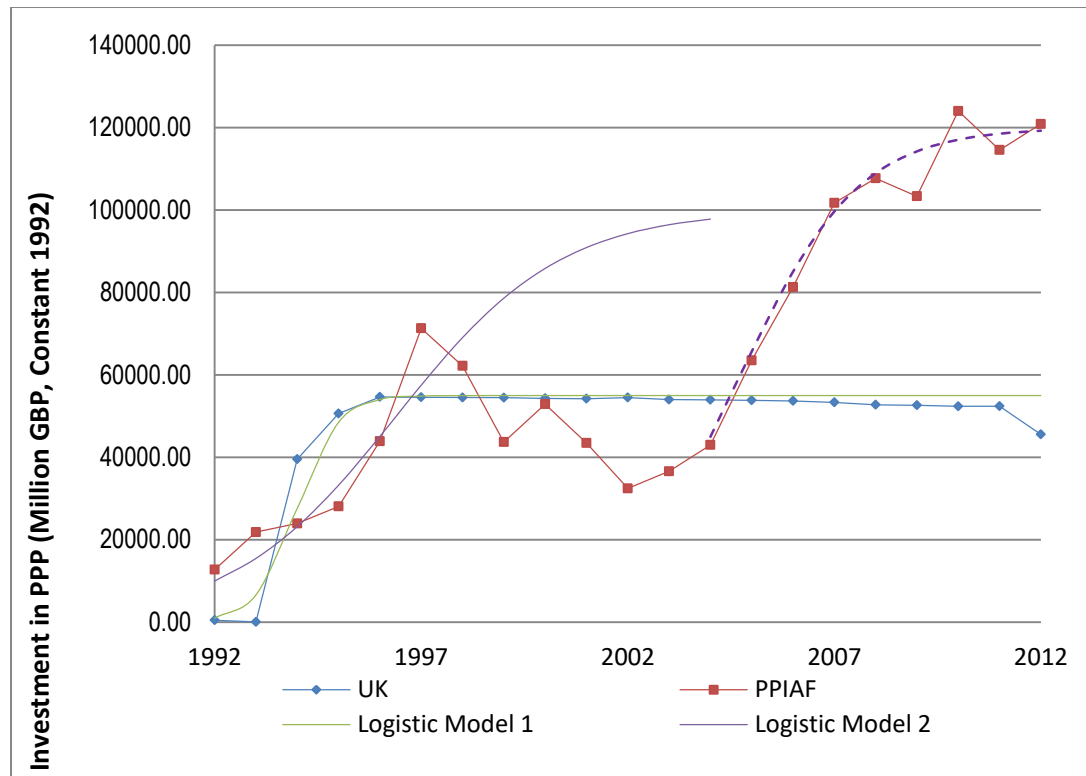


Figure 16: Diffusion of PPP using Logistic Model
Data Source: HM Treasury (UK) and PPIAF Database

Table 1: Definition of the Logistics Curves

Logistic	Model 1	Model 2	Model 3
I_0 (£m)	1000	10000	45000
K (£m)	55000	100000	120000
r	2	0.5	0.7
A	54	9	1.7

Figure 16 shows investment growth in the UK PPP sector following a logistic path until the drop in 2007. Following the 2008 economic downturn, the PPP programme was suspended (detailed HM Treasury 2012). The global PPIAF portfolio, on the other hand, does not fit on the single logistic function (see Wong and Goh 2009 for bi-logistic functions). This is not surprising. The global plot comprises many decision units (countries).

Of more interest is the thrust that the UK curve seems to impact on the global curve. That thrust becomes apparent after scrutinising the two curves. The UK curve shows bedding (incubation) in the early nineties. It then takes off in the late nineties before flattening off. It then falls off, likely due to the economic crisis starting 2007/8 and sheer pressure of re-invention – a new policy has been launched (HM Treasury 2012).

The global curve, on the other hand, shows a short-lived take-off that lags the UK one. It then staggers in the late nineties and early 2000s, which may be attributed to the Asian economic crisis of the same period. It then experiences another take-off around 2003. It is staggering now, likely due to the 2007/8 economic and financial crisis.⁷⁶

Not only does the global take-off lag the UK one in the nineties, its present decline also lags. That makes it likely that PPP in the UK has provided a wave that propelled PPP across developing countries. The former emerges as ‘adopters’ (Rogers 2003: 11). Since DFID led the creation of PPIAF (Section 3.4.1), it is reasonable to suggest that PPP (a conceptual creation of the 1997 Labour Manifesto) is a wave with epicentre in the UK. That stance is important in analysing the institutional aspect of PPP dynamics.

Now focus shifts to future scholarship on the growth of PPP.⁷⁷ Before that discussion, it is worth refreshing the place of this chapter within the broader case study. The PPP concept is the vantage point (pedestal) from which the two policy nodes (SAP and CMC) are explored. The concept is a major conduit for infrastructure delivery (the investment data laid above attests to that effect). Therefore, the mechanics and diffusion of PPP deserve scrutiny. Not only does the scrutiny bring completeness (simply knowing the pedestal as a micro-case), it also offers perspectives for new case explorations (or even attempts at generalisation).

⁷⁶ The crisis changed institutions of finance that underpin PPP organisations. The most salient change was in monoline insurance. The ‘monolines’ were the fulcrum of the PPP mechanics preceding the recession. For a deeper look at the subject, Loxley (2012) is a good starting point.

⁷⁷ Refinement of knowledge (scientific research) is an integral part of policy (cf. Sec 2.3 and 1.1).

Otherwise, the K-parameter (country's PPP capacity) in equation 3.5.1 will likely be one of the main areas of research focus. In the foregoing analysis, the K-parameter is assumed constant. That is a simplification. The K-parameter captures numerous variables, which makes it a variable – particularly in the long-run. The foundational variables (feeding the K-parameter) are axiomatic – they derive from the definition of PPP. The first is state integrity. The other is private sector strength and dynamism.

Let us have a closer look at growth rate r (equation 3.4.2). Figure 17 presents increasing intensity of PPP space at a growth rate of 4.0 percent with the K-parameter constant.⁷⁸ That plot (Fig. 18) is an output of the logistic model in Figure 18.

⁷⁸ Cf. May (1975)

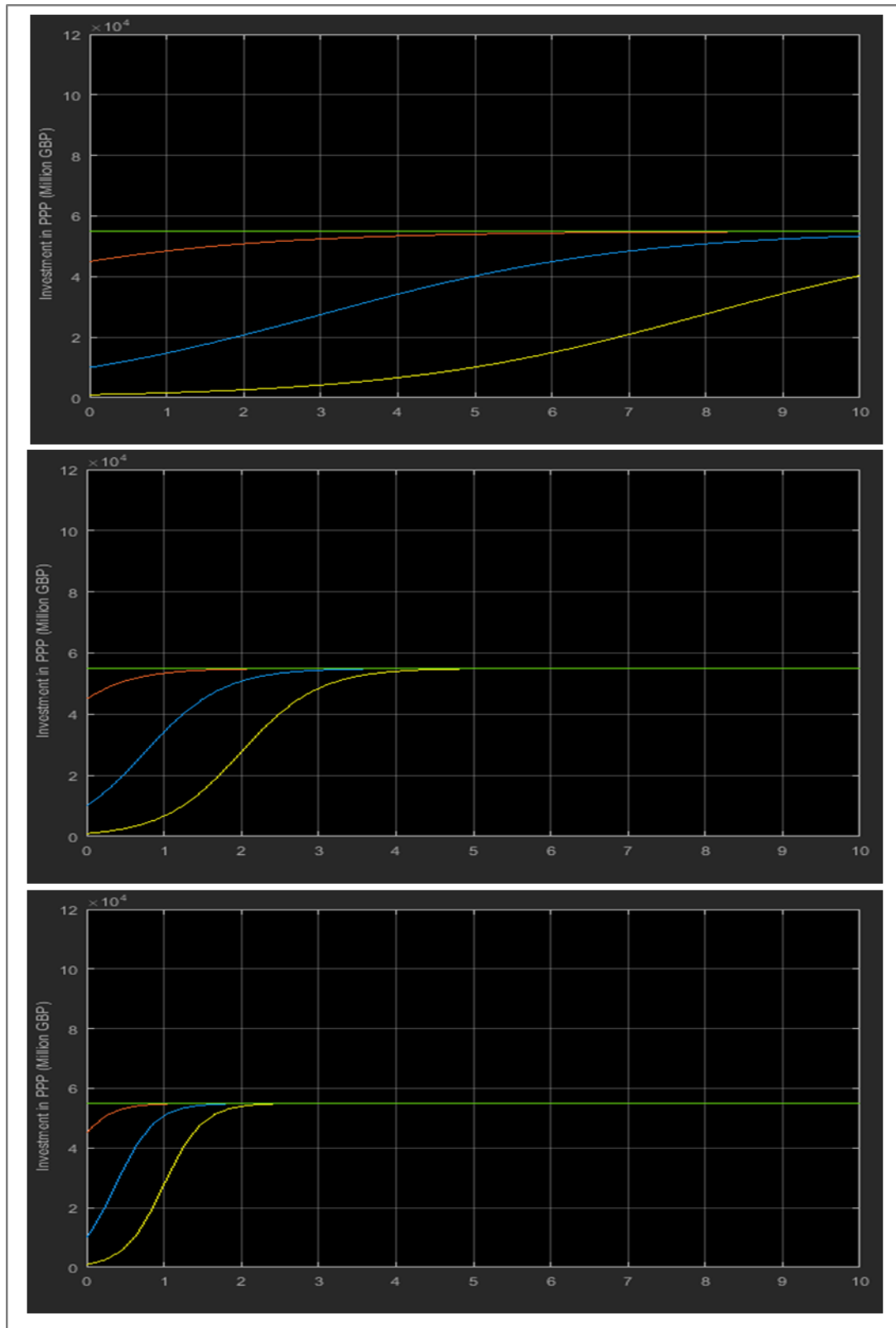


Figure 17: The Compaction of PPP Space

Note: Investment rate increasing from 0.5 to 2 to 4 while K remains constant at £55Bn

X-axis, time in years

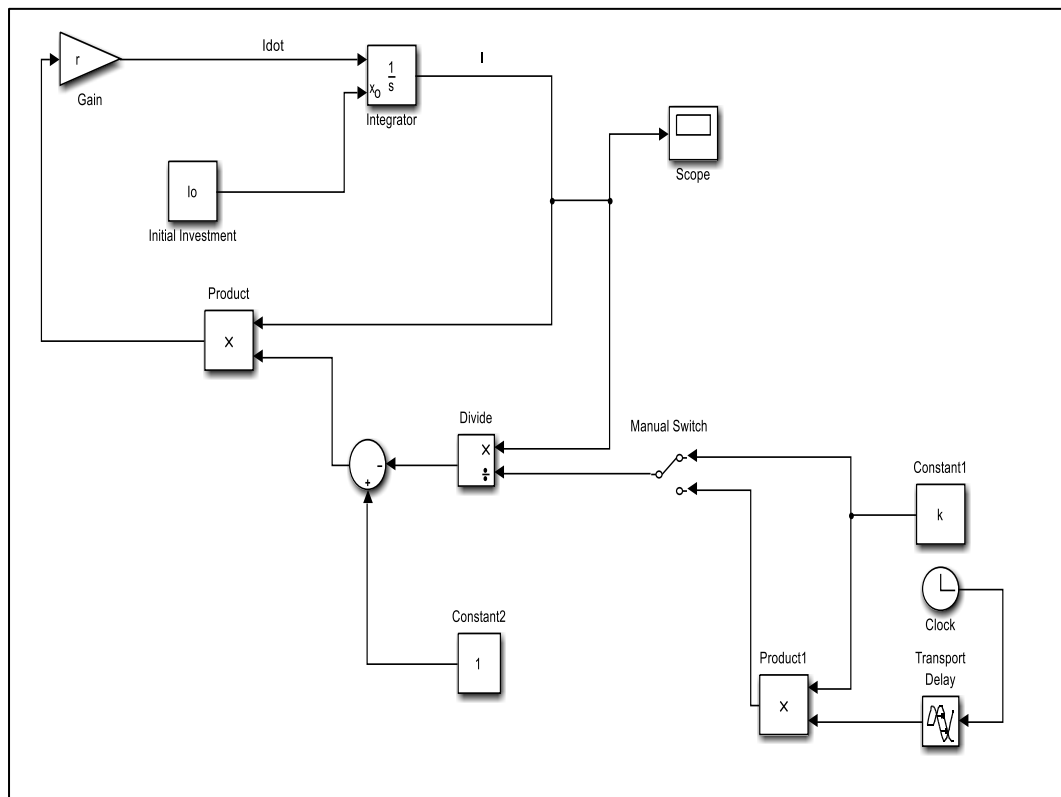


Figure 18: Simulink Logistic Model of PPP Investment

Note: Simulink is a graphical plug-in of MATLAB.

Figure 17 shows that saturation of PPP investment can be quick – even relative to the political cycle. The approach to the upper asymptote is quick (typically under 5 years). In other words, PPP can become unpopular even before the economic effects of these long-term investments play out. That means a key challenge of PPP policy is continual design, launch and management of new investment regimes.

The core functions of the state are control of the implements of violence and ensuring property rights (North 1990). These two axiomatically influence a country's capacity to employ PPP. The ensuing question is whether the two variables can be disentangled and measured within an investment trajectory of PPP. To that end, scholarship on Foreign Direct Investment (FDI) offers insight. Borrowing from Busse and Hefeker (2007), PPP capacity K assumes the following dynamic form:

$$\ln(K_{it}) = \beta_0 + \beta_1 \ln(GNI) + \beta_2 \ln(GROWTH) + \beta_3 \ln(STATE) + \beta_4 \ln(PRV) + e_i \quad 3.4.3$$

Where:

GNI	Gross national income per capita, capturing the economic depth of the country
GROWTH	Growth projections of the country, reflecting the desire for PPP
STATE	The core strands of the state (security and property rights) and the effective of agency of the state (government)
PRV	Depth and dynamism of the local private sector.

The specification in equation 3.5.3 begs testing. However, while GNI and GROWTH data are readily available (World Bank, for one source), the other variables are more difficult to quantify. Capacity K should use asymptotes of curves such as in Figure 16. However, such data points are too few – PPP as defined in this research is hardly two decades old (particularly in developing countries).

Moreover, the decomposition of STATE and PRV (as well as their potential proxies), must be developed by studying PPP phenomena (akin to this case research). The case studies of PPP will reveal the mechanics of PPP in specific settings. This challenge of data underlines the role of case studies, and particularly the place of case studies as pre-cursor to orthodox generalisation works. The same observation [on STATE] applies to PRV.

Bouchet et al. (2003) highlight the need for case study approach in scholarly efforts like the present (and particularly the measurement of political risk). The researchers write:

Because of the multiplicity of the sources of risk, the complexity of their interactions and the variety of social sciences involved, an underlying theory of country risk is still missing. Such a conceptualization would greatly help to identify the variables at stake. It would make it possible to test the respective relevance of the various approaches on offer. So far, most of the research merely consists of a classification and a description of the various potential sources of risk, and the assessment methods turn these elements into

numerical variables without any scientific Justification. [emphasis mine] (12)

In other words, Bouchet et al. point out that the state of our understanding of the field lends itself only to the ordering of forces and mechanics of the phenomena. That effort should, however, open the way to future generalisation. Stated differently, our knowledge of political risks (or more broadly, country risk) limits us to case studies. If that is true of the West, it applies even more closely to developing countries like Uganda where data is generally more scarce.

Focusing back to the STATE variable, it decomposes into constitutional, policy, regulatory and administrative components. At present, scholarship on measuring sovereign risk relies on quantified ordinal scale. This approach ranks countries and assigns numerical values to the ranking. The product then feeds risk analysis modules. For example, Busse and Hefeker (2007) use International Country Risk Guide of Political Risk Services in an empirical analysis of political risk in FDI in 83 developing countries. Moreover, in the risk analysis of PPP projects, the constituent STATE variables are packaged as political risk and placed under the public sector. To that end, Grimsey and Lewis (2000) present case studies from Australia. A similar treatment to political risks analysis was adopted in the emerging attempts at PPP in Uganda detailed (see Chapter 5). The difference is that in the latter, the investors would not accept the state (Uganda) as ultimate holder of the risk [the norm in developing countries]. The investors needed guarantees from supra-national entities, and in this case the World Bank.

Noting the role of supra-national entities above, ultimately political risk must be measured, albeit in a coarse way. The Multilateral Investment Guarantee Agency (MIGA) entrusted with improving investment climate in developing countries through risk insurance addresses five main elements of risk. These are currency inconvertibility and transfer restriction; expropriation; war, terrorism, and civil disturbance; breach of contract; and non-honouring of financial obligations, Shihata (1988) discusses these elements in detail. The five elements of risk condense to state structure and efficacy of agency (government). The pertinent question: How can this risk-set be quantified? The answer to that question should lend a tool for

the quantification of STATE variable (equation 3.5.3), and ultimately PPP capacity K.

The MIGA framework relies on the ordinal scale. Pricing of risks is guided by country rankings (see Shihata 1988 for details). Moreover, other scholars (and particularly Jensen 2008) have used the more precise regression analysis in testing how the pricing from the ordinal scale relates with insurance premiums [paid by multinational entities]. This approach glosses over the key challenge of measuring the structure of the state. Moreover, the pricing of state effects [political risks] is influenced by subrogation arrangements amongst lenders, insurers, sponsors and the beneficiary government (see Moran 2001 for details). Therefore, any prices of political risk drawn from multilateral insurers will capture a perception of state integrity as well as the unique project mechanics. Consequently, the regression parameters will not accurately reflect state integrity.

Asiedu (2002) presents a unique approach to measuring state integrity. The researcher suggests the use of assassinations and revolutions as indicators of the integrity of state structure. This approach faces two challenges. First, the suggested two variables are difficult to define. That is, the incidents cannot be easily ascertained. Secondly, meaningful data for time series analysis would require many decades of observation.

Therefore, any attempt at quantifying the capacity of a country to engage in PPP cannot hide from the analysis of the state as structure. However, scholarship faces the challenge of methodology, let alone data. This research suggests the case study approach [e.g. of this thesis] as a way of illuminating different phenomena of state. The collection of case studies will offer fodder for constructing methodologies, and subsequently attempting generalisations. Focusing on weak economies like Uganda, the capacity for PPP depends on willingness-to-guarantee by the multilateral entities (cf. juridical state, Jackson and Rosberg 1982). Consequently, for an unencumbered PPP relationship [between the state and private sector], sub-national PPP (SN-PPP) seems the way forward. A prototype SN-PPP is laid out in Amonyia and Okello (2014).

The foregoing analysis of the diffusion of PPP is instructed by a specific motivation. It sought the epicentre of the present wave of PPP. The textual analysis points to the UK, and the logistic curves support that proposition. A determination of the epicentre is important because it allows the character of the wave to be analysed. Premising on the UK as epicentre, the reforms leading to PPP in the country (see Amonya 2006, Egan 1998, and Latham 1994) stress the role of institutions. However, there are many structural aspects of the diffusion of PPP not addressed in this section. It is worth highlighting a few.

The mechanics of the diffusion of innovation depends on the process as well as the medium (see Hagerstrand 1953). In the case of PPP, the institution (as structure) is one layer of the medium, a formation layer. The other layers are the state and government – the latter being more flexible and transient. While equation 3.5.3 highlights the effect of the state and government (and the attendant challenges of modelling that effect), it does not address the deeper effect of institutions. Such consideration would address questions such as the following: How is the speed and amplitude (level of investment) of PPP in common law jurisdictions different from civil law jurisdictions? Works like Cuttaree and Mandri-Perrott (2011) appreciate this gap in knowledge. However, the researchers lacked the requisite variety of case studies for deep analysis.

As regards the ‘process’ front, the challenge is sterner. Time series analysis will require long PPP investment profiles (country level) for a variety of countries. Existing attempts at time series analysis (for example, Ng et al. 2007) focus on project returns, and in effect ignore the institution as a variable. For analytical frame, future process analysis could borrow from Godin (2006) and Valente (1995) covering the linear versus iterative schools of the development of innovation.

3.4.3 *Internal Dynamics: A Lagrangian View*

Having discussed the origin and diffusion of PPP in Sections 3.3 and 3.4, this section uses the abstraction of Lagrangian dynamics to examine PPP in Uganda. The analysis that follows is not a new and isolated conceptualisation but rather a perspective of the phenomenon [PPP in Uganda] under the overarching framework presented in Section 1.3.

The relevance of Newtonian mechanics to social science (and in this case, policy science) does not need explication. Newtonian mechanics provides the foundation for the field. However, Newtonian thinking is micro in character – explicitly incorporating points of action and the attendant constraints. In the case of PPP, it would look at all the multiple dimensions (coordinates) of capital infusion, and the risk mitigation measures. On the other hand, the Lagrangian framework abstracts from the micro strands in its analysis.

Going back to the coupled equation of the overarching framework (1.3.1), let K denote the potential for PPP in the country, arising from the interaction of the state (σ), society (χ), and market (κ). Lagrange dynamics instructs as follows:

$$\frac{d}{dt}\left(\frac{\partial K}{\partial \dot{\mathbf{r}}}\right) - \left(\frac{\partial K}{\partial \mathbf{r}}\right) = Q \quad 3.4.1$$

Where:

\mathbf{r} is the state of the policy space or the 3 bases (state, society and market). It can also be viewed as a matrix of the three.

Q total excitation (equivalent to generalised force in the Lagrangian language). It captures the effect of Northian institution τ and external effects \mathbf{e} .

Equation 3.4.1 is instructive. Not only is it non-homogeneous, it is non-autonomous too. Q is a function of time as well as \mathbf{r} . The external effect of PPP in the country depends on the state of the policy space as well as global forces not originating from the country such as economic downtown and political upheavals. This truism

is illustrated (for example) in Hodge and Greve (2007), Bovaird (2004), and Miraftab (2004).

Moreover, not only is Northian institution τ a trait of society, it is irrationally time variant, leading to non-ergodicity (see Amonya 2016 and 2015).

Therefore, the problem at hand (establishing the evolution of PPP potential K), reduces to a three dimensional non-autonomous problem. This situation does not yield to a stable long-term equilibrium.

3.5 The Future of PPP in Uganda

3.5.1 *The Deeper Policy Challenge*

One question will persist going forward. The state, market and society will ask this question: What are the realisations (outcomes) of PPP?

This is the follow-on question: In what space will the question above be asked? The orthodox space for thinking of questions on PPP is Newtonian – as is the case with most of social science. For a close examination of this subject, see Rose (1992) and Cohen (1994).

Within the Newtonian space, social science narrows down to the platform of Laplace equation:

$$\nabla^2 \phi = 0 \tag{3.4.4}$$

Where:

ϕ a social scalar (potential held within a society awaiting to be actuated, for example, PPP)

∇^2 is the usual Laplace operator.

The premise of equation 3.4.4 is the existence of an equilibrium, which the policy process should seek and use as a platform of decision-making (cf. Prigogine, 1993).

This thesis is a critique of the premise of stability of policy space, and that critique provides a turf for looking at the future challenge of PPP policy in Uganda, and kindred policy environments.

The orthodox equilibrium of the Laplace equation is challenged when we look at the heat equation (3.4.5). For disciplinary comfort, the use of the heat equation as a space of thought is not unique to this thesis. For example, the seminal Black-Scholes capital asset pricing model (a domain in finance) hinges on the heat equation (see Black and Scholes 1973).

$$\rho c_p \frac{\partial \phi}{\partial t} - \nabla \cdot (\kappa \nabla \phi) = \dot{q}_v \quad 3.4.5$$

Where:

The first term $(\rho c_p \frac{\partial \phi}{\partial t})$ is the time rate of change of the attendant scalar property (in this case, a social potential like PPP) per unit of the extensive property (e.g. the initiation financing).

The second term $(\nabla \cdot (\kappa \nabla \phi))$ is the flow per unit surface area per unit time (in our case, the diffusion of PPP across the country).

The RHS term (\dot{q}_v) is the external effect (positive or negative), and in the case of heat, it is the flux (in our case, the external influence on PPP policy).

The heat equation provides an essential space of thought for policy analysis as follows:

1. Stability is dependent on the character of the excitation term \dot{q}_v . If the excitation term is intractable on a null constraint, the system will be intractable.
2. Consequently, prediction of long-term effects of PPP in Uganda hinges on the ability of the state structures to control the excitation (external effects).
3. However, the control of the state is stifled by institutional constraints (see Chapter 4).

4. Therefore, the future of PPP in Uganda depends on the capacity of the state and the ability of its agent (the government) to control strands of the institution (note, this refers to Northian institution). In the language of mechanics, the future of PPP hinges on institutional constraints being rendered holonomic.⁷⁹

In light of the discussion above, the country's long-term development strategy (Vision 2040) addresses PPP as follows:

Government will review development financing policies to facilitate faster accumulation of development infrastructure. The sources of funding will include; tax and non-tax revenues, Public Private Partnerships (PPPs), concessional loans and grants, revenue from oil and gas and borrowing from domestic and international markets.
(Vision 2040, Uganda: Cl. 41, p18)

The excerpt above considers PPP a transactional issue. In light of equation 3.4.5, the following arguments hold:

- Structural change will be manifested when policy structures like Vision 2040 link PPP to the country's long-term external relations (\dot{q}_v). For a more vivid appreciation of external effects, see the country's current account deficit in Figure 19.
- The trend of the current account deficit is an overburden on the country's control of external effects. If the country does not loosen its negotiation with external players, it must tighten its outflows (imports) and scale down investment to a level commensurate with the country's income. This latter option is politically difficult (cf. Obstfeld and Rogoff 1995, and Van de Walle 2001).
- Internal mechanics (RHS 3.4.5) should reflect PPP as a philosophy of government. That means a need to consider distributional effects of PPP, and hence sub-national PPP (SN-PPP).

⁷⁹ Relatedly, we can employ the Lagrangian frame to analyse national development strategy in preparation for the next point of system stability. See Amonya (2017)

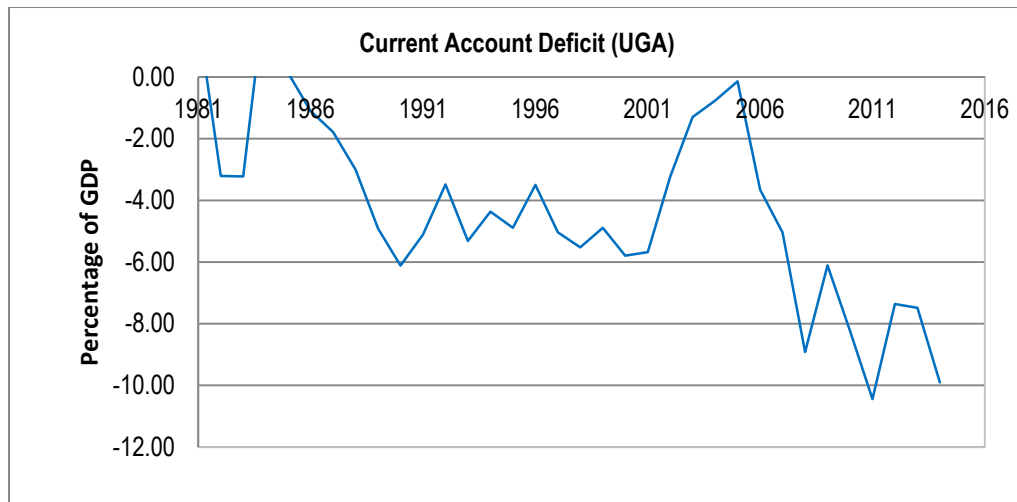


Figure 19: Current Account Deficit

Source: World Development Indicators (World Bank)

To sum up, the future of PPP in Uganda hinges on the country's institutional strands.

3.5.2 The Pragmatics of Regulation

Let us move from policy to regulation of the PPP space. Here is a generalisation of growth equation 3.4.1:

$$I_t = \alpha + (K - \alpha) / (\gamma + e^\lambda - \beta(t - \epsilon))^{1/\nu} \quad 3.4.6$$

Where:

α is a lower asymptote or investment required for take-off of PPP in a country

ν is a growth-skewness parameter that shifts growth between the lower and upper asymptotes

β is the new growth rate and ϵ is a lag capturing efficiency of take-off.

The generalisation of equation 3.4.6 is an analytical framework credited to Richards (1959). The main innovations are the lower asymptote and the growth-skewness parameter.

The lower asymptote allows a closer look at delegitimation of existing policy frames and the development of the new PPP frame, or a relaunch of PPP under double-logistic curve (on delegitimation of policy, see Amonya 2014). This is not only pertinent to Uganda but also developing countries experiencing high-intensity dynamical situations.

That frame in equation 3.4.6 finds a complement in the mechanics of innovation shown in Figure 20.

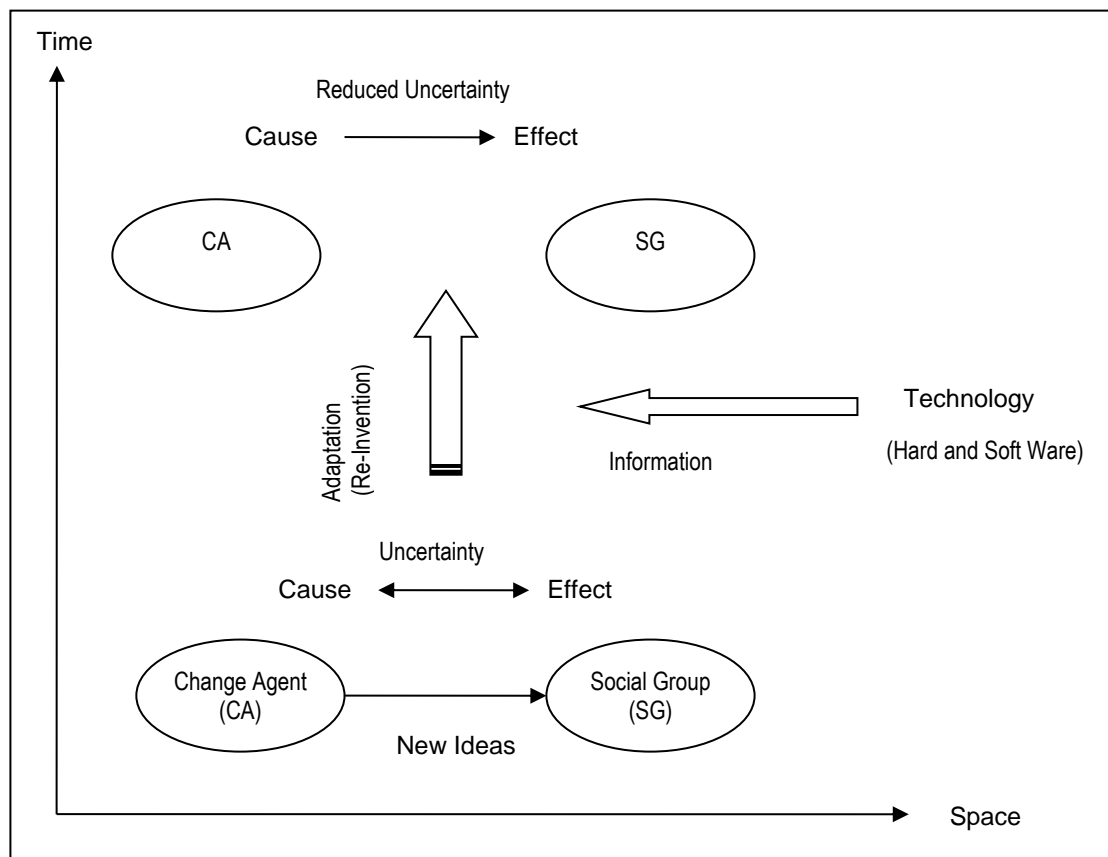


Figure 20: Mechanics of Innovation
Developed from Amonya 2010 and Everett 2003

The speed and duration of take-off of innovations depends on reduction of uncertainty. That occurs in the adaptation (re-invention phase). In that period, the holders of power question the cause – effect link associated with the idea floated.

In this instance, the main question is whether PPP leads to efficiency – and the attendant equity effects. In common parlance, is PPP value for money?

That question is one aspect of adaptation (cf. Section 1.3). The others are the actors (the power holders) and mechanics policy. Who drives the decision? What actual power do the people (the broader society) hold? Moreover, within government, who are the drivers of policy decisions? What is the mechanics? Moreover, in the case of the developing world, what power do the donor entities [development partners] wield, and how will that relationship change with the dynamics of politics in these countries?

3.6 Chapter Summary

The present wave of PPP is a force of excitation on the policy space of Uganda. The thesis argues that PPP is a phenomenon better understood by tracing back to global effects that followed the Second World War. The effects were both economic and political, and more pertinently – they crystallised into Third Way politics that heralded ‘partnership’ in the UK. The present wave of PPP was born.⁸⁰

Propagation of the PPP wave across the developing world (and particularly Uganda) traces back to the same War. Specifically, PPIAF (housed in a Bretton Woods construct, the World Bank) has provided the impetus for PPP.

In Uganda, the wave is striking a complex policy space, conceptualised as a dynamical system – and shown to be non-ergodic. However, the review of literature shows that scholarship has not drilled down to the non-ergodic character of policy spaces of PPP. Therein resides a unique dimension of this thesis.

⁸⁰ However, some scholars will argue that the PPP wave was triggered by self-interest in the state-capital relationship. See Sec 3.3.6. Looked at deeper, this is a debate about the role of structure and the strength of agency. This thesis subscribes to the Northian institution. It recognises the institution as structure, and its control over human action.

Looking ahead, this chapter instructs that PPP must be a construction entailing public equity. The structure must be defined by joint risk management of complexity. Consequently, the function will be a duality of service and returns.⁸¹

⁸¹ These CSF strands are axioms arising from the conceptual framework of Sec 1.3 seen through the origin and diffusion of PPP discussed in this chapter, and the parsing of literature against the conceptual framework. See Amonya (2016) for a generalised outlook of the CSF framework.

Chapter 4.0 The Policy Space of Uganda

4.1 Motivation of the Section

This section provides empirical data on the policy space of the country. Chapter 2 reviewed the science of policy space in general. It offered a buttress for the conceptualisation of policy space as a nonlinear dynamical system (Chapter 1). Chapter 3 looks at the science of PPP against a background of mechanistic policy space. This chapter sets out the empirics of the policy space of Uganda pivoting on the two nodes of CMC and SAP. It starts with a trace of the state of Uganda – as a structure anchored in the constitution.⁸²

4.2 The Moulding of the State of Uganda

4.2.1 *Analytical Framework*

The state as structure resides in the constitution. This thesis addresses policy space defined on three coordinates – the state, market and society. Therefore, examining the moulding of the Ugandan state is in essence a trace of its constitutional path.

Leading scholars on constitutional structure (e.g. Looby 1997) view the state constitution as a superstructure founded on the constitution of nature and the constitution of society (i.e. the institution). The constitution of nature uses the ecological perspective of animals competing for natural resources with the human being holding the responsibility of management. The order of nature should offer humanity a framework to organise its society, and ultimately devise an instructive structure for the interactions of the state (i.e. how government as agent of the state interacts with the individual, society, and the market – whatever its stage of development). See Figure 21.

⁸² At this point, the critic might say (*prima facie*), there has hardly been any constitutional rule. Indeed strains on constitution rule are captured in the chapter. These strains are realisations of the nonlinear and non-ergodic space.

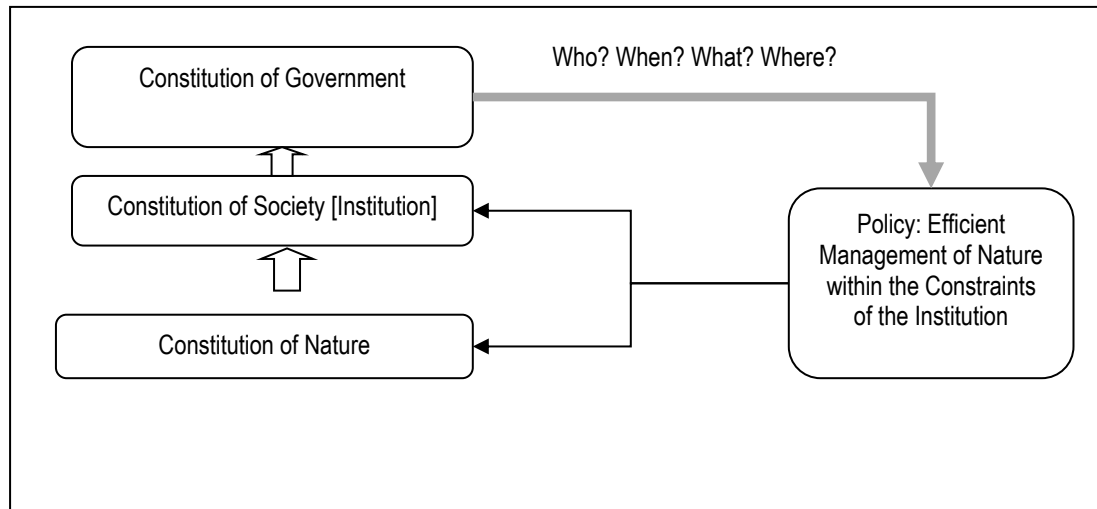


Figure 21: The Constitution as a Layered Structure

How does the layered construction of the state constitution⁸³ aid this thesis in developing a framework for analysing constitution landscape, and its relationship with policy-making? The construction allows the state constitution to be reduced to actors and platforms that seek efficient management of natural resources but constrained by the orders of society. The challenge at this stage then is to identify the key actors and platforms of the past constitutions of Uganda, and the powers and authorities that the constitutions apportion.

4.2.2 Evolution of Law

This is a note of comfort. This thesis views policy space as a dynamical system. This chapter concerns the policy space of Uganda. The central structure of that space is the state. The state is founded in the constitution – the foundational law. This section explicates the concept of law. Primarily, this section is not a pursuit of history. It is a search for structure. The search brings meaning to the concept of state, and consequently the argument of the thesis .

This section is a search for structure. It is not a narrative of history, which would be too long for this thesis. The thesis needs these foundational structures to examine the policy space of Uganda. Recall, policy is a cross product of politics and

⁸³ As a structure resting on the orders of nature and society
Excitation of a Dynamical System

science,⁸⁴ and the state is the operational structure of politics. Therefore, the terminology 'science' interweaves in the discussion of this section, and indeed the thesis.

Why should an enquiry on the constitutional landscape of Uganda consider the evolution of law in the West? The entire trail of the Ugandan constitution is a scion of Western law. It starts with a slight modification of the Westminster model in the Independence Constitution. Along the trail, republicanism took hold. Therefore, that trail is not a creation in a vacuum, and so warrants a dredging of the foundations.

Moreover, constitutional rule in Uganda is nascent. As a self-governed country, it is only 50 years old. That is tender compared to, for instance, the British constitution [exists albeit not written] if traced to the Magna Carta (1215) or even the American constitution (1787).

A mapping of key actors and issues that underpin Anglo-Saxon law is laid out in Figure 22. It starts with Aristotle. Does nature instruct on the conduct of humanity? To Aristotle, the controls or law of nature (physics) instruct on the customs of humanity (nomos). Therefore, the positive law of society should continually appeal to the law of nature for context, and certainly, when positive law is silent on specific issues. The popular lines of Aristotle's Rhetoric sum up this argument:

...there really is, as everyone to some extent divines, a natural justice and injustice that is binding on all men, even on those who have no association or covenant with each other. (1.13.1373b4-9)

⁸⁴ The Northian sense of this terminology cannot be overemphasised, and the definition of policy is an axiomatic statement tracing back to Francis Bacon (see 1885 and 1915 editions). The exacting use of otherwise common terminologies including state, policy and case study is a departure from implicit meanings given to the terminologies in the various common use. In other words, the thesis does not simply use these important albeit common terminologies as shell terms – the thesis is exacting in their use, and enquiry at this level deserves such specificity.

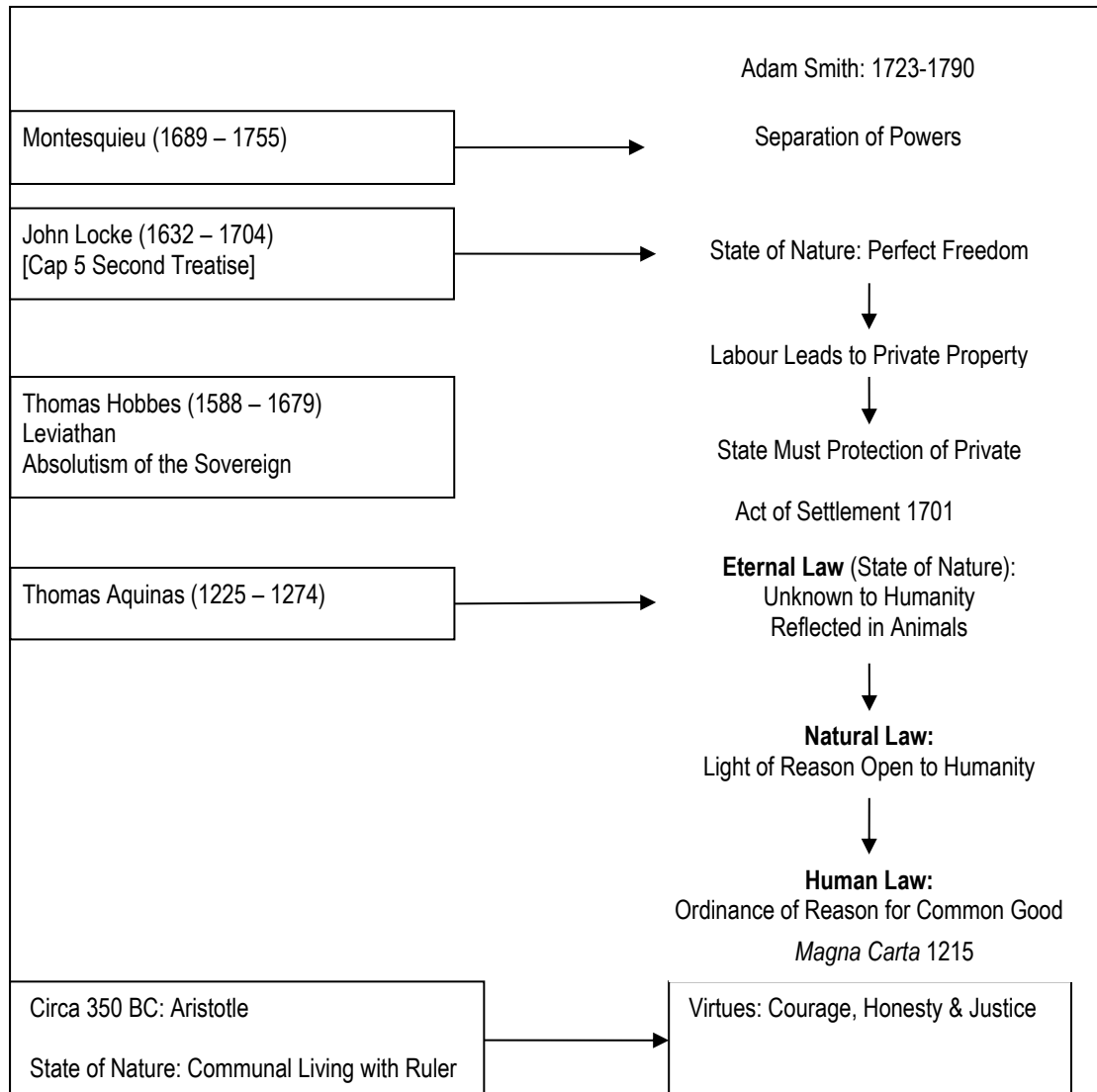


Figure 22: Evolution of English Law

Over 1000 years later, Thomas Aquinas enquired on Aristotle as he pondered the *state of nature*, reason and faith. He concluded that law resided in reason. What is the source of this reason? To Aquinas (*Summa Theologiae* I- Ia 22, 1-2), reason emanates from the ruler as well as the ruled. However, both the ruler and the ruled belong to the Creator, and therein is the ultimate reason. That reason guides eternal law, and is unknown to humanity. However, eternal law is evident in the conduct of nature. Therein resides natural law. Ordinances of reason for the common good of people (human law) should not conflict with natural law.

Natural law would remain a challenge for many centuries to come. Aquinas has been invoked for virtual and vice. The latter includes the defence of slavery on claims that the practice conformed to natural law (Chalk 1951: 332). By sixteenth century, however, liberal interpretation was gaining strength. Notably, Aquinas was instructive in the work of John Locke, a contemporary reference to legal practice in Anglo-Saxon jurisdictions, particularly the United States.

The pivot of Locke's thinking on natural law is the Second Treatise (Locke 2002). Locke espoused 'perfect freedom' and equality of species. On that foundation, labour emancipation rests. Labour adds value and creates private property. Moreover, the protection of private property is the primary responsibility of the state, unfolds the argument. A century after Locke, the laissez faire school would sprout championed by Adam Smith. However, before Smith, Montesquieu, the French Enlightenment philosopher, interjected with Separation of Powers. For deeper insight, see Vile (2012) and Persson et al. (1997).

Noting the American Revolution (1763-1776) and French Revolution (1789–1799), it can be argued that the positivism of law (credited to Montesquieu, 1689 – 1755), as well as its resilience⁸⁵ developed dialectically. Moreover, this was the peak of Enlightenment. Therefore, the institution of science in the West⁸⁶ threaded in the magma of constitution-making – and that was not the case in post-colonial Africa (and particularly Uganda).

Further, constitutional debate in the West is not dead. The volcano could still be active. The intentions of the framers of the US Constitution, for instance, feed contemporary debate. In this debate, the thinking of Locke is frequently invoked (for examples, see Reck 1989 and Dworkin 1961)

However, as this debate rages, the adjudicating role of science in the political process seems assured.⁸⁷ If summoned in the electoral process, science sets in as the guide to policy formulation. It lays out the metrics for policy efficacy. For such a

⁸⁵ Cf. natural law resting on Locke, 1632 – 1704

⁸⁶ Beyond the Anglo-Saxon jurisdictions

⁸⁷ Premising on the force of democracy

scenario to be realised, science must be imbued in society. It must be part of the institution. Otherwise, it will not appeal to politics.⁸⁸

If science is part of the fabric of society, positive law becomes an actuating instrument (using science as a tool of progress). In that interaction, natural law plays a stabilising role. For that to happen, law too must be part of the fabric of society. This argument draws sympathy from Green (1996), who posits:

Law is a social construction. It is a historically contingent feature of certain societies, one whose emergence is signalled by the rise of a systematic form of social control and elite domination. In one way it supersedes custom, in another it rests on it, for law is a system of primary social rules that direct and appraise behaviour, together with secondary social rules that identify, change, and enforce the primary rules. (1687)

The discussion foregoing argues for, and premises on, natural law as a given in society. However, that can only hold if a society is allowed to evolve. What happens when the evolution of a society is truncated as was the case with the colonisation of Africa? Does such society adapt and grow like a grafted tree branch? How can success [of grafting] be adduced?

The questions above dissect the policy space of Uganda. They help expose the character of the state, the institutions and society, and mechanics of the market.⁸⁹ Let us move to the empirics, and focus on the constitutional landscape of Uganda.

4.2.3 The Constitutional Landscape of Uganda

The trail of constitutions of Uganda is shown in Figure 23. The trace starts with the Independence Constitution of 1962. This constitution was abrogated in 1966, and replaced by the 1967 Constitution. Following a military coup by Idi Amin in 1971, constitutional rule was abolished. When Amin was overthrown by the Uganda

⁸⁸ In the case of this thesis, the excitation of focus (PPP) is too nascent and the decision platform is yet too removed from the people. PPP is nascent even amongst policy actors, Sec 5.5). However, this is a transient situation. Long-term, PPP policy (as science) will be a factor in elective politics – a counterargument would have to deny the force of education in the country.

⁸⁹ These effects become vivid in the layout of empirical material on PPP projects in Chapter 5. Moreover, the reality of imperialism is discomfiting (and potentially disconcerting, even on platforms of scholarship). However, we cannot understand the contemporary after escaping from that reality – and why should we seek to escape from it anyway?

National Liberation Front (UNLF) in 1979 – assisted by Tanzania – the pre-election interlude was guided by the Moshi Accord. However, the 1967 Constitution formed the basis of the 1980 election and remained in place until 1995 when the current constitution was enacted.

That was an introduction. The begging question is, how did the process and product of constitution-making interact with the societal and natural orders? The answer to this question will set the stage for examining policy-making in Uganda post-independence. The following sections examine these interactions, identifying the main influences.

4.2.4 The Independence Constitution

The Independence Constitution was not unitary. Neither was it federal. It was a fragile collage of authority, deriving from unitary and federal structures (sketched in Figure 24). Moreover, this constitution was built on the imperial legislative council. It was not a blend of structures of the local societies. Uzoigwe (1983) narrates the lead to the 1962 Constitution as follows:

...But the actual parliamentary institutions and procedures that emerged at Uganda's independence in 1962 had been developed, not from the legislative practices of Buganda's Lukiiko or from Bunyoro's Rukurato, for example, but from the limited British mechanisms of the Legislative Council,' an essentially colonial body that was hardly an object lesson in democracy. (253)

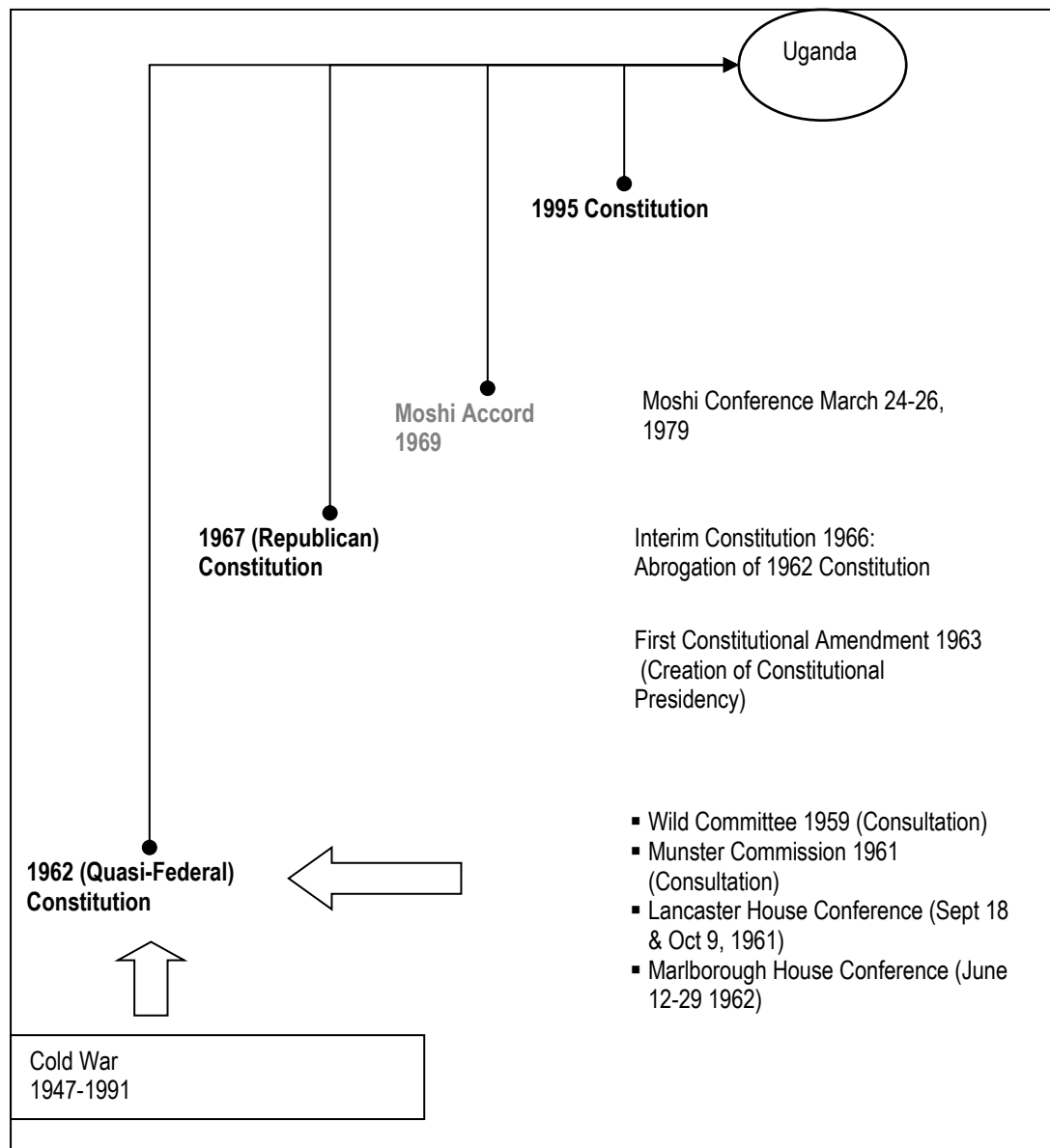


Figure 23: A Trail of the Constitutions of Uganda

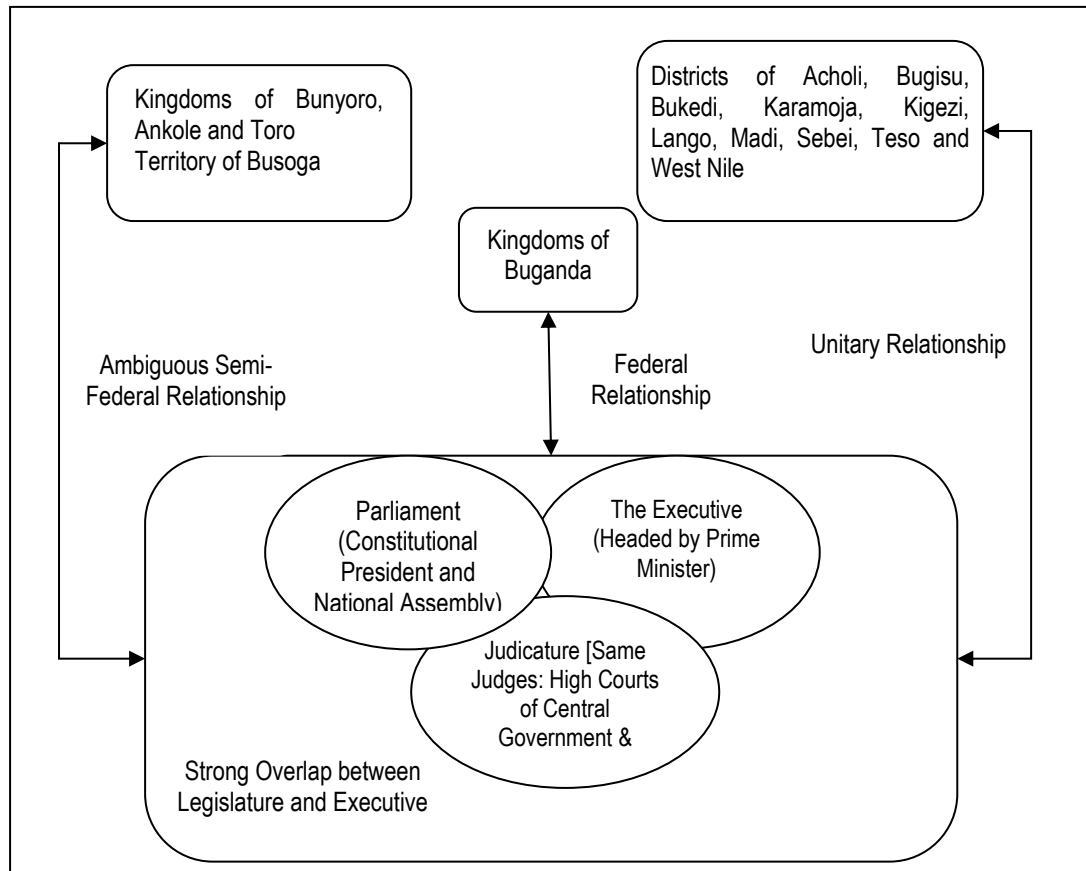


Figure 24: Mapping the Independence Constitution

After the events surrounding the 1953 Namirembe Conference, it was inevitable Uganda was headed for independence. Did Cohen (Governor, 1952-7) have the time to develop a truly native constitutional structure – considering the amalgamation of institutions (and societies) that characterised Uganda? It could be argued the imperial character of the 1962 constitution, which character persists to date,⁹⁰ was inevitable. The exception and most significant departure of the new constitution from the British constitution is its codification, which removed parliamentary supremacy of the latter placing it on the written constitution.

A series of consultations (with the nascent parties and tribes) were held in London (Figure 23) resulting in the fragile constitution of 1962. The Kingdom of Buganda managed to negotiate a federal relationship with the central government, and in

⁹⁰ See the present constitution (1995). Notwithstanding its republican stance, the details reflect the institution of Westminster, and appropriately, it opens: 'RECALLING our history which has been characterised by political and constitutional instability'. We must not look at policy space as a Markovian construct. Institutions are resilient, and in Uganda, the Westminster institution persists.

effect realising a *primus inter pares* with the rest. It used its vantage position that existed at the start of imperial rule, and which was only enhanced over the sixty years of imperial control.

Unlike Buganda, the relationship between the central government and the other three kingdoms (Toro, Ankole and Bunyoro) – as well the Territory of Busoga – was fuzzy. It lacked the distinction of federalism, and the four were less autonomous. For example, whereas Buganda Lukiiko elected (in effect) delegates to the National Assembly [Cap 5 Part], the four (like the rest of the country) would elect their members directly through adult suffrage. Moreover, Buganda enjoyed a special relationship on financial matters. It was also entitled to fifty percent of revenue collected in its jurisdiction [Cap 10 and Sch. 9], and yet the central government was still responsible for funding social service within the kingdom. See Morris (1966: 112) for an anecdotal rendering.

It cannot be stated too strongly that the tensions (and hence fragility) of this constitution would affect policy-making in Uganda in the years to come, and remain a major influence on policy space today. That will be explored in the next section. First, it is vital to refresh on the history of this fragile constitution.

Uganda as a territorial construct started with the 1900 Agreement (the first constitution) and ended in the 1930s. This process was an amalgamation of institutional entities. The norms, values and practices of the north and east were mainly defined by kinship. Most of the south held together in monarchical rule. Superimposed on these multiple institutions was a state and market that considered indigenous Ugandans a class below the Asian traders and the British imperialists.⁹¹ As the world of knowledge opened up to the indigenous people, they started questioning their marginal position in this assembly. This propelled the struggle for independence, and the forces of nationalism offered a fragile bind to the diverse native institutions. The fragility of nationalism surrounding independence is captured by Cooper (1994: 1516).

⁹¹ This class mapping is still evident in the road network of Kampala. A colonial era ring-road connects Kampala Road, Lugogo, Mulago, Wandegaya, Bombo Road and back to Kampala Road. The inside of the ring-road is a reflection of Britain. The road names are British. Asian properties are dotted along the ring-road. The outskirts of the ring-road are characterised by slums capturing the African past. The agency inside the ring-road (Kololo and Nakasero) have changed but the institution of the colonial era persists.

Turning to constitution-making, it was one orchestrated in London. It was a product of the Munster Commission of 1961 and the Lancaster House Conference (Sept 18 and Oct 9, 1961). Authors like Kanyeihamba (1973) argue that the constitution was used as an instrument for the British to secure their residual interest in Uganda by anchoring the divide and rule strategy. This school holds that nationalism could have received stronger support in the constitution. Instead, Buganda was set up to antagonise with the state in the years ahead. This, they argue, created a weak state that ensured continued reliance on imperial devices.

While these arguments faulting the imperialists may be valid, they seem to pay little attention to the time window available to the British to defuse institutional tension, or indeed install structures that would do so. Following the Second World War, self-government was inevitable. Agitation for independence was rife. On the other hand, the constructs of the past sixty years were well embedded in the young mosaic called Uganda. These constructs set Buganda apart creating tensions with other institutional sets, for example, Bunyoro and the Lost Counties of Buyaga and Bungagazi that Buganda had acquired with the assistance of the British (see Map 1). Could these past constructs be reordered in less than a decade? Was it easy to delay independence, especially after the Namirembe Conference of 1953?

It is difficult to see a more prudent constitutional path for Uganda at independence than the adopted. It is apparent the institutional structures of independence could not have been remoulded in time for self-rule, and it should not have been delayed because it is a right of society. Given the inertia of institutions, the country had to rely on the mechanics of personalities.⁹² Unfortunately, the events of the decade following independence harmed humanity (cf. Amin regime) – and set back the stimulation of knowledge that accompanied the nationalism leading to independence.

⁹² Agency is unpredictable if not controlled by structure (institution and state). The nationalism at independence was perhaps the only institutional strand that could ensure the development of the Ugandan state. That strand of institution was subjugated by agency as Amin shredded the 1967 constitution (below).



Map 1: The Kingdoms of Uganda
Source: The Economist (28 July 2008)

4.2.5 The 1967 Constitution

The first challenge in the 1962 Constitution was the position of head of state. Independent Uganda demanded the position be occupied by a native not the Queen. Who would be head of state? Buganda considered the *Kabaka* supreme and would not tolerate anyone else taking dominion. The other kingdoms would not accept the *Kabaka* as ruler neither would they tolerate a commoner. The ten republican districts argued for a nationalist.

There was a fickle compromise. The position had to be occupied by a ruler. Consequently, constitutional rulers were created in the districts. This ensured any part of the country could produce the head of state. Subsequently, the *Kabaka* became constitutional president and *Kyabazinga* [of Busoga] the vice president. That was the first amendment of the constitution. Would this move resolve federal-nationalist tensions? Any such thought would have been naive. These tensions were institutional, and they would resurface in what is commonly known as the Buganda Crisis of 1966.

Pursuant to Article 3 of the 1962 Constitution, a referendum was held so the people of Buyaga and Bugangazi (the Lost Counties) would determine their allegiance. This referendum had been determined by the Secretary for State for Colonies at the Marlborough House Conference (Art. 66) after the two kingdoms failed to reach an agreement. The people voted to be part of Bunyoro. That would spark off the 1966 Crisis.

The President was required to sign the statutory instrument. *Kabaka* Mutesa would not. He would not 'transfer the administration of his subjects to another country' as Kanyeihamba (1973: 70) puts it. The constitution provided for the Prime Minister to sign the instrument in such situation. Obote did.

Two years of heightened intrigue followed. In February 1966, Obote suspended the constitution and Mutesa from the office of president. On April 15, a new constitution was promulgated. This constitution has been called the Revolution Constitution or Pigeon-Hole Constitution depending on the leaning of the author. The abrogation was a stealth operation (Box 2) whose consequences should become clearer with time. It is perhaps too early (only about 50 years) to avoid a dispassionate analysis of the events leading to the abrogation.

Box 2: The Making and Abrogation of the 1962 Constitution

Uganda's rugged constitutional path

New Vision, Aug 9, 2012

But it was not until 1962 when Sir Andrew Cohen, on his appointment as Governor of Uganda, that demand for an national constitution gathered momentum, as a wave of independence swept through Africa and Uganda. "By independence, Uganda had a democratic system. What we needed was a national constitutional order," says Mulira [a Kampala based lawyer and writer]. Abrogation of the 1962 Constitution. The UPC-KY alliance lasted only four years. By 1966, irreconcilable differences had developed between Obote and Mutesa I leading to the abrogation of the 1962 Constitution. After the storming of the Lubiri palace by government forces, the 1962 Constitution was replaced by the infamous 1966 "Pigeonhole" Constitution. The then Attorney General, the late Godfrey Binaisa is credited with crafting the 1966 Constitution largely labelled anti-Buganda...The constitution was adopted in a tense political environment and without debate, abolishing monarchies. In fact, at the launch of his book, Constitutionalism and the Political History of Uganda, in 2002, retired Justice George Kanyeihamba criticised Binaisa for superintending the abrogation of the 1962 Constitution...In his defence, Binaisa admitted participating in the abrogation to avoid a lurking 'bloodbath'. "Faced with the 1966 events, I had to keep the citizens and foreigners from harm," The New Vision quoted him as saying. "I offered a solution. I told Dr. Obote that it was the only thing to do to save the country from a military take over...I kicked out all the Ugandans from the office and let the Europeans handle it so as not to leak it. That constitution saved this country. Author: Joel Ogwang

URL: <http://www.newvision.co.ug/mobile/Detail.aspx?NewsID=634890&CatID=417> (Accessed Nov 21, 2012)

The 1966 constitution was an interim provision. It awaited a new one to be written by a constituent assembly. In September 1967, the new constitution was enacted (the Republican Constitution). It abolished kingdoms and provided a five-year life for the new president (Obote), and the National Assembly. Kanyeihamba (1973) and Mutibwa (1992) discuss the lead to the 1967 Constitution in detail.

Whatever a person's leaning on the subject of federalism, Article 118 of the 1967 Constitution is perhaps the most important in the history of the country. It reads:

The institution of King or Ruler of a Kingdom or Constitutional Head of a District, by whatever name called, existing immediately before the commencement of this Constitution under the law then in force, is hereby abolished. (Art.118)

The core actors and platforms of the 1967 Constitution are captured in Figure 25. In place of the kingdoms are districts. The president assumes the role of Head of Government as well as Head of State. Moreover, the president appointed the district councillors. This concentration of power in the presidency has been widely criticised. For example, see Wapakhabulo (2001: 119).

On the surface, the concentration of power in the new constitution cannot be denied. However, digging deeper, was devolution a feasible alternative given the immediate past (the monarchical entrenchments that the Republican Constitution was attempting to remove)? It was not. There was a danger of the entire republican drive being undermined. Therefore, while the wisdom of the republican move may be open to debate, the concentration of power in the presidency was perhaps inevitable.

The preceding narrative illustrates the controlling power of the institution (norms, values and practices). The mechanics of law attempted a rapid change. That change was resisted by the institution.

The legislature at the time was multi-party. Parliament comprised the Uganda People's Congress (UPC) and the Democratic Party (DP). The parties nominated candidates to the Assembly in 82 constituencies and the presidency. A strange aspect of this constitution is a provision for special unelected members of Parliament. This special group was meant to provide a working majority for the winning party.

Further, DP became increasingly weak as its members crossed to the other bench (UPC). That rendered Uganda a de facto one-party state. Following an assassination attempt on the president in 1969, DP was banned. Kanyeihamba (1973) puts it this way:

It may be necessary at this stage to consider the role political parties have played since the crisis of 1966. The Democratic Party had already ceased to be a serious challenger to the Uganda People's Congress. (241)

The struggle between the federalist and nationalists was brought to a temporary stop in January 1971. Amin staged a coup d'état. The legislature was suspended. The drama surrounding the coup d'état and its impact on the machinery of the state is captured in Box 3. The functions of the legislature, and hence the authority of the people, was usurped and placed in an individual machinery operating from the leading hotel. For eight years, Uganda was a pariah state, but nonetheless

one. The country largely held as a single unit under coercion. Uzoigwe (1983) summarises the survival of the state during military rule as follows:

Obote, in short, was a casualty of deep-rooted historical forces against which his many devices proved to be of no avail in the long run. However, the Uganda that he forcibly created continued to survive after Amin's coup in 1971, even if battered and in great turmoil.
(266)

Box 3: The Rise of Amin - A Narration of the Clerk of Parliament

Golden Jubilee Uganda: Ochwo has Sworn in Six Presidents

New Vision, Oct 16, 2012

During the 21 years that Ochwo spent in the office of clerk to Parliament, he organised the swearing-in of six heads of state, from Idi Amin to President Yoweri Museveni.

In 1962, Ochwo was one of several Ugandan officers recruited to take over positions of administration from the British who were opening up space for the natives.

...His first challenge was when Idi Amin took over government in a coup. On that day, Amin had not shown up at the airport to see off the President who had travelled to Singapore to attend a Commonwealth conference. Instead, Amin showed up after the president's departure, in a convoy of heavily armed military personnel.

He asked the ministers to get back into the VIP lounge while he sat on the President's chair. The president-to-be then started narrating the story of his life to the ministers, but did not tell them he was taking over.

URL: <http://www.newvision.co.ug/news/636451-ochwo-has-sworn-in-six-presidents.html> (Accessed Nov 18, 2012)

What was the mechanics of the state in the eight years of military rule? Most scholarly works present this period in Uganda's history as a hiatus (for example, Dinwiddy 1981: 501). To these authors, whatever the weaknesses of the post-independence unitary drive, the country had a clear line of progress. The coup d'état halted that progress with nothing clear to offer other than the dictates of decrees.

The military regime changed the structure of the state. It did not obliterate it. The country held together under rule-by-decree. In effect, the executive usurped the authority of the legislature and judiciary, and fundamentally, the people.

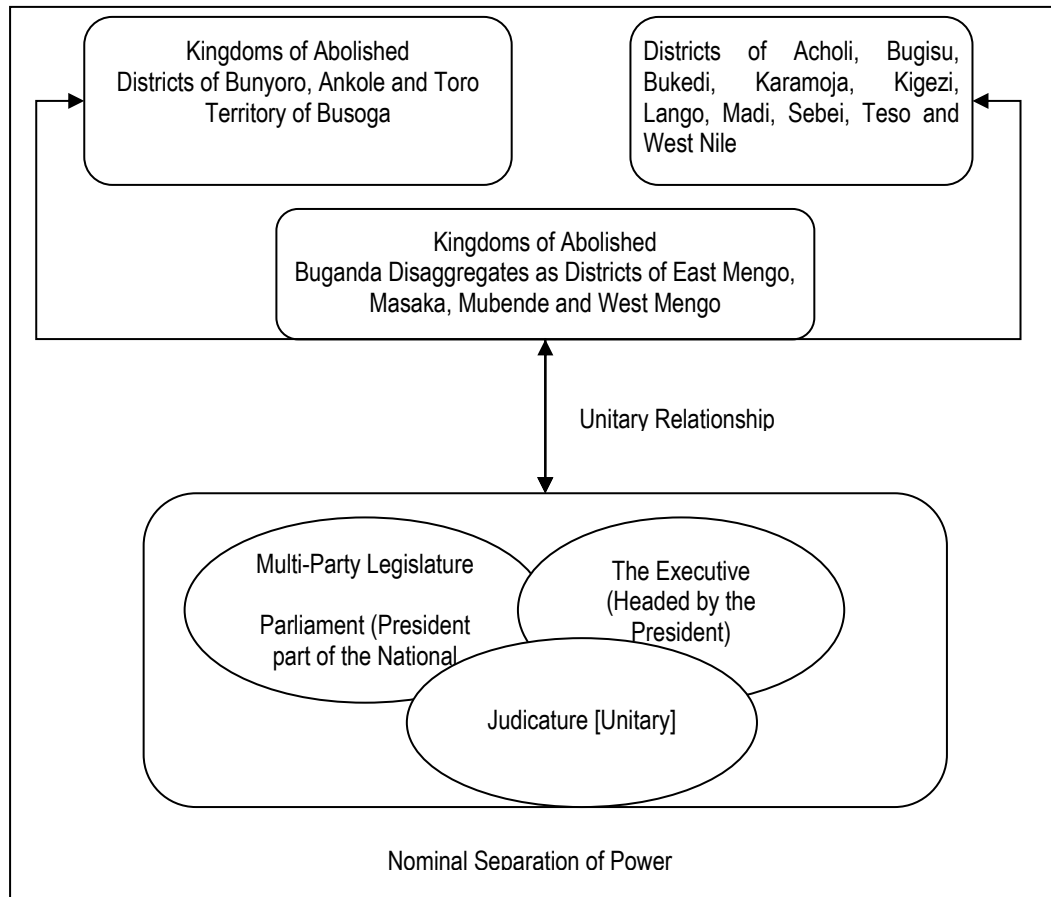


Figure 25: Mapping the 1967 Constitution

4.2.6 The 1995 Constitution

4.2.6.1 Historical Background

While Amin ruled by decree, Ugandan exiles were planning his ouster. However, for eight years, they could not coalesce into a force strong enough to remove Amin. The cleavages that had caused the overthrow of the civilian government in 1971 would not be healed by the challenges of life in exile. Back in Uganda, even Amin's instruments of coercion could not cement the ethnic divides, which on deeper consideration, attests to the resilience of the Northian institution (see Gerzel 1980).

Finally, in March 1979 the exiles managed to gather in Moshi to forge a way back to the country and lay out the reconstruction map. These two days would prove pivotal to the future of Uganda.

Two weeks after the Moshi conference, the former exiles had the mantle of leadership of Uganda.⁹³ The constitution had been suspended by Amin. Where would the group start? This dilemma is captured in Box 3. Lule was hastily sworn president only to be replaced by Binaisa in 68 days. The new president was one only in name. Authority lay with the military. Binaisi was removed in May 1980, and replaced by a military commission under Muwanga who organised national elections in December 1980.

What was the constitutional basis for the 20 months post-Amin? This interlude was instructed by ad hoc amendments [selective application] of the 1967 Constitution using Moshi Accord. Richard Posnett (1980) who re-established the British High Commission post-Amin makes the following remarks on the constitutional challenges of this interlude:

The crisis leading to the resignation or dismissal of President Lule in June quickly showed up the need for a formal constitution to define the powers of the various organs of state, and work on this is proceeding. Meanwhile, they are working on the basis of the 1967 Constitution with suitable amendments, notably in the area of presidential power. (152)

Moreover, the institutional tensions that led to the collapse of the Obote regime may have eased immediately after the coup, but only temporarily.⁹⁴ Buganda generally welcomed the coup. That brought some calm to the agitations of monarchism. Moreover, with the emergent authoritarianism of the Amin regime, a new focal point arose (akin to the nationalism of the pre-independence era). On the downfall of Amin, these tensions resurfaced. Gertzel (1980) details the post-Amin tensions.

In December 1980, the first post-independence general election was held under the 1967 Constitution, and amidst the renewed institutional tensions. The party that would win (UPC) pledged to *preserve the Republican Constitution of Uganda* (Box

⁹³ Do not miss the speed of events. One of the architects of the Moshi Conference, Henry Makmot, in an interview of 24 May 2013 in Kampala pondered this speed of action. The Moshi group did not consider well the policy space of Uganda and the excitation of global effects. They were not prepared for the non-ergodic space. They were not prepared for power.

⁹⁴ This is a case of an unstable critical point in a dynamical system. Had the group (the commission) been more united, they would have had a better chance of bringing institutional effects in the country under control. More formally, they would have reduced the institution to a holonomic constraint.

4, Point 2). However, perhaps more illuminating is Point 1 of the Creed and Call: *To build the Republic of Uganda as one country with one people, one parliament and one Government.*

Box 4: UPC Party Manifesto 1980, Section 1.2

UPC CREED AND CALL

As UPC goes to the polls, it is important to restate the party's political and economic philosophy. The UPC is an indigenous political party. It is a truly nationalistic Party, neither inspired by, nor biased towards any external political movement, ideology, power blocs, or sect. The UPC philosophy is moulded by the Party's struggle and the history of our country. UPC believes that political and economic power must be vested in the majority of our people. The Party was founded to serve the masses and its policies have always been motivated by consideration of the wishes of all the people of Uganda. All this is in consonance with the principles of democracy in an enlightened, free and open society.

Consequently, UPC is committed:

- (i) To build the Republic of Uganda as one country with one people, one parliament and one Government.*
- (ii) To defend the independence and sovereignty of Uganda, maintain peace and tranquillity, and preserve the Republican Constitution of Uganda.*
- (iii) To involve the people in determining the destiny of our country.*
- (iv) To fight relentlessly against poverty, ignorance, disease, colonialism, neo-colonialism, imperialism and apartheid.*
- (v) To so plan Uganda economic development as to increase production and effectively raise the standard of living in the country.*
- (vi) To ensure that no citizen of Uganda will be accorded any special privilege, status or title by virtue of birth, descent or heredity.*
- (vii) To ensure that in the enjoyment of individual rights and freedom, no person shall be allowed to prejudice those of others and the interests of the State.*
- (viii) To support organisations, national or international, whose aims, objectives, and aspirations are consistent with those of the Party.*
- (ix) To do such other things that are necessary for the achievement of the aims, objectives and aspirations of the Party.*

It is in furtherance of these principles and in the context of our history that UPC call on all Ugandans to protect and preserve the integrity of our beloved country and never again permit it to be enslaved and enfeebled by a fascist tyranny.

Author: Uganda People's Congress

URL: http://www.upcparty.net/manifesto/manifesto_1980.htm (Accessed Nov 22, 2012)

The UPC had succumbed in fatigue to the strains of the republican project in 1971. However, as the manifesto shows, leading to the 1980 elections the nationalist strand of the UPC institution was still alive. The first two points of the Creed and Call attest to that motivation. More fundamentally, the emphasis on republicanism and oneness reflect the persistence of the federal - unitary (and monarchy - republic) fractures in Uganda.

A group disputed the election results and launched guerrilla war. That group was led by Yoweri Museveni. However, the Museveni group would not overthrow the UPC regime. The regime fell to internal dissent. There was another military coup in July 1985 led by Tito Okello. Mapolu (1980) offers a detailed analysis of the events.

The ease of the overthrow affirms doubts on the structural integrity of the state. The UPC government emerged from a reconstructed structure by a group that had assumed power two weeks after their assembly. In 20 months (April 1979 – Dec 1980), a new agency of the state (UPC government) was installed. This new agency had fallen to structural weaknesses ten years earlier (1971), and eight of the following years were a period of military coercion. The existing structure of the state had been destroyed, replacing a nascent democracy with an extreme autocracy. Was it realistic that democracy could be reinstated in Uganda in December 1980?

Historians, sociologists, political scientists and even economists will pore over that question for many decades to come. This research merely exposes the constitutional landscape that provided a platform of policy in the country.

4.2.6.2 The Movement and Making of the 1995 Constitution

The NRM came to power in January 1986, deposing the Okello regime. It established the National Resistance Council (NRC) as the legislative organ, selectively using the Republican (1967) Constitution. Museveni was speaker and president.⁹⁵ The Council originally comprised 38 members. The number gradually increased as the NRM pulled in party stalwarts of the old parties. This was the opening strategy at managing the ethnic fractures. Museveni (1997) exposes this history, and Kassimir (1999) makes a deep dissection of the events.

The intellectual pivot of the NRM was the Ten-Point Programme (Box 5). Of most constitutional significance is Point 3. How was the NRM going to counter the tensile forces of ethnicity using the constitution?

⁹⁵ Note this new critical point in the dynamical system.

The substantiation of Point 3 remains silent on this challenge. The most salient address of this point reads:

We rigorously fight tribalism and religious sectarianism and have always aimed at uniting as many people as possible, around the principled programmes, in order to isolate the enemy to the maximum. Anybody that impedes the unity of the people of Uganda is an enemy of the people in more than one way. [NRM Ten Point Programme 1986, Extract of Point 3]

Box 5: The Ten-Point Programme of the NRM

The National Resistance Council of the National Resistance Movement together with the High Command and Senior Officers of the National Resistance Army (NRA) under the chairmanship of President Yoweri Museveni have worked out proposals for a political programme that could form a basis for a nationwide coalition of political and social forces that could usher in a new and better future for the long-suffering people of Uganda. This proposal is now popularly known as the Ten-Point Programme.

Background

1. Democracy
2. Security
3. Consolidation of National security and elimination of all forms of sectarianism
4. Defending and consolidating National Independence
5. Building an independent, integrated and self-sustaining national economy
6. Restoration and improvement of Social services and the rehabilitation of the war ravaged areas
7. Elimination of corruption and misuse of power
8. Redressing errors that have resulted in the dislocation of sections of the population and improvement of others
9. Co-operation with other African countries in defending human and democratic rights of our brothers in other parts of Africa
10. Following an economic strategy of mixed economy.

Author: National Resistance Movement

URL: <http://www.amazon.co.uk/Ten-point-programme-National-Resistance-Movement/dp/B0000EECKJ> (Accessed Nov 22, 2012)

The 'movement' was a strategy for bridging ethnic tensions since it embraced all parties. However, the leaders of the NRM will have been cautious of the short-lived marriage of UPC and KY. They were prominent actors in post-independence politics. Moreover, the NRM had built early relations with the deposed actors of the monarchy of Buganda (Mutibwa 1992). However, any progress had to be internalised in a constitution. That was crucial to the Movement realising the

ecumenical appeal that post-independence nationalist craved, and nearly attained, but could not sustain the momentum.

Museveni understood the challenge of monarchism – republicanism fracture (translating into federal - unionist divide). It would be his most significant challenge. Space was needed to attempt a resolution of the tension. Such space would allow the institutional tensions to fizzle out giving way to the forces of economics. The forces of economics would drive the country to the industrial era. In the words of Cullimore (1994):

He [Museveni] further maintains that multi-party democracy, though desirable in principle, is not well-suited to a pre-industrial society such as Uganda because there are no common, nation-wide interest groups. Accordingly, parties appeal to tribal or sectarian concerns to attract support, thereby accentuating ethnic and religious divisions in a country where they run deep. (707)

The Movement was a mild mechanistic way of creating this space (cf. similar effort by Said Barre in Somalia, Menkhaus 2000). The two countries have turned out differently. Moreover, Museveni's clamp seems milder (more subtle) than Barre's. This contrast is rich fodder for further enquiry, which should consider the texture of the institutional terrains.

So then, what was the path to a new constitution? On taking control of power, the NRM partially affirmed the authority of the 1967 Constitution. It upheld provisions for fundamental rights, citizenship and the provisions for technocracy (civil service and other public entities). However, it usurped the authority of legislation and core executive decisions. It announced a four-year interim period before relinquishing the authority of state agency to the people.

In November 1988, the NRC passed the Constitutional Commission Act. This Act formed the basis of the Uganda Constitutional Commission (Odoki 2005). The Commission was provided 'guidelines'. One was the need for a separation of power clause. That means from the outset, parliamentary supremacy (the Westminster model of government) was ruled out. That triggers this question: Can parliamentary supremacy exist in a true sense under a codified constitution? Who would be the protector? If parliament, that would diminish the authority of the

constitution. The constitution would be open to the whim of parliament. If placed on the prime minister, would that not make the person presidential? Moreover, how can parliamentary supremacy exist without the buttressing of the institution – a set of values, norms and practices drawing deep in history? These questions are parked for follow-on enquiry.

Colonialism bolted disparate societies to form a collage called Uganda. The blending of these institutions was still a challenge in the run-up to the new constitution. The institutional mosaic required time to blend and metamorphose. Would such a country have space for the Westminster model, or did it require the mechanical hold of presidency? The latter prevailed.

Back to the track of the constitutional process, after four years of consultation, the Commission submitted Draft Constitution in December 1992. A constituent assembly was elected in March 1994. After 16 months of debate, a new constitution was enacted in September 1995 and adopted on the eve of independence, 8 October 1995.

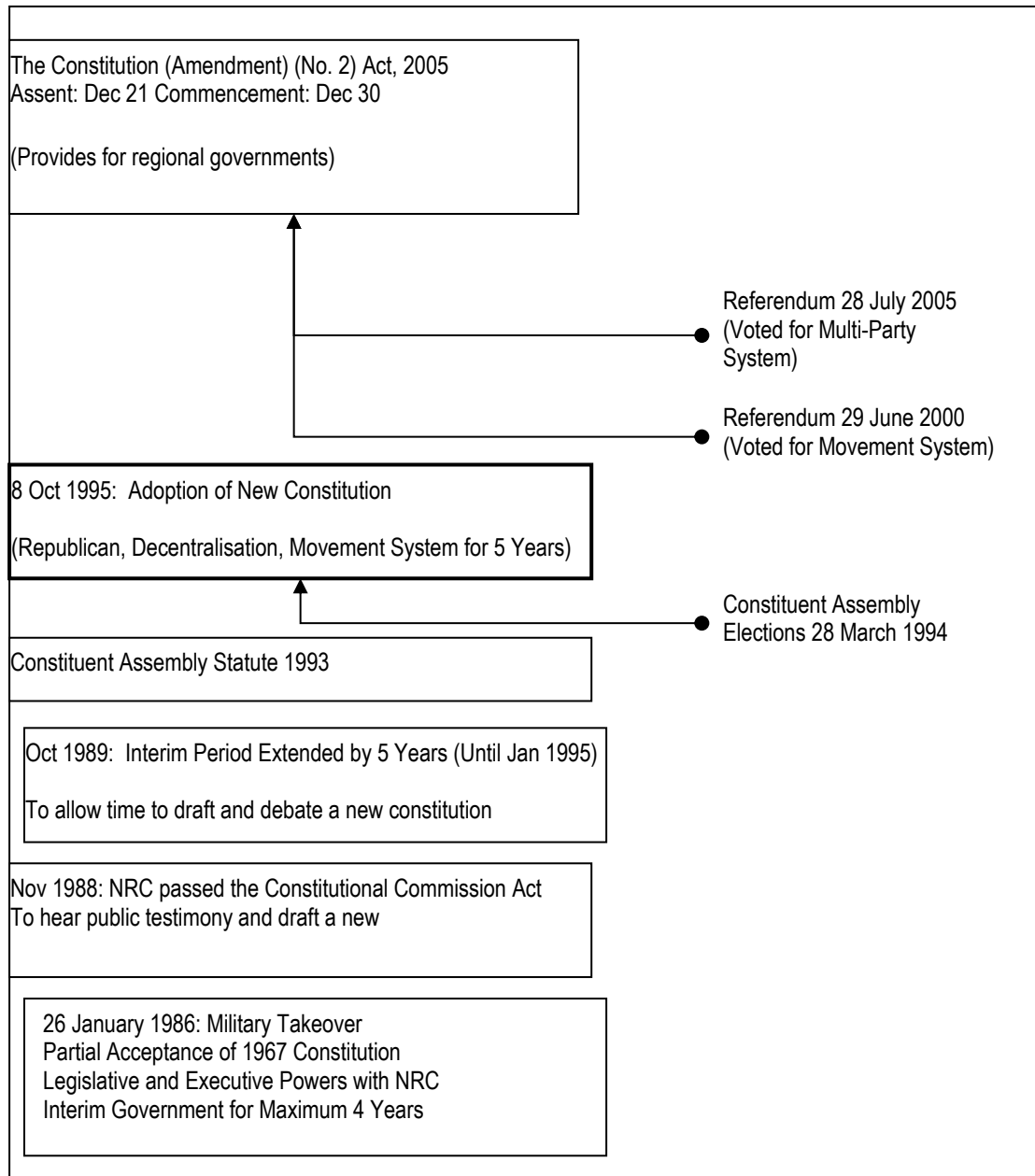


Figure 26: The Making of the 1995 Constitution

Notes:

NRC

National Resistance Council

The Constitution left open the issue of political system. It would be determined in a referendum in conformance with Article 74 of the Constitution (Box 6).

Box 6: Article 74 of the 1995 Constitution

Change of Political Systems by Referenda or Elections.

(1) A referendum shall be held for the purpose of changing the political system—

(a) if requested by a resolution supported by more than half of all members of Parliament;

(b) if requested by a resolution supported by the majority of the total membership of each of at least one half of all district councils; or

(c) if requested through a petition to the Electoral Commission by at least one-tenth of the registered voters from each of at least two-thirds of the constituencies for which representatives are required to be directly elected under article 78(1)(a) of this Constitution.

(2) The political system may also be changed by the elected representatives of the people in Parliament and district councils by resolution of Parliament supported by not less than two-thirds of all members of Parliament upon a petition to it supported by not less than two-thirds majority of the total membership of each of at least half of all district councils.

(3) The resolutions or petitions for the purposes of changing the political system shall be taken only in the fourth year of the term of any Parliament.

[Article 74 of the 1995 Constitution]

In June 2000, a referendum was held. The referendum was held in an environment of relative stability. The country (except the north) was experiencing peace and stability compared to the two decades following the coup by Amin. It voted for the Movement system. There was calm and the 'alternative to full blown multiparty democracy' (Bratton and Lambright, 2000: 429) seemed legitimised.

For the next five years, the two main independence parties (DP and UPC) would have skeletal operations, regulated by the legislation. They hardly mobilised at grass-roots level. Their existence was felt mainly amongst the elite in Kampala and the Diaspora.

In 2005, another referendum was held. It sought to adjudicate on the multiparty system. The multiparty system was chosen, a position supported by the then government. This referendum was followed by two constitutional amendments (Box 7). The September amendment, *inter alia*, removed limits on tenure of the president. Another amendment followed in December. Significant in the December amendment is a provision for the creation of regional governments. Districts could amalgamate on specific welfare goals and cultural causes.

Box 7: Long Titles to 2005 Amendments of the 1995 Constitution

The Constitution (Amendment) (No. 2) Act, 2005.

An Act to amend the Constitution to provide for Kampala as the capital city of Uganda; to provide for the districts of Uganda; to provide that subject to the existence of regional governments the system of local government in Uganda shall be based on a district as a unit; to provide for the creation of regional governments as the highest political authority in the region with political, legislative, executive, administrative and cultural functions in the region and to provide for the composition and functions of the regional governments; to provide for regional assemblies for each regional government; to provide for grants for districts not forming regional governments; to replace the Fifth Schedule to provide for details relating to regional governments; to amend article 189 to recognize the functions and services of regional governments and to provide for related matters. [Dec 2005]

4.2.6.3 Structure of the 1995 Constitution

The autonomy of Buganda was the principal concern in 1962, 1966/67 and indeed 1995. The Constitution provides for titular monarch. Article 246 provides for cultural leaders as follows:

Subject to the provisions of this Constitution, the institution of traditional leader or cultural leader may exist in any area of Uganda in accordance with the culture, customs and traditions or wishes and aspirations of the people to whom it applies. (Art. 246, Point 1)

Unlike the 1962 Constitution, this new constitution does not offer Buganda a special position. This stance would always be challenged, and remains challenged. However, Constitution Amendment (No. 2) Act 2005 allows districts to amalgamate and take responsibility for core social services as a unit. That can be considered an easing of the holds of the central government. However, this amendment has not been actuated (see Amonya and Okello 2014), and this unresponsiveness traces back to the confines of the cultural leader to matters apolitical. That restriction is contained in Point 3 (e & f) of Article 246:

(e) a person shall not, while remaining a traditional leader or cultural leader, join or participate in partisan politics;

(f) a traditional leader or cultural leader shall not have or exercise any administrative, legislative or executive powers of Government or local government. (Art. 246, Point 3)

In sum, compared to the 1967 Constitution, perhaps the most significant change in the 1995 Constitution is the emphasis on decentralisation. The 2005 amendment devolves responsibility for most public services to regions, should they be created. However, the centre retains most of the authority for revenue collection.

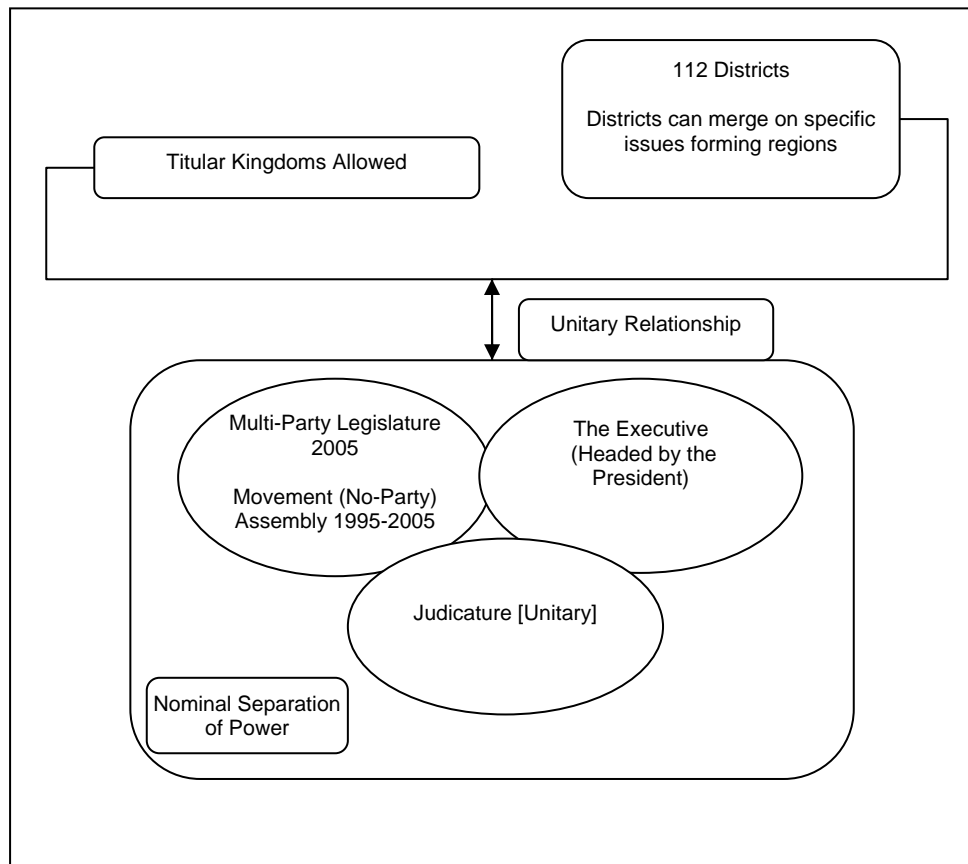


Figure 27: Mapping the 1995 Republican Constitution

4.2.7 *Summary*

This section has exposed the institutional tensions of Uganda, and the effect of the tensions on the state structure of the country. As the force of PPP hits Uganda, it encounters not a vacuum but a phase space comprising the interaction of the strands of the Northian institution with a new state structure (residing in the new constitution), a society that has evolved from the vortex of institution-driven effects, and an emerging market captured in the empirics of Chapter 5. In addition, the country continues to interact with the rest of the world, and this excitation is also captured in the project empirics of Chapter 5.

This is a complex space. From the conceptual framework (Sec 1.3), the space is nonlinear and non-ergodic. This frame allows a deep illumination of PPP in Uganda. That illumination is seen in the consideration of PPP projects in Chapter 5 followed by a synthesis of structural components of PPP – better suited to the complexity of the country than the existing PPP structure.⁹⁶

However, before the two chapter (5 and 6), the remainder of this section hinges on two policy nodes of the country (CMC and SAP) to make more vivid the nonlinear and non-ergodic dynamical space of policy.

Finally, a critic might question whether the mechanics of the past will affect the future. The answer lies in the resilience of the institution, premised in IRC, and the realities of the dimensions of the past policy space – the state, society, market and the excitation of the external world. These effects are facts of the past, and so will be of the future – and they are bound on the institution. The task of scholarship is to provide structures for better management of the ensuing nonlinearity and non-ergodicity. So does this thesis.

⁹⁶ It is crucial for the reader to remember that PPP is a composite and complex structure. It is not a monolithic structure of finance (cf. literature review in Sec 3.2).

4.3 Common Man's Charter

4.3.1 *Motivation of the Section*

This section addresses the first of the two nodes of the policy space of Uganda. The other is SAP, which is addressed in the next section. To put it explicitly, rigorous analysis of PPP in Uganda cannot avoid the institutional strands woven in the Common Man's Charter (CMC).

Moreover, this section and the next make vivid the role of archival material in policy analysis. As observed (and defended) in Section 1.5.4, archival material (whether textual and numerical) is the backbone of policy analysis. Interviews serve a minor role. They merely offer direction to archival data. The two sections bring this point to light, and they should serve as a challenge and pointer to scholarship on policy science and case study.

4.3.2 *Genesis*

The CMC crystallised policy of the UPC government of the sixties. It sought to build a socialist Uganda (the move to the Left). The Charter followed an annual delegates' conference of June 1968.

In the forward of CMC, the party president, Obote, notes:

It is my sincere belief that in June 1968 the Party Conference clearly indicated that the Party and Uganda as a whole must take initial steps, as early as possible, to move ideologically and practically to the Left...It has been my responsibility as the President of the Party to codify all that the Party stands for and the principles, which have been basic characteristics of the Party since its foundation. (1)

4.3.3 *A Search for the Motivations of the Charter*

Why did the party seek a move to the left, how was this decision informed by science⁹⁷ – and consequently, how does it influence the policy space of Uganda?

4.3.3.1 A Textualist View

What does a textualist approach reveal? How would a ‘reasonable’ person perceive the text? In other words, what does the text say in its plain form?⁹⁸

Article 1 identifies a search for meaning in ‘independence’ as the overarching motivation of the Charter, and the bedrock on which the delegates to the emergency party conference passed the Charter. Article 2 is a platitude of the socialist chorus [full security, justice, equality, liberty and welfare for all sons and daughters of the Republic of Uganda]. Article 3 is more instructive and worth reproduction:

We subscribe fully to Uganda always being a Republic and have adopted this Charter so that the implementation of this Strategy prevents effectively any one person or group of persons from being masters of all or a section of the people of Uganda, and ensure that all citizens of Uganda become truly masters of their own destiny. (Art. 3)

Why does the cord of the Charter restate the republican structure of Uganda? Why does the article make a passionate appeal against ‘masters of all’ and people being ‘masters of their destiny’? Moreover, where does the actual challenge of poverty appear?

Articles 4 and 5 do not answer these questions. They expound on the appeal of Article 3. Article 6 escapes to the party creed. The creed is an exposition of the party’s nationalist and republican aspiration. Its most outstanding retreat is Part V that espouses cooperatives. The nationalist and republican wave sweeps through the Charter, and only makes a brief pause at Article 22. This article identifies the structure of the economy. After the pause, the wave continues until Article 28

⁹⁷ Recall, Kuhnian science is the actuating vector of policy (Sec 2.3).

⁹⁸ This is a viewpoint on constitutions espoused by scholars like Scalia (1989 and 1997), which perspective finds relevance in policy analysis.

where the structure of the economy is addressed. Excessive dependence on agriculture, particularly two export crops [coffee and cotton] is highlighted as a challenge. So is the need for industrialisation.

Articles 29 to 37 identify the challenge of financial capital and the need for an educated (technologically astute) labour force. The set of nine [articles] also highlight the challenge of land policy. However, these articles do not identify or (impute to) independent research structures feeding these positions of the Charter, and available for continual review of the economic aspirations. It is not surprising that the last three articles (38 to 40) conclude with nationalist and republican pursuit.

So then, would the ordinary ‘reasonable’ reader not be puzzled by the overwhelming focus on nationalism and republicanism? Without a historical backdrop and sociological appreciation of Uganda, the text of the Charter might be confusing. It is at this point that the appeal of hermeneutics cannot be resisted.

4.3.3.2 The Hermeneutics

What did the delegates perceive as the real meaning of independence, and what was the perception of Obote? Moreover, how were these perceptions instructed by science?

The research could not establish the contribution of the delegates (through the executive committee) in the formulation of the Charter. However, commentators like Sathyamurthy, 1974 (Box 8) suggest the Charter was largely a single-handed effort of Obote. Therefore, let us look at the vantage point of Obote.

Obote was a political actor. Therefore, the urge of power was a major influence in his life. However, he must have been guided by some virtues. What are these, and how did science influence his thinking? While these questions are instructive for understanding the Charter, they could easily lead to a slide along a biographical review – and such detour cannot be accommodated in this research. Therefore, the questions are addressed with caution.

The young man striding the quiet hills of Busoga College Mwiri (as a high school student) would drop out of Makerere University in an intellectual discord. Obote's transformative early years have been described by scholars like Ingham (1994), Woodsford (2010) and Tuma (2015).⁹⁹ The Mwiri boy would be a key actor in Uganda's pre-independence struggles, becoming the country's first prime minister. The complexity of the country he would lead has been given sufficient attention in the early part of this chapter.

The most outstanding of his challenges was institutional tension. The collage of institutions that constituted Uganda was fragile. The most precarious of the tension lines originated in Buganda. To that end, even the fiercest critics of Ingham (1994) like Oloka-Onyango (1995) are in broad agreement on the core challenge of the country. The author describes the institutional challenge this way:

...a diversity of peoples, casually linked together by the vagaries of colonial enterprise, into viable political and economic units. (3)

Therefore, did institutional tensions detract Obote from appealing to the guidance of science¹⁰⁰ in policy decisions?¹⁰¹ Did the expediency of politics overwhelm the cause of science?

Obote needed Buganda. That preoccupied his politics in the lead to independence. The KY-UPC alliance was a fragile compromise. It delivered victory at independence, but could not hold for more than three years. In fact, the relationship started yielding after just one year caused by the subject of Lost Counties.¹⁰² In 1966, Obote had a brutal break up with Buganda. At that point, Obote seems to have installed coercion instead of the compromise at independence. Sections 4.2.4 discussed this history.

⁹⁹ Obote (born 1925) joined Busoga College Mwiri in 1946 from Gulu High School. At Mwiri, he studied under Rev F.G. Coates. Obote was not alone. Mwiri and similar schools founded on religion produced the first indigenous actors of independent Uganda (and CMC in particular). Therefore, while the extent can be debated, the influence of the War and the institutional strand of religion on Obote and his contemporaries is beyond dispute.

¹⁰⁰ Recall, this is Kuhnian science

¹⁰¹ Always recall, to understand policy, we have to look at the vectors of science and politics. Then, we have to understand the moulding of the country's policy space to appreciate better the mechanics of PPP today. That is the instruction of the calculus of dynamical systems hinging on the resilience of the institution (Sec 1.3).

¹⁰² Ibid. Sec 4.2.4 and 4.2.5

Therefore, from the perspective of Obote, the calculus had gradually changed from compromise in 1962 to coercion by the enactment of the Charter in 1969 – a document he characterised as a ‘quick march command’ (Uganda Argus, Nov 11, 1969: 1). Did this change provide an opportunity for greater influence of science? This question is addressed in the following section.

Box 8: Common Man’s Charter – Authorship and Implementation

The Social Base of the Uganda Peoples’ Congress, 1958-70 (Sathyamurthy 1974)

An ideological blueprint was first published under the title of 'The Common Man's Charter', written, for the most part, by Obote himself. This charter contained an announcement of a 'move to the left'. Obote sought to identify the party with an ideology of socialism, presumably suited to Ugandan conditions, capable of carrying the country in a radical sweep from its feudal stage to a stage of egalitarian socialism.

4.3.4 The Charter and Nonlinearity of the Policy Space

Drafters of policy nodes such as CMC desire that the node becomes an attractor on the nonlinear phase space. Otherwise, the node would not be stable. It would not have the desired transformative effect.

Placing the axiom above on the conceptual frame of the thesis (1.3.1), the core challenge of Obote was to control potential excitation on the policy space—the effect of Northian institution, τ and the external effects e .

Obote understood this challenge.¹⁰³ In an attack on his opponents on 11 November 1969, Obote focuses on the ‘theorists and academics’ critical of the Charter (Uganda Argus, Nov 11: 1).¹⁰⁴ To Obote, the new republic was not one for those who wanted to ‘live like the queen’ (a comment he made a day earlier, Uganda Argus Nov 10: 1). These sentiments show Obote had shrunk his political base to ‘the common man’. In his calculus, the challenges of the ‘common man’ would provide a generalised coordinate and allow him control over the ‘conservative’ Northian institution – let us denote it τ_c , and the new generalised coordinate ψ_c .

¹⁰³ And it is reasonable to say he did so without the deeper illuminating effect of the conceptual framework of this thesis. This is a case of science explaining nature. The science of this thesis allows a better appreciation of the natural empirics of Obote’s action.

¹⁰⁴ From the archives of the British Library

However, to control external excitation, Obote had to align the international community to his focus on the 'common man'. More formally, he needed to reduce external effects e .

Obote's fears of the external effects can be seen tracing back to the country's independence. Here is his 1962 article:

We have stated in the past that this Party believes in the principle of a "Welfare State". Our political opponents have shouted at this and have lamented our view of all government efforts to assure citizens "a full stomach and a warm cloak". We do not agree with the conservatives that the individual can take care of himself, come what may. I honestly believe that the opposition to our view is as futile as the baying of a dog at the ascending moon. (Obote 1962, 1)

The language of the excerpt above shows Obote making an appeal to Britain.¹⁰⁵ At the same time, Obote desired to control the residual homogenous component of the dynamical system. In his pre-independence speech, he notes (Obote, 1962b):

I recommend to the Conference the strengthening of our already announced policy. Let us tackle the problem of poverty in four ways. First, let us encourage private enterprise to play its full part. Second, let us assist the co-operatives to do more than what they have so far done or are doing. Third, let the parastatal organisations like the U.D.C. and U.E.B. continue to play their part either alone or in association with others. Lastly, let the government continue to provide basic services such as trunk roads, hospitals and schools and continue to co-ordinate the activities of the first three...The government shall soon announce its decision to establish a high powered Economic Planning Commission. The government is fully decided on the war on poverty. The U.P.C. National Headquarters is to be reorganised to provide for a full-time Development Bureau with the full responsibility of assessing the demands of the country. I am sure that debate on economic policy will assist the government and the Party's Headquarters to determine where stress is to be put. (1)

¹⁰⁵ Some scholars argue that the West foiled this linearisation attempt by Obote, inspired by Cold War concerns. See Mittelman 1972 and Adyang 2011.

In reflection, at independence in 1962, Obote set out his goals in a nonlinear dynamical system defined by institutional tension. His main challenge was to linearise the system.

However, by 1967 Obote's desire for control was in distress.¹⁰⁶ In his contribution to the making of the 1967 Constitution, Obote remarks:

*...It was not the masses who caused chaos. It was not the masses who had brought shame on Africa. It was those who sought in the Parliament of Africa and those who saw the inside of universities and those who had seen the light of modern society. Those were the people who had given Africa her present shape. It was such people as these who would not hesitate to see that an African state was plunged into difficulties in the hope that these difficulties would provide them personal advantage. (1)*¹⁰⁷

Recall, the university was the hope of Uganda in the struggle for independence. Here is an excerpt from the first article of *Makerere College Magazine* of 1936: (Mills 2005):

Makerere College is in the public eye. The whole of East Africa is looking with a curious gaze and eager expectant eyes to see what Makerere can do for her 'But a Makerere student does it,' will be on the lips of everyone in attempting to justify himself. The populace, backward as they are, are looking forward for leaders from Makerere. There is a thick cloud of darkness hanging over the eyes of the people. It is our duty to lift it off. 'Advance' should be our watchword. Whole-hearted willingness is essential to ensure success in our campaign. (247).

Therefore, CMC was published at a time of distress. Obote struggled to see the hope in the university. The people who 'saw the inside of universities' presented him from linearizing and controlling a nonlinear dynamical system.¹⁰⁸

¹⁰⁶ Cf. Sec 4.2.5 on institutional tensions associated with the Lost Counties of Buyaga and Bugangazi

¹⁰⁷ From the archives of Parliament Library, Uganda

¹⁰⁸ Cf. Kanyeihamba (1973, Amin era) and Ghai (1974).

On 1 May 1970, Obote laid out the blueprint for the leftist policy (commonly, known as the Nakivubo Pronouncement). The nucleus of this implementation strategy was partial nationalisation of private corporations. This is the so-called 60 percent socialism.

As Obote pushed forward the socialist stance, his approach to controlling the nonlinear system turned from the calculus of politics to a bounded and more static approach.¹⁰⁹ Kanyeihamba (1973) paints a *de facto* one-party Uganda emerging even before the practice became *de jure* in 1970:

The legislation to effect the new political culture [one-party rule] was formally introduced in 1970. What had previously been de facto became, for all intents and purposes, de jure. Uganda, like her sister Tanzania became a one-party state... (246)

In other words, Obote introduced a rigid structure (one-party rule) in an attempt to control the nonlinear dynamical system he faced following CMC. That rigid structure failed. On 25 January 1971 the state collapsed. Idi Amin overthrew the democratically elected government of Obote. More formally, a new phase space depicting non-ergodicity emerged.

Scholarship will debate how best to manage nonlinearity and non-ergodicity. A face of that debate will focus on agency of the state, i.e. political science.¹¹⁰ Another face will focus on the economics dimension, i.e. political economy. This thesis is concerned with the mechanics of policy, i.e. policy science.

¹⁰⁹ More vividly and formally, Obote tried to keep his eigenvalues below zero. When he failed, he chose to eliminate variables and reduce the dimensionality of his space.

¹¹⁰ A good reference is Mazrui (1995) who argues that an institutionally bipolar country, which Uganda was (considering the strength of Buganda), needs more diversity. Lack of diversity stifles compromise. The researcher, however, cautions that increasing diversity overwhelms the capacity of the state. This is a potential trigger for the reader of this thesis to dig deeper into enquiry and along the discipline of political science. The trigger affirms both the explicating epistemology of case study and the inevitable interdisciplinarity of policy science.

Note the constancy of agency. Museveni was a researcher in Obote's first regime, a key player in Arusha Conference, held ministerial positions in the post-Amin regime, and has led the country since 1986. Therefore, the persistence of institutions can be defended from both a structural perspective and an agency one.

4.3.5 Concluding Remark

The Charter was a reaction to a nonlinear dynamical space. Attempts by Obote to linearise the space failed. The Charter was terminated in 1971 following the overthrow of Obote's regime by Amin. The policy space that followed was a depiction of non-ergodicity. Despite coming to an end as an active policy platform, the institutional tensions that motivated CMC still exist. These tensions feature in the sections that follow.

4.4 Structural Adjustment Programme (SAP)

4.4.1 Motivation of the Section

This is the second node of the policy space. The goal is to dissect the node while drawing on archival material. That way, strands of institutions in SAP are illuminated, and their link with CMC and connection to PPP, established.

4.4.2 The Crystallisation of Structural Adjustment Programme

The formulation of SAP was not a revolution. History shows the programme evolved from ideological cords strutting the First Washington Conference (Dec 1941 – Jan 1942) to Bretton Woods Conference (July 1944). These cords were drawn up by Harry Dexter White, representing the US position, and John Maynard Keynes for Britain.

White was fixated with agency, and not structural, attributes of the global organisation that had been mooted at the 1941-42 Washington Conference. He advocated an organisation of worldwide membership. Gavin and Rodrik (1995) write:

Building a truly international organisation, in which all members had some stake and felt responsible for decision-making, was a central objective of the World Bank's intellectual father, Harry Dexter White, from the very beginning. (329)

It seems Keynes towed the line of White, which is not surprising considering the power balance of the time. In a review of the works of Robert Oliver (1975), Gilbert

(1976) narrates an apparent complementing position of Keynes that stretches his otherwise didactic attention to aggregate demand. Gilbert writes:

[In Robert Oliver 1975] Keynes stands out prominently for his creative thinking and wisdom regarding the steps that should be taken to bring about international economic cooperation. It was a relief to hear Keynes cited on broader matters than deficit financing, the main theme of his 1936 classic book. In 1930 Keynes offered a plan for a Supranational Bank which anticipated much of his plan for an International Clearing Union drafted in 1942 and presented as the British position at Bretton Woods. [Of semiotic interest, Robert Oliver's 1975 PhD Thesis (Princeton) was on the Origin of IBRD] (31)

Therefore, it would seem at its formation in 1946, the structure of World Bank [then IBRD] was challenged. Most of the energy of the framers was directed to developing global tentacles (on a backdrop of the War). The institutional (and hence structural) challenge remained in the background.¹¹¹ As observed by Gavin and Rodrik:

Our second focus is on the major role played by the Bank as a source of ideas on economic and social development, a role that was not anticipated by its founders, but which has become increasingly important as the scope of the Bank's activities and of its influence over economic policy in borrowing countries has broadened. (329)

Note that addressing the main functional issue (i.e. post-War economics) entailed political effects. However, the Bank was not designed to tackle the latter (as Sec 4.4.4 shows). Given that background, how did the economic policies of the Bank emerge?¹¹²

The Bank's focus was post-War reconstruction. Central to this mission was robust preparation of projects. That was the knowledge challenge of the Bank in the two decades following its formation (Gavin and Rodrik 1995).

Moreover, in 1960 the International Development Association was formed to focus on developing countries. These countries lacked the technical expertise to prepare projects. The Bank took on this responsibility (see Box 9).

¹¹¹ Cf. Section 4.4.4

¹¹² See how science (i.e. economics) is interacting with politics

Box 9: Emergence of World Bank as Project Development Hub

The Bank began to use human capital measurements in its analytic work in the early 1960s for reasons having little to do with the theory of economic development and more to do with the priority of human over physical capital goods. The Bank began to use human capital measures because it had a specific problem: how could their investment in a new fertilizer manufacturing plant make any difference without a staff of agriculture engineers? (Heyneman 2003: 315)

It is worth noting that Robert McNamara became president in 1968, and would stay in office until 1981. McNamara brought the passion for rigour that had marked his work at the Rand Corporation and the US Defence Department to the World Bank. McNamara was a shrewd actor. He would use any tool of machination to have his way, and the excerpt below from Brookings Institution (1991) supports this statement:

And then--and I shouldn't tell you this but will--and then I thought, "Well, I better get--I know exactly what I want to do." I digress a moment. I had some association with some consulting firms at Ford and in the Defence Department, and I never felt that you should call in a consulting firm as the CEO of an institution unless you called it in to ratify what you'd already decided to do. So being quite frank with you, I had decided what I wanted to do in '72, and I called in McKinsey and Company to ratify it. That's what happened. (1)

It is, therefore, not surprising the Bank would become the leading driver of public policy in developing countries in the seventies and eighties. Its worldwide role may have diminished, but the Bank remains predominant in developing countries.

The Bank could not sustain the institutional tension above (i.e. the need to consider politics). In the seventies, the narrow focus on projects shifted to the broader concerns of policy. Gavin and Rodrik (1995) summarise this evolution as follows:

What forced the Bank to enter the business of development "ideas" was the environment in which it found itself operating. Borrowing countries sorely lacked the technical expertise needed to prepare project applications...Finally, the fact that the soundness of the projects to which the Bank lent money ultimately rested on the overall quality of policy-making was recognized very early on. Hence, the Bank was required from the very beginning to have ideas about what

constituted an appropriate policy context. This policy context was initially construed quite narrowly, but its scope broadened substantially overtime. To the Bank's early concern with balanced budgets, sound tax systems, and monetary stability, were added in the 1950's the needs for national development plans. The Bank began to stress the role of the private sector during the 1960's, and of rural development and population policies in the 1970's. The 1980's in turn were the decade of "structural adjustment" and "outward orientation".
(332)

Therefore, when the economic crisis of the late seventies struck, the Bank was a more political entity – you could say, a more policy-oriented entity. Moreover, the Bank was under the leadership of a man prepared to have his way (i.e. Robert McNamara).¹¹³ These factors are critical to understanding SAP. Moreover, the reforms of the McNamara regime prepared the Bank for PPP in low-income countries like Uganda. The risk mitigation structures provided by the Bank for PPP¹¹⁴ in these countries required these reforms – a better appreciation and engagement on political issues.

4.4.3 The Outset of Structural Adjustment Programme

Economic crises engulfed the seventies. Principally, the oil crises of 1973 and 1979 stretched public finance in the United States, and the other donor countries. This placed pressure on lending. Developing countries needed to tackle their fiscal deficit, and install structures that would ensure these deficits did not re-emerge. That meant reducing public expenditure, and removing the burden of subsidising poorly managed parastatals. In general, the Bank and IMF required that developing countries embraced free market economics (World Bank 1994).

The effect of structural adjustment came with the introduction of conditionalities. The recipient countries were required to remove trade protections and move to a free market environment. Easterly (2005) describes the outset of the conditionalities as follows:

On February 5, 1980, World Bank President Robert McNamara sought and received approval from the World Bank Board to launch a new instrument: the structural adjustment loan (SAL). The proposal

¹¹³ Illustrated by the declassified instruction to McKinsey Consulting above

¹¹⁴ See project empirical data in Chapter 5, and particularly the partial risk guarantee (PRG) of Bujagali Project
Excitation of a Dynamical System

followed a year of discussion with the operations chief Ernest Stern, with the outline of the SAL emerging on a flight the two took together to the Bank-Fund Annual Meeting in Belgrade in late September 1979. The loans would provide finance over a period of several years in return for reforms in trade protection and price incentives for efficient resource use...This statement already contains the main features of what would characterize adjustment lending for the next two decades for the IMF and World Bank: fiscal adjustment, getting the prices right, trade liberalization, and, in general, a movement towards free markets and away from state intervention. (1)

It is important to note that the concern of the Bank was broadening from physical [infrastructure] to the conduct of the state. How would this change play out? That question requires an analysis of Article IV of IBRD.

4.4.4 The Challenge of Article IV

Article 4 Section 10 of the World Bank [IBRD] Charter stipulates:

The Bank and its officers shall not interfere in the political affairs of any member; nor shall they be influenced in their decisions by the political character of the member or members concerned. Only economic considerations shall be relevant to their decisions, and these considerations shall be weighed impartially in order to achieve the purposes stated in Article I. (Art. IV)

The framing of the UN and Bretton Woods Organisations (BWO) sought to separate politics from economics. That explains Article IV. However, what was the concern of the Bretton Woods delegates? It was reconstruction. Did the framers of BWO foresee their concern growing from projects and infrastructure to the mechanics of the state (i.e. politics)? It could be argued they should have, but Article IV suggests otherwise. This structural challenge in the construction of BWO is captured in the following narration of Tung (2003), vice president and general counsel of the Bank (1999-2003):

Oversimplifying, the United Nations was in charge of international politics, and the Bretton Woods Institutions in charge of international economics. Thus, as Commissioner Robinson [UNHCR, 1997-2002] had noted, two separate "languages" had developed. She talked about the need for "bilingualism" the need for greater coherence between economic development and human rights. As she implied, there still are two separate languages spoken. Politics is spoken at the United Nations; economics is spoken at the World Bank and IMF.

This dichotomy between economics and politics was very much in the minds of the framers at Bretton Woods. (1)

Article IV restrained the World Bank to a 'Project Bank', to borrow from Edward Jaycox (Vice President, Africa, 1984/96). How could the Bank discuss macroeconomic policy, for instance, without drawing on politics? That is easier if an entity is fixated on project. Here are the words of Jaycox (Brookings Institution 1991):

You have to remember that in those days, we were a project Bank, and we were doing projects.... McNamara was always going gung-ho for employment, direct employment creation. Well, you know, that's really a macroeconomic issue. As you must know, you don't just do that. You know that better than I do. That is not—we had all the apparatus to repair the roads or sweep the streets or clean the drains or, you know, string wires to poles and put poles in the ground. That wasn't the problem. It's just the economy and the demand side of the economy just wasn't there. We couldn't manage the macroeconomics, and this Bank was not in that business. (2)

The constraint of Article IV has particularly been apparent in the fight against corruption by BWO amongst its borrowers. In a doctoral research on corruption and the World Bank, Marquette (2002) paints an organisation ensnared in Article IV as follows:

In 1997, the Bank announced a four-pronged strategy to help its borrowers combat corruption, despite claiming in the past that it could not conduct work of this kind given the Bank's non-political mandate. Indeed, in the early 1990s, the Bank's General Counsel provided a new interpretation of the Bank's Articles of Agreement [Article IV, IBRD] that still excluded work on corruption. Despite many attempts to reshape the discourse on corruption from a political one into an economic one, this issue of the non-political mandate has never been satisfactorily addressed. (1)

So then, given the structural constraint of Article IV, how would the World Bank and IMF implement structural adjustment in the vortex of politics and institutional complexity of post-colonial Africa, and particularly Uganda?

That question is addressed in the next section. Before then, a concluding remark is required. Institution binds politics. It also binds the organisation and delivery function of government. To separate politics from the efficacy, and efficiency, of

government requires cutting off the control of the institution. How possibly can that be done without introducing artificiality? That is the dilemma of Article IV. Robert McNamara tackled this challenge. The Bank is a policy entity, and by definition – it is political.¹¹⁵

4.4.5 Structural Adjustment under Obote II

As Robert McNamara and his IMF counterpart were sketching structural adjustment loans in February 1980, in Uganda the UNLF was trying to cope with the haste of Amin's downfall. A modicum of stability would only be realised after the December 1980 elections. How did the Obote II regime cope with the new juggernaut of policy emanating from Washington DC?

A reminder is necessary. Obote had been overthrown in 1971, a year after launching his Move to the Left. Not only did he flee to Tanzania, he was helped back to power by the socialist country. Now, perhaps more than ever before, he was confronted with this pull to the right, and this was at a time the country desperately needed uplift after nine years of military rule.

How different was Obote II UPC from that of the leftist Common Man's Charter? How did the emerging SAP influence UPC?

However, Box 4 shows that in the lead to the 1980 elections, UPC had toned down its leftist rhetoric of the sixties and early seventies. The manifesto opens:

As UPC goes to the polls, it is important to restate the party's political and economic philosophy. The UPC is an indigenous political party. It is a truly nationalistic Party, neither inspired by, nor biased towards any external political movement, ideology, power blocs, or sect. (1)

Although the nine points of the 1980 manifesto are largely expositions of the nationalistic rhetoric, the opening lines above contrast sharply with the following opening of the Charter (1970):

¹¹⁵ Admittedly, most scholarly dialogues will find this characterisation of the Bank discomforting. However, policy vector is a cross-product of science and politics (cf. Sec 2.3). The Bank cannot attempt to change policy while being indifferent to politics. This note highlights the significance of the Joint Research Model in Chapter 6.

It is my sincere belief that in June 1968 the Party Conference clearly indicated that the Party and Uganda as a whole must take initial steps, as early as possible, to move ideologically and practically to the Left. (1)

What guided this change by Obote? Which is the instructing science? It seems the change derives from experience, and not artefacts of science. When the question of this change was placed before Henry Makmot (2013), one of Obote's henchmen from Moshi days, he said:

Tanzania (exile) changed Obote's mind on socialism. He saw poverty and depravity, and a lot of it. When he assumed power, he had changed. SAP [structural adjustment programme] did not change him. He was a converted to the opportunities on the right. [Interview with Henry Makmot, State Minister for Finance, Obote II, and Delegate to Moshi Conference: Interview May 24, Kampala]

However, the foregoing does not answer this question: Was the lead to the 1980 UPC manifesto (and particularly Moshi conference) cognisant of the forces instructing Robert McNamara to SAP? In the same interview, Henry Makmot answered:

No. We were totally swamped by the challenge of Amin. We had no space for thinking post-Amin. Global economic forces did not factor in the Moshi Conference.

Therefore, it seems when Obote came to power, he did not have the benefit of a scientific critique of SAP. The challenge of assuming power was overwhelming. The institutions of research were missing. In this situation, it comes as no surprise that Obote embraced the conditions and agency (technical assistance) of the IMF in the following letter of 1981 to the Fund:

The Government of Uganda has decided to take immediate action to ease the foreign exchange bottleneck...I welcome the strengthening of the Fund's technical assistance to the Central Bank. [Letter to the IMF from AM Obote, President and Minister of Finance, Uganda, 04 Sept 1981]

Obote's letter is significant. Let us place this letter on the conceptual frame 1.3.1. The letter represents action by the lead agent to generalise the country's institutional vector τ on the new coordinate of SAP. This invitation marked the outset of SAP in Uganda. However, the force of SAP would become vivid only after the

Obote regime. Privatisation and retrenchment in the public service made SAP clear, and these changes occurred in the early years of Museveni (late eighties and early nineties). The early eighties was a period of attempts at rebuilding (cf. Box 10 and Table 2).

Further, note that Amin halted an attempt to build a local market base using SAP.¹¹⁶ The replacement of CMC was ‘chaotic capitalism’.¹¹⁷ This background is instructive in looking at the present attempts at PPP in the country (BHP and RVR, Chapter 5). The building of market (κ) collapsed into instantaneous acquisition of wealth by individuals close to Amin. This new market institution of chaotic capitalism was a rupture on the amiable sociological construct of native Uganda.¹¹⁸

Box 10: Narratives on the Economics of Obote II Regime (1980-95)

The leadership vacuum left by the rapid collapse of Amin’s military government increased the level of insecurity, weakening all attempts at economic reform by the three governments that ruled between 1979 and 1980. Thus, co-ordinated economic reforms were not embarked upon until 1981, when Obote, on his return to power, sought support from the IMF and the World Bank. The priorities of the Obote II government, as outlined in policy statements, were to raise efficiency in the productive sectors, prudent use of funds and the creation of incentives for both domestic and foreign investors (Uganda, 1981, 1982).

(Bigsten and Kayizzi-Mugerwa 2001: 16-17)

...The Government of Uganda (GOU) with external assistance from the International Monetary Fund (IMF) and the World Bank initiated its first efforts to economic reform in 1981. The structural adjustment program, covering the fiscal years 1981/82-1983/84 provided a total of SDR 373.2 million (GoU, 1998). Multilateral effective development assistance increased from US\$ 35.6 million in 1980 to US\$ 70.4 million in 1983. .. (Muwonge and Obwona 2003: 65)

¹¹⁶ It will be helpful to refer back to the policy space under the 1967 Constitution discussed in Section 4.2.5.

¹¹⁷ This is a terminology from Amonyia (2016). It captures the emergent institution of wanton grabbing of property of Asians following the orders of expulsion by Amin. This experience is vividly captured in this narration: Jamal V., 2012. Ugandan Asians: *The Untold Stories*. The Daily Monitor, Uganda, 27 Sept 2012.

¹¹⁸ Cf. Aasland (1974), Brierley and Spear (1988), and Coxill (1959)

Table 2: Uganda's Foreign Exchange Regimes, 1966 - 1990

Years	Adopted Policy
1966 - 1971	A par value of 0.124414gram of gold per Uganda shilling was maintained.
1971 - 1975	The Uganda shilling was pegged to the dollar at a rate of UGX 7.14286.
1975 – 1980	Shilling was pegged to the SDR at UGX 9.66 due to volatility of the dollar
1981	The shilling was floated. This saw the rate drop to Uganda shillings 76.97 to a dollar form Shs.8.1453.
1982	A dual exchange rate regime was introduced and foreign exchange was auctioned through a system known as Window 1 and Window 2
Window 1	Was for financing priority imports and the rate was determined daily taking into account the value of the dollar against other currencies and the economic conditions in the country
Window 2	Was for financing non-priority imports
1986	The auction system was replaced by allocation based on a rate of Shs.1470 to a dollar. The dual exchange rate was re-introduced at a fixed rate of UGX 1400 to a dollar.
1987	In May 1987 the shilling was devalued by 66% from UGX14 to 60. This was after the currency reform.
1990	Forex Bureaus were introduced

Source: Bank of Uganda

Notes:

1981: An important element in the package to allow market forces to play an important role in the economy is the decision announced by the President on June 1, 1981 to float the Uganda shilling, which is at present overvalued. The Bank of Uganda will intervene in the market to smooth out short-term fluctuations, but will not attempt to affect the underlying trends. After the exchange rate has stabilized, the authorities intend to peg the Uganda shilling at an appropriate rate. [Statement by SM Kiingi, , IMF Executive Board Meeting, 04 June 1981 (ED, UGA, IMF)]

1982/6: The margin between the rates of exchange prevailing at the two windows has been progressively declining. The second window rate (in terms of US\$ per US dollar), which exceeded the first window rate by 200 per cent during the first three weeks of the dual exchange system, exceeds it now by 106 per cent only. This resulted from a progressive depreciation of the first window rate from 99 US\$ per US dollar to 111 US\$ per US dollar and an appreciation of the second window rate from US\$ 300 per US dollar to US\$ 230 per US dollar. Simultaneously, the rate at the parallel market has been appreciating from about US\$ 360 per US dollar to US\$ 270 per US dollar. [Statement by UGA Rep, IMF Executive Board Meeting, 18 Feb 1983]

Therefore, the global wave of SAP hit Uganda during the Obote II regime, the country hardly had stable 'structures' to adjust.¹¹⁹ The economy had collapsed (Table 2) along with would-be fiscal 'structures'. Chaotic capitalism ruled.

Consequently, the excitation of SAP hit a policy space close to the critical point. The state (σ) and society (χ) generalised on the new vector of SAP (κ_s). In other words, the global wave of SAP translated into a 'structural reconstruction'

¹¹⁹ The war on inflation captured in Box 12 depicts a reconstruction effort not an 'adjustment' of structure.

challenge – not ‘structural adjustment’. This challenge of structural reconstruction was helped by the critical point emerging from the overthrow of Amin. Moreover, recall that Obote himself had moved away from the socialist anchor of his first regime, which led to CMC.¹²⁰

Therefore, the liberal environment of Uganda today should not be a surprise.¹²¹ The calculus of SAP explains the liberal environment. It traces back to 1980.

However, the ease of SAP in Uganda came at a price. Organisations of science (read, local research centres) were not developed in tandem. Local agents of science (many educated in the West) joined programmes of the Washington-anchored SAP.¹²² The country now faces the complexity of PPP, which demands local research centres.¹²³

The next section considers the encounters of the Museveni regime with the wave of SAP.

4.4.6 The Museveni Regime and Washington Consensus

Two significant events trace to the second half of the eighties. January 1986, a group comprising largely young military men marched into Kampala overthrowing the Okello junta (29 July 1985 – 26 January 1986). Approximately 11,670 kilometres away in Washington DC, a development economist was collating from the OECD catchment a set of strands that defined a new approach to economic policy in Latin America. That economist is John Williamson, of the Peterson Institute for International Economics. He would wrap his findings as ‘Washington Consensus’ in a conference paper that year, 1989 (Williamson 2009), and the researcher recounts:

My opinion at that time was that views had pretty much coalesced on the sort of policies that had long been advocated by the OECD. I

¹²⁰ Refresh interview with Henry Makmot, 24 May 2013, Kampala

¹²¹ Ibid. Footnote 127, and cf. Mamdani (2007)

¹²² This became apparent in interviews the Economic Policy Research Centre (arguably, an island of policy research in the country) 7 March 2012, the Cabinet Secretariat 7 May 2012, Chair Sectoral Committee on Infrastructure (Parliament of Uganda) 21 March 2012, and National Planning Authority 08 February 2012.

¹²³ Detailed in the synthesis of Sec 6.4.

specifically did not believe that most of the “neoliberal” innovations of the Reagan administration in the United States or the Thatcher government in Britain had survived the demise of the former (Mrs. Thatcher’s government was still in its death throes at the time). The exception was privatisation, which was Mrs. Thatcher’s personal gift to the economic policy agenda of the world, and which by 1989 had proved its worth. But I thought all the other new ideas with which Reagan and Thatcher had entered office, notably monetarism, supply-side economics, and minimal government, had by then been discarded as impractical or undesirable fads, so no trace of them can be found in what I labelled the “Washington Consensus.” (251)

The ten points of ‘consensus’ are outlined in Box 11. Striking in Williamson’s 2009 recount is the assertion that there is ‘no trace’ of ‘minimal government’ in the Consensus. The ideology of the extreme right had been ‘discarded’ [by 1989]. Can the cherry-picked privatisation be divorced from reduction of government? Why privatise? It must be in search of efficiency. If so, is privatisation not an implicit [at the least] advocacy for smaller government?

Box 11: Williamson’s Ten-Point Washington Consensus

- i. Fiscal discipline.
- ii. A redirection of public expenditure priorities toward fields offering both high economic returns and the potential to improve income distribution, such as primary health care, primary education, and infrastructure.
- iii. Tax reform (to lower marginal rates and broaden the tax base).
- iv. Interest rate liberalization.
- v. A competitive exchange rate.
- vi. Trade liberalization.
- vii. Liberalization of FDI inflows.
- viii. Privatization.
- ix. Deregulation (in the sense of abolishing barriers to entry and exit).
- x. Secure property rights.

(Williamson 1999)

The questions above will be left as nodes, with heuristic possibilities, for another pursuit. This research will move on and focus on the renewed call for privatisation, the state of the SAP wave, and the three-year old regime in Kampala (as of 1989 when Williamson was laying out his arguments).

To employ contemporary parlance, the Washington Consensus went viral. Williamson (1999) identifies the many new usages the tagline had birthed over the decade. It was no longer a conversation about Latin American. It grazed the

developing world. The privatisation tag of the Consensus and the broader free market wave of SAP struck resonance, propelling privatisation across the developing world (for details, see McKinnon 2010 and Harrison 2005).

In Kampala, the Museveni regime seemed to be pondering direction. They shared a common thread of nationalism with the Obote II regime – many of the new actors were part of the 1960s nationalist wagon. Moreover, the new team espoused ‘mixed economy’ [Point 10, Box 5]. A socialist leaning was evident in the new group.

Understanding the early swirls of the NRM requires a look at the moulding of the leader of this group, Museveni. The boy nurtured in the discipline of Christianity would have his early adulthood absorbed in guerrilla warfare inspired by critical theory, and particularly the anti-colonial work of Frantz Fanon. On Museveni’s upbringing, Ori Amaza (1998) writes:

In high school, he [Museveni] became a born-again fundamentalist Christian, and led the school’s grouping of similarly minded ultrareligionists; at the University of Dar es Salaam in Tanzania he studied under Walter Rodney, became an unreconstructed Marxist, and set up an organisation called the University Students’ African Revolutionary Front (USARF). He received the rudiments of guerrilla training and combat in Samora Machel’s FRELIMO in Mozambique in the late 1960s. He returned to college to write his senior thesis on the applicability of Frantz Fanon’s revolutionary violence to postcolonial Africa, having presumably seen the theory applied in practice. (235)

The ideology that shaped Museveni in the sixties and seventies was vivid when he took power in 1986. The new president would immediately confront the principles of SAP. On the ideological struggles of Museveni as president, Bonger (2004) writes:

An account of these years [early years of the NRM] with regard to promotion and protection of trade could be rendered in two phases. The first of these covers the year 1986 in particular. During this period, Museveni spoke in left-wing or Marxist language in his public rhetoric. (253)

After flirting with barter trade as a way around the ‘imperialist’ aid-trade (Tindigarukayo 1990, Morrissey & Rudaheranwa 1998), the Museveni regime

succumbed to Bretton Woods in 1987. In an apparently patronising tone, Bonger continues:

...Under the imperatives that arise from real politics, the regime quickly disabused itself from this left-wing romanticism. This was the circumstance under which, in 1987, it made peace with Bretton Woods institutions and embarked on taking its prescriptions. (254)

Moreover, in a longitudinal exploration of the political economy of Uganda, Young (2001) highlights the swings of the three most influential actors of Ugandan politics – Obote, Amin and Museveni. Young paints a shift by the latter from a socialist slant to SAP-driven right as follows:

In other noteworthy contributions, Ali Mazrui, who has never walked past a paradox he fails to draw to our attention, discovers a treasure trove in an evocative comparison of Obote and Museveni. Obote moved from a market-friendly posture toward socialist orientation, while Museveni voyaged from virtual Marxism-Leninism to exemplar of the Washington Consensus. Obote and Amin shifted from pro-Western disposition to (under Amin) Soviet clientage; Museveni journeyed from vociferous anti-imperial-ism to abandonment of Westphalia (sovereignty obsession) for Westphilia (uncritical embrace of the West) (207)

The most telling of the challenges that faced the new military regime (leading to the left-right swing) is the plunge in GDP growth in 1985-6 (Figure 28). Moreover, inflation was hovering above 100 percent (Figure 29, cf. Figure 30). In a dirigiste move, the government introduced new notes in May 1987, effectively removing two zeros from the old (100:1) along with 76 percent devaluation. This was only a part of the broader war on inflation the country fought in the eighties and nineties (Box 12).

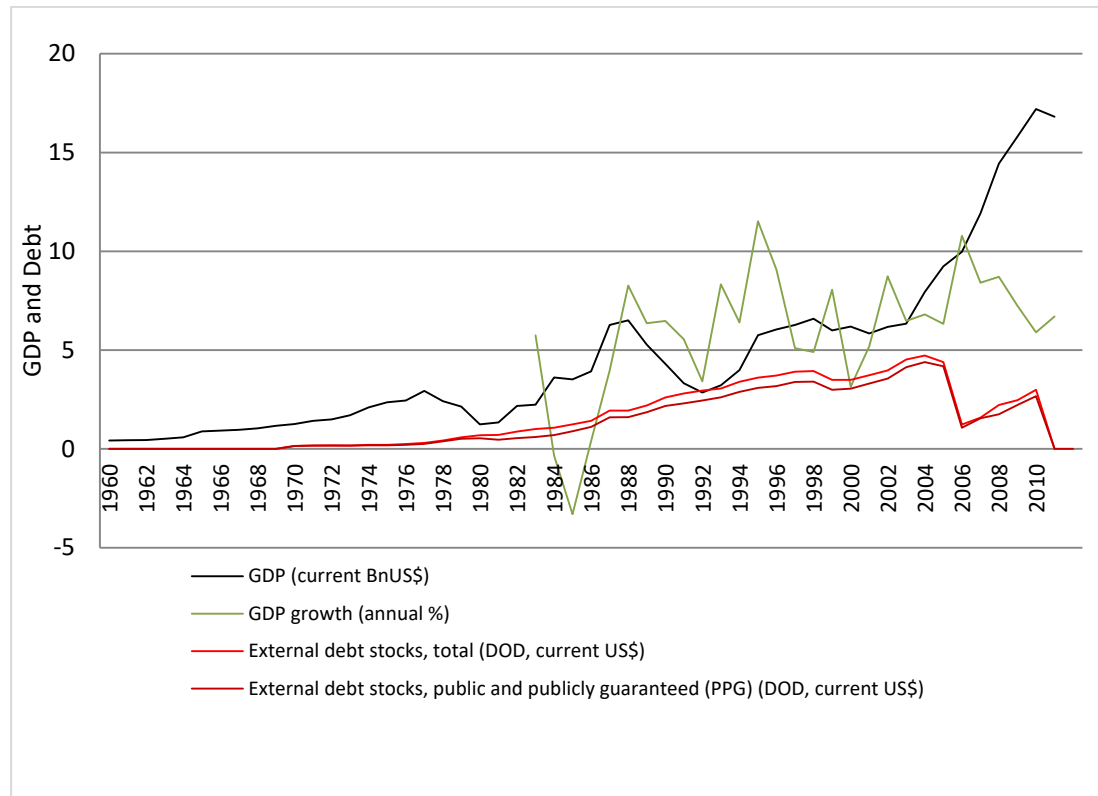


Figure 28: The History of GDP and Debt in Uganda

Data Source: WDI, World Bank

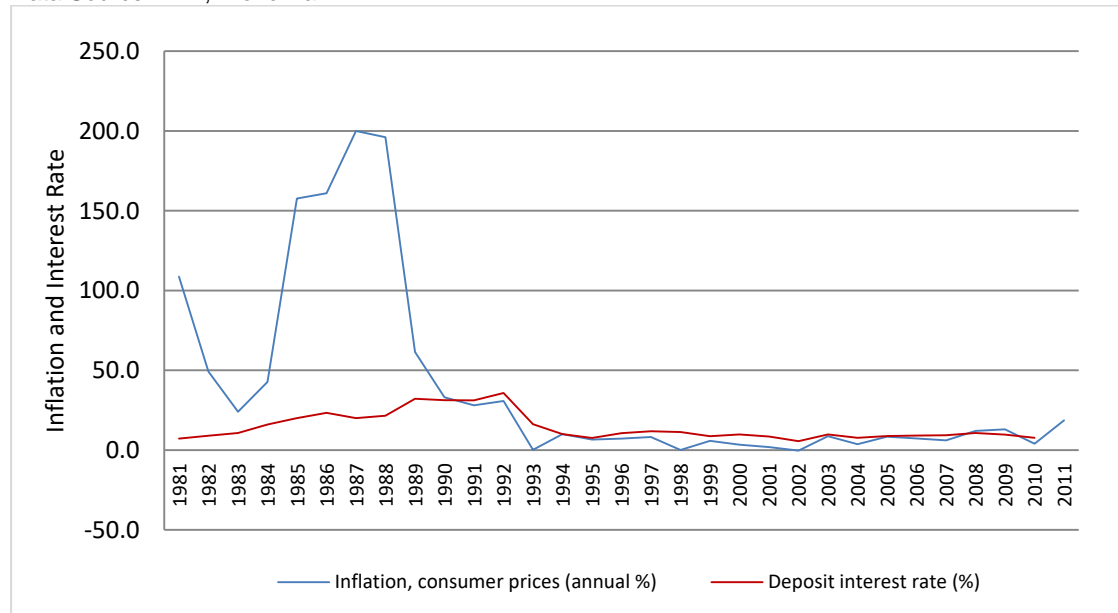


Figure 29: Inflation and Interest Rate in Uganda Since 1980

Data Source: WDI, World Bank

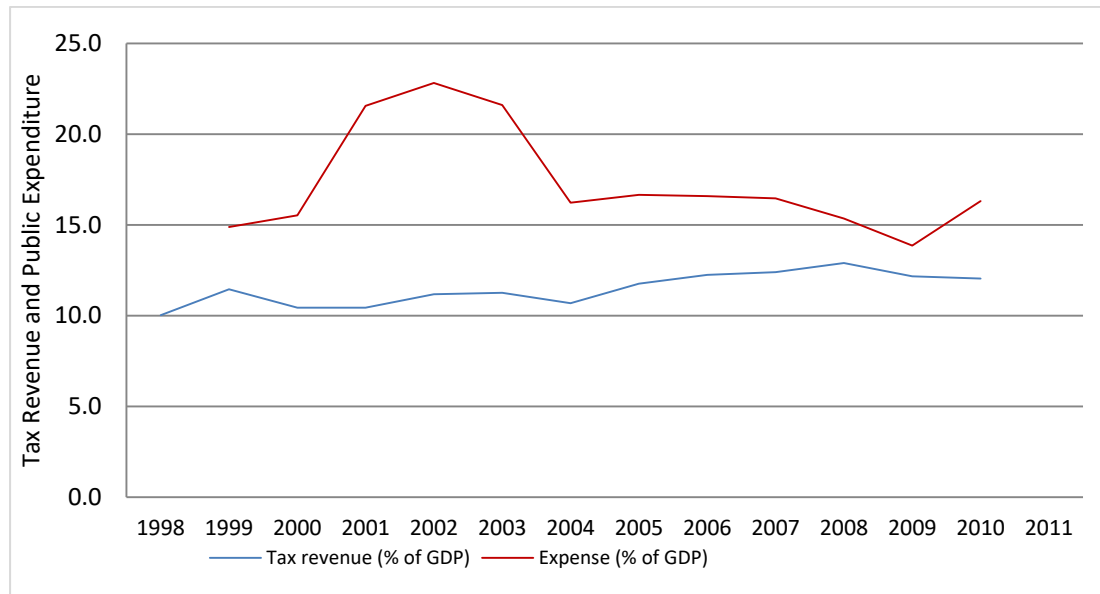


Figure 30: Budget Deficit in the Past Decade

Data Source: WDI, World Bank

Box 12: The War on Inflation

Between 1981 and 1988, the government repeatedly devalued the Ugandan shilling in order to stabilize the economy. Before 1981 the value of the shilling was linked to the IMF's special drawing right (SDR). In mid-1980 the official exchange rate was US\$9.7 per SDR or US\$7.3 per United States dollar. When the Obote government floated the shilling in mid-1981, it dropped to only 4 percent of its previous value before settling at a rate of US\$78 per US\$1. In August 1982, the government introduced a two-tier exchange rate. It lasted until June 1984, when the government merged the two rates at US\$299 per US\$1. A continuing foreign exchange shortage caused a decline in the value of the shilling to US\$600 per US\$1 by June 1985 and US\$1,450 in 1986. In May 1987, the government introduced a new shilling, worth 100 old shillings, along with an effective 76 percent devaluation

(Source: http://www.mongabay.com/history/uganda/uganda-currency_and_inflation.html corroborated with WDI, World Bank)

Let us place the relationship between the Museveni government and the Bretton Woods organisations on the conceptual frame 1.3.1. Museveni came to power with a vision partially in conflict with the Washington Consensus. His vision of a 'mixed economy', which could resolve the constraints – better trade was not aligned to the free-market premise of the Washington Consensus. Therefore, the external effect (e) could not be generalised locally. There was no clear solution to this dynamical situation in 1986.

Moreover, the rebuilding effort of the first half of the eighties had created zones of economic stability that could now be opened to the forces of liberalisation.¹²⁴ This was a more visible space of SAP. The next section looks deeper at the stability of that period.

4.4.7 Structural Adjustment in the Museveni Era

4.4.7.1 A Phase Space at Critical Point

The move to liberalisation was evident by mid-1986. Here is an excerpt from an executive board meeting of the IMF, July 1986:

The new government, which came to power in January 1986, has announced a firm commitment to a mixed economy under which the public and private sectors will each play its proper and effective role. To underscore this commitment a national committee is being set up to review all the parastatals and to advise on which should be retained and those which should be sold to the private sector. (Statement of the IMF on Uganda- EBM/86/111 (7/9/86) (BUFF/86/122) Ref: 341929 July 7 1986, archival list in Appendix B.3)

Let us examine the policy space mid-1986 on the conceptual frame 1.3.1. The Movement was a generalisation of the local Northian institution τ . However, the free-market leaning SAP included an institutional strand in conflict with the new Museveni regime.¹²⁵ Therefore, Museveni faced a nonhomogeneous and nonlinear dynamical system.

If we removed the excitation function, the market κ did not present a challenge to Museveni. The local market was insignificant following the turmoil of the Amin regime, and the recovery effort of the early eighties was still nascent by the time the Museveni regime came to power.¹²⁶ Consequently, in the early years of the Museveni regime, the main concern was the external excitation function. This concern eased in the late eighties to early nineties as the new regime became a

¹²⁴ Otherwise, the sharp increase in GDP growth between 1986 and 1988 shown in Figure 28 would have been difficult to realise. The new Museveni regime found economic structures, which under the new environment of relative peace, permitted economic growth.

¹²⁵ Museveni, the student of Frantz Fanon (Sec 4.4.6, ori Amaza 1998 and Langan 2014) attempted to open trade in the early days without success, and held a nonaligned position w.r.t. the Cold War forces.

¹²⁶ Figure 28 shows that the country posted negative GDP growth between 1984 and 1986.

beacon of liberalisation.¹²⁷ The result was a phase space of policy at critical point. Complexity was drastically reduced and liberalisation swept across the country's economic organisations.

4.4.7.2 Privatisation in a Nonlinear Policy Space

At the core of SAP was divestiture of 'inefficient' state parastatals to the private sector. From Section 4.4.7.1, the strong propagation of the privatisation wave¹²⁸ was due to an enabling environment – a coalescing of political actors (and otherwise disparate institutions) under the Movement umbrella, and the shackling effect of a weak economy.

More formally, and drawing on conceptual frame 1.3.1, the local dynamics was generalised on the promise of the state (σ), and specifically the promise of peace – one of the two Weberian cardinals of the state.¹²⁹ Moreover, the external effect (e) was made stable by the close relationship between the new political regime and the Western donors.

However, this window of stability was difficult to maintain. By 1995, there was a new constitution.¹³⁰ It changed the structure of the state. The umbrella of the Movement was replaced by the multiparty system (see Sec 4.2.6). Moreover, the sheer fact of fatigue – if for no other reason – meant that the stability of the external effect (e) would wane.

¹²⁷ For an extended read, see Oloka-Onyango (2004) on the 'new breed', Young (2001), Cullimore (1994), Tindigarukayo 1990, Morrissey, and Rudaheranwa 1998 – and most treatise on the political economy of contemporary Uganda will contain an account of this development.

Note that the country posted its best growth in the years subsequent to this generalisation of external effects, mid-nineties (Figure 28).

¹²⁸ This was at the core of the 'new breed' exaltation of the new regime in Kampala in the late eighties and early nineties.

¹²⁹ Popularised in contemporary scholarship by North (1990). Besides the monopoly over violence, the other cardinal is protection of property rights.

¹³⁰ A pertinent view of such constitutional change rests on the argument of Thomas Aquinas [exposited by John Locke] that ultimately, the state – prescribed by human law (constitution) – must align to the law of nature. The law of nature finds custody at the crust of the institution (the deeper norms, values and customs of society). See Locke (1689).

4.4.7.3 The Legal Platform and Public Sentiment of Privatisation

Privatisation of public enterprises in Uganda came to effect with the Public Reform and Divestiture Act of 1993. The intention of the Act was to actualise the ‘government policy’ of reforming and divesting off equity in public enterprises.¹³¹

Box 13: Public Enterprises Reform and Divestiture (PERD) Act 1993 - Extract

Objectives: *The main objective of this Act is to give effect to the Government Policy for Public Enterprise Reform and Divestiture published in Gazette No. 48 of 1st November, 1991, and also the Action Plan for Public Enterprise Reform and Divestiture...Without prejudice to the general effect of subsection (1), the following objectives shall be deemed to fall under the objective specified in that subsection— the reduction of Government equity holding in the public enterprises and thereby, inter alia, relieving the Government of the financial drain on its resources and the burden of their administration and raising revenue by means of divestiture, including, where necessary, liquidation or dissolution of public enterprises and by the promotion, development and strengthening of the private sector...*

The 1993 Act identified 119 enterprises for divestiture under four classes. The first comprised eight entities that would be corporatized, but the state would retain 100 percent ownership. These eight entities had a regulatory function. The second comprised 14 enterprises, and for these, the state would retain majority ownership. These entities were deemed of national interest, and they did not serve any regulatory role. The third class consisted of 90 enterprises. The government would fully divest its interest in these entities. Seventeen entities would be liquidated. The divestiture was overseen by Divestiture and Reform Implementation Committee chaired by the Minister for Finance.

What has been the effect of the divestiture? This question triggers another. What framework was installed at policy design to evaluate the effect of the divestiture?¹³²

A review of scientific publications (Kibikyo 2012 and 2008, and Ddumba and Mugume A. 2001) and the PERD Act provide no evidence of an evaluation framework. Neither did the key actors of the privatisation process have knowledge

¹³¹ Future research should ask: How was this policy formulated? Specifically, does ‘sequencing’ matter? That is, should institutional reform (kindred to the thinking of Fukuyama (1989 and 1995) – drawing on Hegel) be done prior to privatisation? If sequencing is crucial, why was it not respected?

¹³² Do not miss the point: An evaluation framework would point to structures of science underpinning the privatisation policy. Since privatisation was the precursor of PPP in the country, those structures of evaluation would inform PPP. There were no formal structures of evaluation, which shows that the emerging wave of PPP did not have a local component for knowledge refinement (research). That observation affirms interviews in Section 6.4.

of any ex ante evaluation framework. Had there been one, it would have been conspicuous, especially given that Kibikyo (2012) sought to evaluate firm performance before and after privatisation. The researcher had earlier (2008) addressed the same subject in a doctoral thesis. Ddumba and Mugume attempted to drill even deeper in the effects of the divestiture. The two sought the effect of privatisation on society. Therefore, it seems reasonable to conclude no evaluation framework was installed ex ante.¹³³

4.4.7.4 Corporatisation and Commercialisation of Public Service

The reform of public service under SAP is often associated solely with the front driven by the IMF.¹³⁴ However, following the meetings between Robert McNamara of the World Bank and Ernest Stern of the IMF in 1979/80 leading to SAP,¹³⁵ the new policy trunk (SAP) permeated the sectoral operations of the Bank.¹³⁶ The roads sector provides a good platform for analysing SAP. This is so for two reasons. First, the roads sector was on top of the priority the Museveni government at the peak of SAP reforms in the nineties (see Box 14). The second reason is more nuanced. Unlike electricity and water functions, for example, roads remained in the domain of the state in the nineties – it had not been corporatized into an arms-length operation. Therefore, an examination of the roads sector allows the deeper institutional thinking of the actors of SAP to be exposed. That is, reforms of the roads sector required a deeper appreciation of the institutions of the organisations of the roads sector than did reforms of the other two sectors.

¹³³ This finding is important in analysing future frames for assessing the performance of PPP, which is a perpetual endeavour (unlike privatisation) and a more complex one – on the basis of the non-ergodicity that the long timeframe induces. An interview with the director of research team (Parliament), 05 December 2011.

On the subject, the Privatisation Unit (PU) noted they did not have a broad evaluation framework, except project-specific 'monitoring and evaluation' units. At the same time, the PU observed 'the policy framework was developed by an international consultant.' The dependency on the 'international consultant' is vivid. (Interview 14 Oct 2011, Kampala)

The evaluation would require the difference-in-difference (DD) approach. The use of DD, has gained prominence in the last two decades. The DD tool is a natural product of the growing body of policy science that traces back to the early sixties. Abadie (2005) and Ashenfelter and Card (1985) discuss the tool in detail. However, in nonlinear and non-ergodic situations, DD should be used as a frame of exploration not a model of explanation.

¹³⁴ See narratives on SAP in Appendix B

¹³⁵ See Section 4.4.3

¹³⁶ This diffusion of SAP in the sectoral operations of the World Bank is a natural consequence of the policy trunk. Moreover, this diffusion of SAP is apparent in the archival analysis of documents presented in Appendix C.

Consequently, this section attends to the corporatisation and commercialisation of the roads sector. However, before addressing these reforms, the subject of the section highlights fundamentals of the policy science and case study that deserve refreshing. On the former, the section brings to light the interwoven character of the science at the fulcrum of Parsons (1995). As a subject of policy, PPP in Uganda cannot be robustly addressed without looking at SAP – PPP is a derivative of SAP. Moreover, to appreciate the mechanics of SAP in Uganda requires an examination of the node of CMC. Yet, we now see the institutional nuances of SAP appealing to the examination of the roads sector. These strands bring together many disciplines. The policy challenge is complex and necessarily interdisciplinary – and this thesis uses a conceptual frame that allows depth in the illumination of this complexity.

The other highlight of pedagogy arising from this section is the methodology and epistemology of case study. While literature review of Chapters 2 and 3 capture the trunks of this thesis, this section highlights the appeal of the ‘integrated strategy’¹³⁷ of literature review in contrast to the concentrated and self-standing approach typical of the H-D frame. To that end, Chapters 4-6 continue to draw on literature specific to the instant issues of research – and in this case road sector reform in Uganda. Therefore, notwithstanding the crafting of two chapters of literature review,¹³⁸ future research inspired by this thesis could be more liberal in using the integrated strategy, and giving a fuller meaning to the explication epistemology of case study. Finally, this buttressing of policy science and case study is a more important contribution to the global effort of knowledge than the specific improved comprehension of PPP in Uganda arising from the thesis.

Following that note of pedagogy, let us look at SAP-driven institutional reform of the roads sector of Uganda. The wave of SAP struck the road sector of SSA in the early nineties. In most countries, the sector had management arrangements and institutional structures inherited from the imperial regime (Amonya 2006). Predominantly, the state played the client and supplier role, commonly called ‘force account’. However, for the upgrading of trunk roads, the supplier role was

¹³⁷ This borrows from the doctoral research of Patterson (2006), see Section 1.4.

¹³⁸ The concentrations in literature review is in conformance to demands of the process leading to this thesis.

contracted out, and these projects were mainly donor funded (particularly by the World Bank). Moreover, this commercialisation had started in the sixties, and mirrored the post-War changes in road management across the West, and particularly in Britain (Robinson et al. 1998 and Talvitie 1996).

The wave of SAP sought the corporatisation of road management. The first step was to create client units within the ministries, along with road funds to improve accountability. These client units would later be removed from the ministries leading to arm's length road agencies and the attendant funds. That change would allow the parent ministries to focus on policy.

The road 'authority' of Uganda (UNRA) was enacted in 2006. However, it only became functional in 2008. The fund was established the same year. Unlike in other countries of SSA (Sierra Leone, for example), the fund was designed as a dedicated entity for user charges from the outset. In other words, it was designed as a 'second generation' fund, see Heggie and Vickers (1998). The PPP unit is being crafted.

Prior to the corporatisation of the nineties, the World Bank and the United Nations Economic Commission for Africa (UNECA) had attempted to reform the sector under road management initiative (RMI). That RMI effort happened in the late eighties (see Amonya and Okello 2012, and Heggie and Vickers 1998).

That early quest for efficiency focused on reforms within the existing organisational structures of the sector. However, in the late nineties, the World Bank noted that the internal reforms were ineffective and a more fundamental change that imported private sector values and practices was required.¹³⁹ That pursuit is crystalized in the seminal work of Heggie and Vickers (1998). The new reform advocated for executive agencies for road management.

In Uganda, the Road Agency Formation Unit (RAFU) was formed in 1998. The development component of road projects moved to RAFU. However, institutionally, this was not a difficult move. Development projects were largely managed by

¹³⁹ Note that this was at the peak of SAP in Uganda, cf. the development of the legal structures of SAP in 4.4.7.3.

donors. The underpinning institutions of these projects, the norms and values, were different from the broader institution of the ministry. In some cases, the foreign development agency was the client and the local ministry of works simply a recipient. To this end, projects funded by Danish aid (DANIDA) are an example.¹⁴⁰

Therefore, the heavy task of institutional reform of Uganda's roads sector would be the transfer of the maintenance function to the new agency. That shift lasted a decade. Today, UNRA is moving away from the commercialisation principles that led to the entity (Wesonga 2016). This is a delegitimation of the reform that lasted decades. How do we explain the reversal?

Let us draw on the concept frame 1.3.1, and particularly the phase space analysis in Sections 4.4.7.1 and 4.4.7.2. First, Museveni does not face the same 'shackling effect' of the economy, which forced the generalisation of external effect (e) and institutional effect τ to a SAP coordinate κ_s . Borrowing the words of James Wolfensohn [former President of the World Bank], Museveni could now 'get his way'.¹⁴¹

In the edition of 16 March 2015, *the New Vision* quotes President Museveni saying, '...we are not going to allow more privatisation of government institutions [read organisations]. If the public officials occupying public bodies do not perform, we will remove them and replace them.' In an earlier related statement, State House (2014) published:

President Yoweri Museveni has said the Uganda National Roads Authority (UNRA) is becoming a problem and that despite the progress in the road infrastructure development across the country, the Authority that receives Shs. 1,700 billion per annum [approx. 3% of GDP] mainly for the construction of tarmac roads has nothing much to account for the funds it has been receiving...UNRA is one of the products of the Roads Sector Reforms charged with establishing a robust administration for effective and efficient management of the

¹⁴⁰ Draws from my personal recollections working on these projects.

¹⁴¹ See Box 14, p.159

national roads network. Its work has however been marred by allegations of corruption and delays on major contracts. PS: In May 2015, Museveni ended the tradition of engineers climbing up the ranks to head road management by appointing a non-engineer as executive director of UNRA, characterising the move as an effort to rid UNRA of 'den of thieves'. (*Daily Monitor*, May 4).

Given the apparent control of the excitation function,¹⁴² Museveni was left with a homogeneous space, which is easier to control. Moreover, the public considered the roads function corrupt.¹⁴³ Consequently, Museveni could generalise the institutional effects onto his coordinate of choice. The result was delegitimation of the SAP reforms.

While the decade from the mid-nineties was the peak of SAP and the dominance of the external excitation function, the institutional effect τ was noticeable in the roads sector. The corporatisation effort of the roads sector was marked by the establishment of Road Agency Formation Unit (RAFU) in 1998. As the name instructs, RAFU was the predecessor to the present Uganda National Roads Authority (UNRA). However, it took nearly a decade before UNRA became operational. Recall, the UNRA Act was enacted in 2006.

In explaining the delay in establishing UNRA, the World Bank (2011:75) noted, 'Road Agency Formation Unit (RAFU) reduced the sense of urgency in moving forward'. In other words, the reform should have been fast, avoiding the transitional phase. Put differently, a mechanical mould anchored on the excitation effect at the peak of SAP would have conditioned the old institution of the ministry of works and transport to the new design structure of UNRA.¹⁴⁴ This argument of the World Bank ignores the external effect (e). We must therefore not be surprised that as the

¹⁴² The diminishing excitation function is seen in the country's fiscal space. The national budget framework of the ministry of finance shows local government borrowing rising nearly eightfold over a decade from the peak of SAP in the early nineties. This show of control was followed by a rise in the country's current account deficit from nearly zero in mid-2000 to 10% of GDP a decade later. This trend shows an agency of the state in increasing control of the external excitation function.

¹⁴³ An annual survey of government functions regarded most corrupt by the Daily Monitor regularly featured the roads sector. In addition, the press headlines of 2016 was dominated by a presidential commission of inquiry into corruption in UNRA.

¹⁴⁴ The core of RAFU was drawn from the maintenance function of the ministry of works and transport.

excitation weakened over the past decade, the reform of the roads sector threatens to be undone.¹⁴⁵

The dynamics of UNRA is instructive to the ongoing effort at developing PPP in Uganda. The dynamics warn on approaches that rely on mechanical conditioning as a way of delegitimising institutions of existing public sector organisations. The space of PPP, like the one of the SAP reforms, is nonlinear and non-ergodic. The anchorage of either local state agency (government) or external actors will be temporary. Effective reform will require gradual delegitimation of opposing institutional strands and a state structure that can control excitation by rendering it non-holonomic.

4.4.8 Affirming Non-Ergodicity of Policy Space

The preceding sections laid out the evolution of the state (as structure resident in the constitution) and the place of the two nodes of the policy space, CMC and SAP. Those previous sections form a set of empirical data on the policy trunks of Uganda.

The complexity and tensions of the institutional strands of the country is salient. This set of institutions form the constraint in the dynamical system shown in expression 1.3.1 (the overarching concept). That constraint is complex and non-holonomic. That is, it is irreducible to a generalized coordinate – the institutional set cannot be dismissed.

Figure 31 captures the policy landscape. The traversing effect of the institution is salient. The actors of policy view an open system defined by nonlinearity. As an attribute (and example) of the nonlinearity, when the system is excited (in this case by PPP), the outcome will not be a closed-form trajectory. Formally:

$$\dot{x}(t) = g(t, x(t), u(t)) \quad 4.5.1$$

¹⁴⁵ In addition to Museveni's dismay at the 'privatisation of government institutions' (Ibid. p.139), the present UNRA is taking back the supplier functions (including infrastructure design and construction), which was a key aspect of the SAP-driven reform leading to UNRA. This observation draws on interviews with the board of UNRA between March and September 2016.

$$\mathbf{p}(t) = \mathbf{h}(t, \mathbf{x}(t), \mathbf{u}(t))$$

4.5.2

Where:

\mathbf{x} is the vector for the mechanics of the policy platform (the attendant change is dotted)

\mathbf{p} is the output (policy)vector

\mathbf{u} is the input (science and policy).

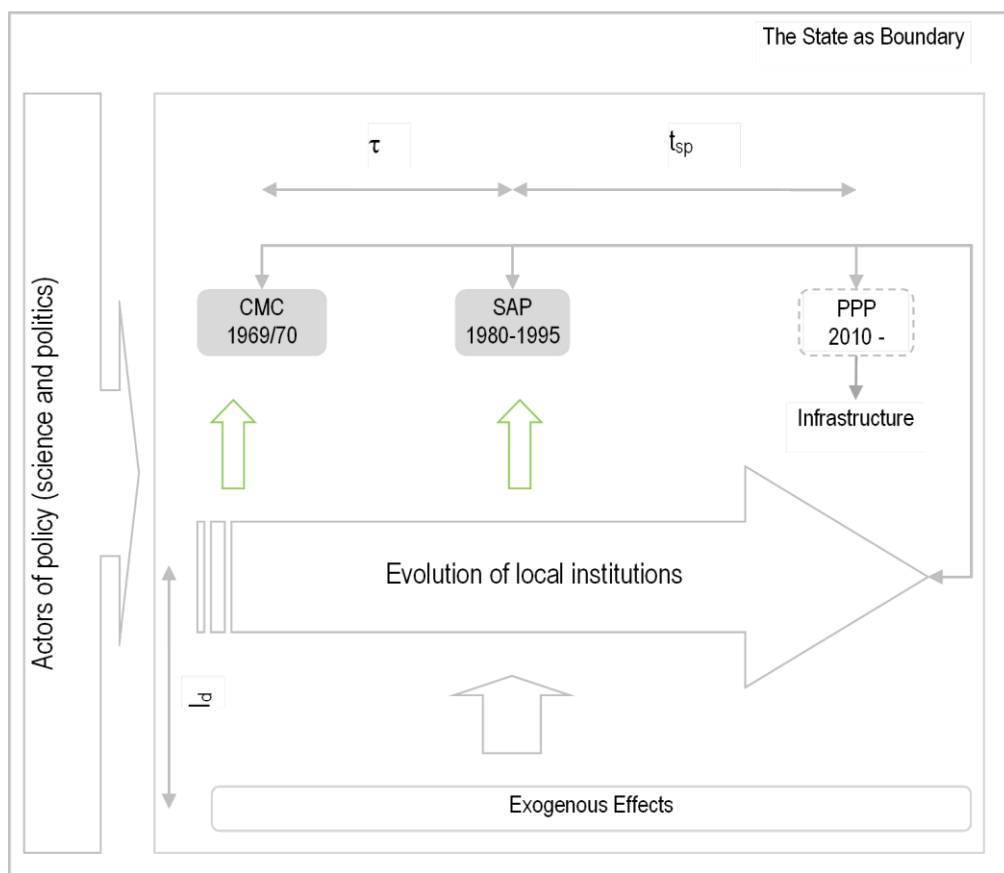


Figure 31: A Sketch of the Policy Landscape of Uganda

In equations 4.5.1 and 4.5.2, the input $\mathbf{u}(t)$ is a dot product of science (\mathbf{s}) and politics (\mathbf{y}). That is, the [draft] policy framework assumes a character of its own. It enters the legislative platform open to be remoulded by institutional forces, competing political actors, and external supranational forces.

The remoulding process of policy ideas (\hat{x}) is a function of the structure of the decision platform. The process is influenced by institutional and external exogenous effects, and the interaction of the two effects with the state (the containing structure). If the two (institutions and exogenous forces) excessively strain the state, the policy platform could collapse leading to anarchy or authoritarianism. To that end, the Amin era is instructive. That regime was part of a wave of military coups that followed independence across Africa (see Figure 32).

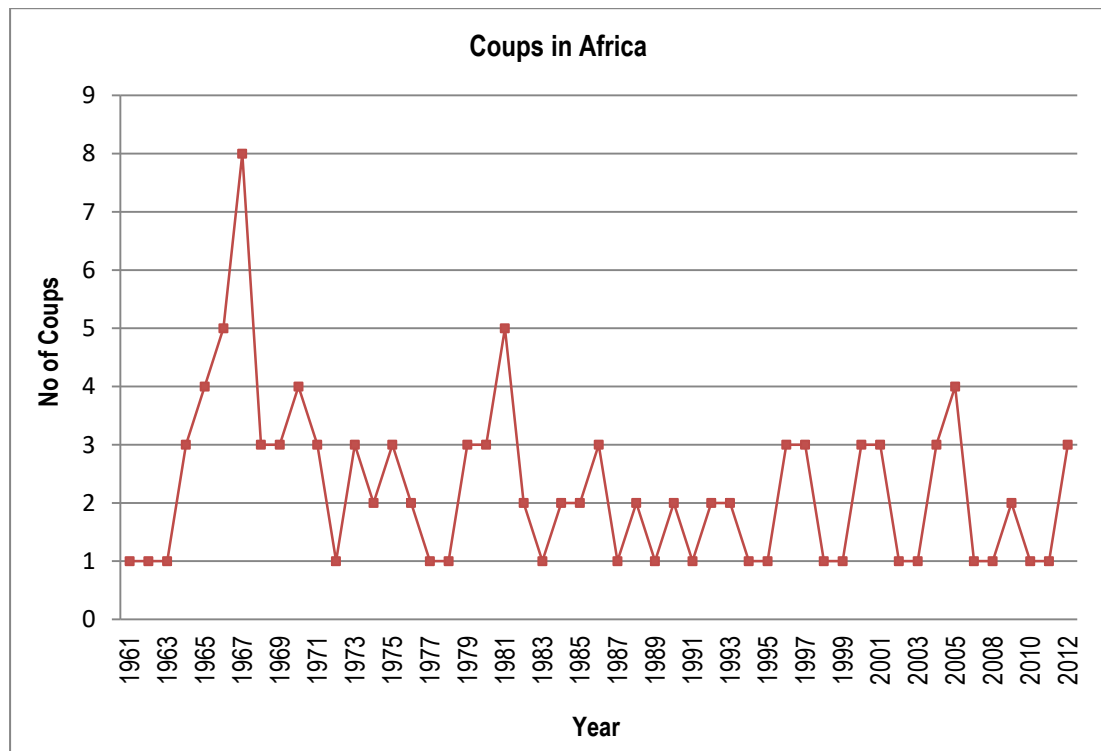


Figure 32: Military Coups in Africa
Source of Data: African Development Bank

Across the continent, colonial states clamped collages of institutions, and when the control of colonial masters was withdrawn, the new native leaders struggled to ensure the integrity of the state that was being strained by institutional tensions. Moreover, the Cold War played out as tectonic plates under the new states – leaving them vulnerable to collapse. This argument on the high number of state failures in post-independence Africa (particularly 1965-69) finds support in Mazrui (1978), Rothchild (1995), Allen (1995), and Fearon and Laitin (2003) – among many.

The Cold War is over but institutional tensions have not dissipated (see Easterly and Levine, 1997). Uganda is no exception. The residual tensions strain the state (Kibanja et al. 2016). Consequently, the tensions increase the divergence of politics from science. Consequently, the resolution of politics y on science s is weak.

The character of the policy platform described above makes it non-injective (the vector of science does not lead to a unique policy). However, specific arguments of science will have injective effect (at a lower level). For example, if sub-national PPP is a strand of the PPP policy, the fiscal implications can be mapped to specific improvement in infrastructure service. However, the path of that component of science through the policy arena is not definite. As a result, the science cannot be mapped to a specific policy outcome. The unpredictability is associated with the parameters of the policy arena (including institutions and external supranational effects). Consequently, a system that is deterministic at a lower level becomes non-deterministic at a higher level. This leads to a chaotic deterministic system (see Casdagli 1992 and Schuster et al. 2006).

Looking ahead, scholarship should borrow from fractal mechanics more extensively to illuminate the behaviour of policy systems when parameters cannot be reasonably linearised. See Weidlich 1991 for this interaction of natural and social science.

4.5 Chapter Summary

The policy space of Uganda is a dynamical system hinged on two nodes. They are the Common Man's Charter (CMC or the Charter) of the late sixties and Structural Adjustment Programme (SAP) of the eighties and nineties. These nodes are connected by the non-Markovian institution.

This chapter discusses the origin and mechanics of the two nodes. The illumination is in response to the third research question (Box 1), and the resulting dynamical system captures the 'reality of the policy space of Uganda'.

The Charter was leftist – a definitive position of the Cold War era and apparently a residual detestation of imperialism. It also seems a crystallisation of institutional struggles. It was a reaction of the unionist forces that faced the breakaway agitation of the Buganda Kingdom.

Two decades after the Charter, and with the Cold War ebbing, SAP hit Uganda. The country was a confluence of two economic crises, and it was recovering from the decay of the Amin regime. In that situation, it faced the force of SAP, itself driven by the global economic downturn of the seventies.

Agency of the state, anchored in socialist ideology, eventually relented to SAP. The state scaled down and liberalised. Many of the state-owned enterprises were privatised. The new organisations (and attendant institutions) of privatisation provided a platform for PPP in the country.

Chapter 5.0 Project Empirics: Initial Experience of PPP in Uganda

5.1 Motivation of the Section

Chapter 1 laid out the conceptual framework – dynamical system. Chapter 2 placed the concept on a tapestry of policy science. Chapter 3 placed the excitement of PPP in the literature on the subject. Chapter 4 illuminated the policy space of Uganda.

This chapter lays open the empirics of PPP – from a policy perspective. It starts with the economic and political effects of infrastructure, which is the motivation of PPP. It then considers the two salient attempts at PPP in Uganda – Bujagali Power Project and Rift Valley Railways.

This is critical to understanding the chapter, and the thesis: The aim of considering the two projects is to provide a contextual environment of PPP in the country. The chapter seeks to illuminate key drivers. The goal is not to provide a verdict on the success of these projects. This thesis firmly argues that it is too early to attempt a verdict of the two projects. The deeper mechanics of the two projects will become known in declassified archival material decades from now. However, we can look at the main links of the mechanics, and appreciate better the policy space as a dynamical system.

A Summarising Statement of Scholarly Health:

- The empirical data of this section (and indeed the entire research) should not overshadow the abstraction of the overarching framework – policy space as a nonlinear and non-ergodic system.
- The power of scholarship is in the abstraction.
- The chapter reminds us to seek structure underneath evolving empirics. For example, the actors RVR have changed since financial close but not the

mechanics captured in the overarching framework. Therein lies the purity or robustness of abstraction.¹⁴⁶

- This is a nuanced point. The empirical data illustrate the concept of nonlinearity and non-ergodicity. The data do not justify it. The justification is axiomatic (see Sec 1.3).
- The illustration of nonlinearity and non-ergodicity is simple, and should be effective. For example, would an observer looking at the state space of the rail sector of Uganda in 1967 predict the present state space? No, the present state space is different. Moreover, that observation point is only five decades back. The PPP contracts being signed today have durations of approximately three decades. Yet, today, Uganda is arguably more strongly connected to the world. To put it more formally, the forcing function of the dynamical system is stronger. Therefore, there would be no time-space for anyone attempting to dispute the conceptualisation – recall, the state was formed in 1962.

Above all, this explication of the phenomenon of PPP in Uganda is unique – buttressing the case for the epistemology of case study (cf. Sec 1.5). While the individual data points are not all a revelation, the thesis places these data points on a unique platform, and sees them through a unique lens. Chapter 2 exposes the uniqueness of the overarching framework as a lens of policy. Chapter 3 exposes this uniqueness on a background of scholarship on PPP. Moreover, for completeness, Chapter 4 lays the tapestry of the policy space of Uganda, and hence it provides a foundation for this Chapter 5.

¹⁴⁶ (cf. conservation law and Noetherian symmetry in Sec 1.3.2)

5.2 Infrastructure: The Motivation of PPP

5.2.1 *The Policy Position of Infrastructure*

Infrastructure development is the reason for PPP in Uganda. Therefore, any discussion of PPP would be incomplete without a look at the vector of infrastructure.

The vector of infrastructure in Uganda is well captured by a debate between Yoweri Museveni and James Wolfensohn (then president of the World Bank) in 2000. An excerpt of this debate is presented in Box 14.

Box 14: Debate on Roads and Poverty in Uganda

[By Y. Museveni (YM), President of Uganda, and J. Wolfensohn (JW), Former President of the World Bank]

YM: *If the roads are open the peasants would be able to market their crops. Then the traders would be able to carry their goods to rural areas. Then also investors would find it easier to go up-country and invest there. They affect tourism - tourists don't want to bump along roads for twenty hours, they want to drive smoothly back to town. So they affect everything.*

JW: *But obviously we agree that roads are essential for development but it's a question of whether it's the first thing you do or whether it's the only thing you do and it's clear now, I think, as a matter of priority, that we take a look at it. So my guess is you'll get your way which I think you're used to doing. You'll have a lot of under-educated people using the roads ...*

YM: *No problem ... once they have incomes they can fund their own education.*

Source: International Broadcasting Trust (IBT) 2000 [Available at www.ibt.org.uk accessed June 2006]

This debate illustrates a major challenge of policy science – understanding the effects of policy interventions. For transport in particular, the challenge is one of understanding the mechanics between the point of service and the aggregation of the economy. This mechanics is termed the transmission mechanism (for details, see Amonyia and Okello 2014).

Refresh: The identification of the challenge of transmission mechanism illustrates the essence of case study. The primary goal of case study is not the generation of grand predictive generalisations or conclusions. Rather, the goal is to explicate reality, yielding questions that drive research forward. Flyvbjerg (2006) and others have made this point robustly (cf. Sec 1.5).

Let us see how the strong conviction on transport shown by Museveni in the debate has influenced public expenditure in Uganda. Table 3 and Figure 33 show that the transport sector¹⁴⁷ is the leading item of social expenditure.

Table 3: Spending on Social Infrastructure in Uganda

	2008	2009	2010	2011	2012	2013
Transport						
Expenditure (Mn USD)	221.30	404.02	401.35	380.04	734.65	743.17
Percentage of Outlay	8.2	14.8	10.8	10.9	18.2	18.3
Percentage of GDP	1.6	2.7	2.5	2.5	3.7	3.5
Energy						
Expenditure (Mn USD)	197.41	158.34	237.67	169.00	179.59	126.23
Percentage of Outlay	7.3	5.8	6.4	4.8	4.5	3.1
Percentage of GDP	1.4	1.1	1.5	1.1	0.9	0.6
Health						
Expenditure (Mn USD)	203.23	225.25	278.10	336.38	432.42	284.23
Percentage of Outlay	7.6	8.3	7.5	9.6	10.7	7.0
Percentage of GDP	1.4	1.5	1.7	2.2	2.2	1.3
Education						
Expenditure (Mn USD)	470.07	413.10	498.64	485.71	554.30	588.69
Percentage of Outlay	17.5	15.2	13.4	13.9	13.8	14.5
Percentage of GDP	3.3	2.8	3.1	3.1	2.8	2.7

Source: Ministry of Finance (Uganda) and World Development Institute (World Bank)

¹⁴⁷ Particularly, roads that account for over 90 percent of passenger and freight traffic.

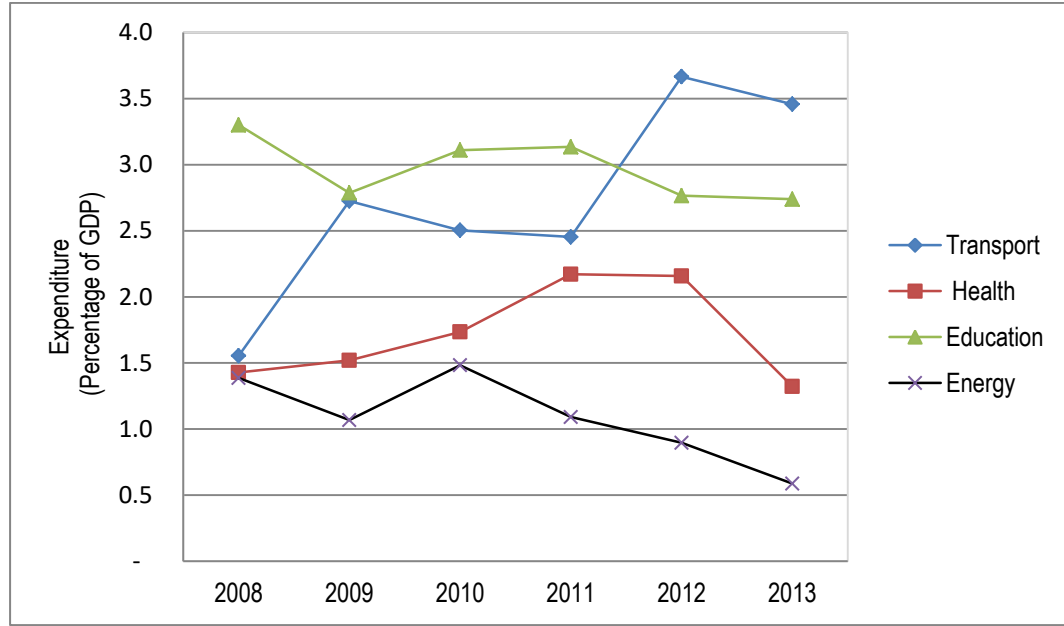


Figure 33: Uganda's Focus on Transport

Source: Ministry of Finance (Uganda) and World Development Institute (World Bank)

Having identified the challenge of transmission mechanism of transport effects and the outlays of Figure 33, let us look at the observable impact of infrastructure investment at the aggregate (national) level.

5.2.2 The Economic Impact of Infrastructure

The science of infrastructure has been driven by the World Bank, and addressed at the regional level (i.e. SSA). Therefore, while the case study is on Uganda, the framework of analysis will draw on regional work.

The dominant framework is the endogenous growth model. In particular, the steady state formulation of Mankiw et al. (1992) shown in equation 5.2.1.

$$y^* = \ln A(0) + gt + \frac{\alpha}{1-\alpha} [\ln(s_k) - \ln(n + g + \delta)] + \frac{\beta}{1-\alpha} \ln(h^*) \quad 5.2.1$$

Where:

$$y^* = \frac{Y_{(t)}}{L_{(t)}}$$

g = Technology growth rate [exogenous]

n = Labour growth rate [exogenous]

δ = Capital depreciation rate

s_k = Investment in capital [income share of capital under perfect competition]

$$h^* = \left[\frac{s_k^\alpha I s_h^{1-\alpha}}{n + g + \delta} \right]^{1/(1-\alpha-\beta)}$$

Estache (2005) uses 5.2.1 to investigate the impact of transport investment in SSA. The results are shown in Table 4. These results show that doubling investment in infrastructure is associated with 30 to 60 percent increase in per capita income ($\eta = 0.3 - 0.6$), the data consider the two core sectors of government investment – transport and energy sectors.

For a finer context of Uganda, doubling the length of paved roads is associated with approximately 30 percent increase in per capita income ($\eta=0.34$), and the improved stock would be built in approximately a decade.

Let us focus on productivity. Table 5 presents labour productivity (GDP per labour force) regressed on gross fixed capital formation. The results show a decreasing return to scale. The elasticity is 0.46. Looking at the dominant transport sector, the elasticity of road traffic with respect to GDP is 1.5-2.0 in Uganda (see Amonyia 2006). This indicates a disproportionate amount of the country's output is spent in generating road traffic. This observation is a structural fiscal challenge with implications to the development of PPP in Uganda – and particularly in the roads sector.¹⁴⁸

The regression was widened to include four other Anglophone SSA countries – Ghana, Kenya, Rwanda (post-genocide)¹⁴⁹ and Malawi. The four countries should

¹⁴⁸ Why does the country spend a disproportionate amount of fiscal resources in generating traffic? That is both a sociological and management issue. We could ask differently, why is public transport ineffective? The analysis is outside the frame of this thesis. However, such complex questions remind us that we need PPP. Embedded in the question are risks that require the joint effort of the public and private sectors over a long time.

¹⁴⁹ Post-genocide Rwanda is strongly Anglophone

share a thread of economic institution rooted in colonial heritage, and in the case of Rwanda, the thread traces to the post-genocide moulding of the country. Consequently, labour productivity of the five countries was analysed using data from WDI (World Bank). The results are shown in Table 6.

Table 4: Impact of Infrastructure on Growth in SSA (Estache et al., 2005)

Variable	Roads		Electricity		Telecom		Water	
	BM ¹⁵⁰	Infra ¹⁵¹	BM	Infra	BM	Infra	BM	Infra
Education	0.78 (10.56) $\eta=0.54$	0.45 (5.76) $\eta=0.45$	0.60 (6.78) $\eta=0.60$	0.47 (5.71) $\eta=0.47$	0.54 (11.30) $\eta=0.47$	0.32 (4.90) $\eta=0.32$	0.87 (11.04) $\eta=0.76$	0.73 (10.25) $\eta=0.58$
Total Investment	0.30 (2.71) $\eta=0.23$	0.08 (0.90) $\eta=0.00$	0.60 (6.78) $\eta=0.60$	0.14 (2.28) $\eta=0.13$	0.08 (1.26) $\eta=0.00$	0.32 (4.90) $\eta=0.32$	0.29 (2.33) $\eta=0.22$	0.25 (2.44) $\eta=0.20$
Infra		0.34 (6.69) $\eta=0.34$		0.50 (4.63) $\eta=0.50$		0.19 (4.78) $\eta=0.19$		0.57 (3.66) $\eta=0.45$

¹⁵⁰ Benchmark (BM) show estimates for human capital augmented Solow models

$$\ln(GDP) = b_0 + \delta_t + b_1 [\ln(TotalInvest) - \ln(popnGrowth - 0.05)]_{it} + b_2 \ln(Educ.) + \varepsilon_{it}$$

Where:

$i = 1, \dots, N$; $t = 1, \dots, T$; N is number of years; T is the number of time periods; and δ_t is a set of time dummies.

Note: The sum of the growth rate of technology and the rate of capital depreciation ($g + \delta$) is assumed to be 0.05.

¹⁵¹ The estimation of infrastructure (Infra) impact considers each sector separately using the following specification:

$$\ln(GDP) = b_0 + \delta_t + b_1 \ln(Infr)_{it} + b_2 [\ln(TotalInvest.) - \ln(popnGrowth - 0.05)]_{it} + b_3 \ln(Educ.) + \varepsilon_{it}$$

Roads is in km of paved roads per capita, Water as percentage of population with access to an improved water source, and Electricity as apparent consumption in kilotons of oil equivalent per capita.

Overarching Notes:

t-statistic is in parenthesis

Elasticity (η) is implied. The model uses GLS not standard OLS as a control for endogeneity.

Table 5: Impact of Social Infrastructure - Uganda

Dependent Variable: LOG(Y_N_UGA)				
Method: Least Squares				
Date: 11/11/16 Time: 14:39				
Sample (adjusted): 1990 2014				
Included observations: 25 after adjustments				
LOG(Y_N_UGA) = C(1) + C(2)*LOG(K_UGA)				
	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-2.91	0.20	-14.53	0.00
C(2)	0.46	0.01	49.55	0.00
R-squared	0.99	Mean dependent var		7.01
Adjusted R-squared	0.99	S.D. dependent var		0.28
S.E. of regression	0.03	Akaike info criterion		-4.24
Sum squared resid	0.02	Schwarz criterion		-4.14
Log likelihood	54.97	Hannan-Quinn criter.		-4.21
F-statistic	2454.88	Durbin-Watson stat		0.92
Prob(F-statistic)	0.00			

Notes:

1. The data are from World Development Indicators (WDI) completed by Ministry of Finance (UGA) and the regression was performed on Eviews 8.
2. The Durbin-Watson stat is at the borderline of acceptance. Therefore, the regression was performed using Generalised Least Squares. The results show an elasticity of 0.20 but the Inverted AR Root is 0.97, which means the dynamic process is potentially explosive, and particularly when the period of analysis is made wider and additional variables incorporated.
3. These elasticities are significantly lower than the 0.8 estimated for investment (specifically highways in the USA, 1945 - 1985) in the seminal work of Aschauer (1998). The elasticity of four Anglophone countries (Ghana, Kenya, Rwanda and Malawi) combined is 0.39.
4. The redundant Log Likelihood estimate is presented for completeness of the Eviews output. Otherwise, as a refresher, in a comparative setting (and using standard notations) we would seek: $\text{Log}\mathcal{L}(\hat{\theta}; y) \geq \text{Log}\mathcal{L}(\theta; y) \forall \theta$.
5. The same completeness note applies to the utility of model selection of AIC. Again as a refresher, for a maximum value of likelihood function \mathcal{L} and k parameters: $AIC = 2k - 2\text{log}\mathcal{L}(\hat{\theta}|y)$.
6. The Schwarz Criterion (SC) is yet another data point retained here for completeness of the Eviews output. It penalises additional parameters more than AIC: $SC = k\text{Log}(n) - 2\text{log}\mathcal{L}(\hat{\theta}|y)$. Hannan-Quinn Criterion places even a high penalty but it is less popular: $HQC = 2k\text{Log}(\text{Log}(n)) - 2\text{log}\mathcal{L}(\hat{\theta}|y)$
7. The elasticity of four Anglophone countries (Ghana, Kenya, Rwanda and Malawi) combined is 0.39.

8. The Big Picture: Ultimately, all the measures of goodness of fit and the remedies are directed to stationarity. However, not every situation can be reasonably reduced to achieve stationarity, and subsequently linearised for prediction. These situations motivate the overarching framework of this thesis, and particularly the synthesis of Chapter 6.

Table 6: Labour Productivity: Uganda in the Context of Anglophone Africa

Dependent Variable: Y_N_ALL_				
Method: Least Squares				
Date: 11/12/16 Time: 13:52				
Sample (adjusted): 1 125				
Included observations: 125 after adjustments				
Y_N_ALL_ = C(1) + C(2)*D_GHA_ + C(3)*D_KEN_ + C(4)*D_RWA_ + C(5)*D_MWI_				
	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	1153.44	67.04	17.21	0.00
C(2)	1470.07	94.80	15.51	0.00
C(3)	1243.38	94.80	13.12	0.00
C(4)	-282.49	94.80	-2.98	0.00
C(5)	-231.28	94.80	-2.44	0.02
R-squared	0.84	Mean dependent var		1593.38
Adjusted R-squared	0.84	S.D. dependent var		829.39

Notes:

1. Data from African Development Indicators
2. In this Analysis of Variance (ANOVA) model, C (1) captures labour productivity of Uganda.

Table 6 shows that a typical worker in Ghana and Kenya delivered USD1470 and US1243 (respectively, constant 2010) more than the worker in Uganda. On the other hand, the worker in Rwanda and Malawi delivered USD282 and USD231 (respectively) less than the worker in Uganda.

The difference in output per worker is not surprising since the resources and constraints will be different in the countries, despite the common economic institution.¹⁵² Let us look at the resources, and focus on the three EAC countries.¹⁵³ Figure 34 shows that indeed Uganda has lagged Kenya in fixed capital available to the typical worker, and the gap has been widening in the past ten years. Similarly, Rwanda lags Uganda but the gap has been approximately constant over the past 20 years.

¹⁵² Common Anglo-Saxon heritage. However, note that the two superior performers are coastal countries.

¹⁵³ A complete dataset, 1990-2014, for these countries was available on WDI (World Bank).

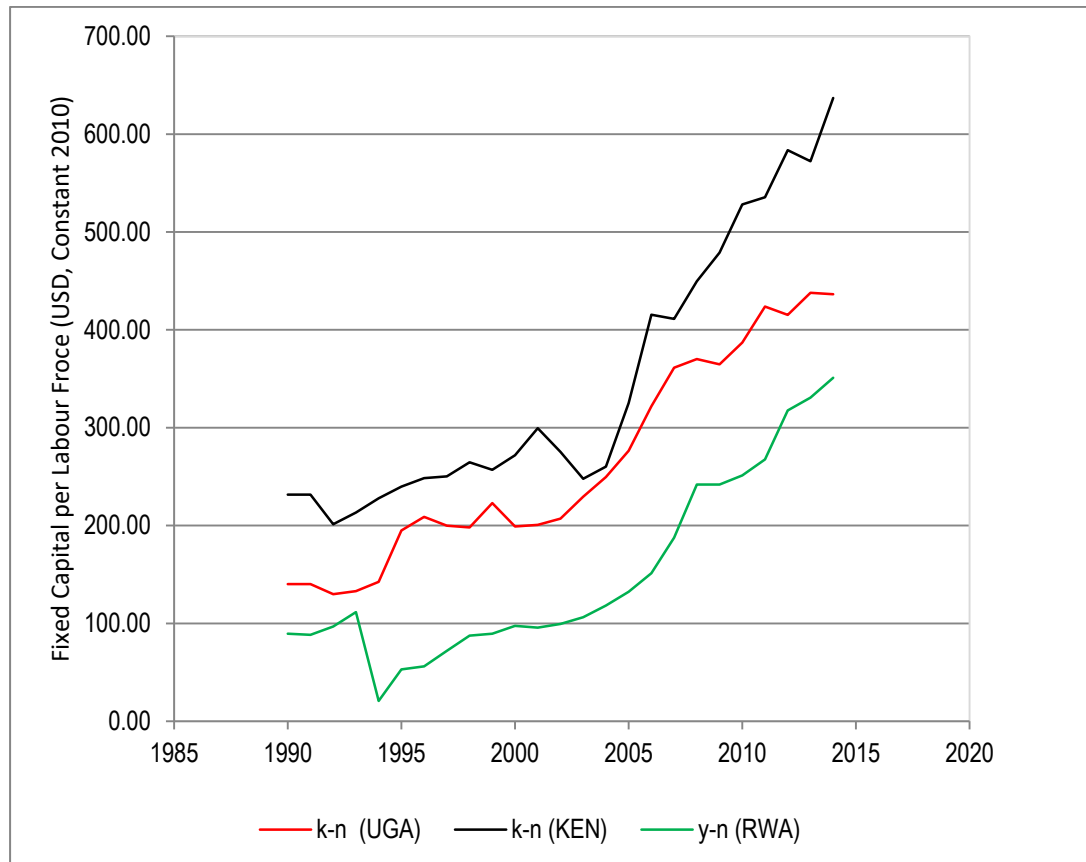


Figure 34: Fixed Capital per Worker (Uganda)

However, Figure 35 is more revealing of fixed capital formation in Uganda. Over the past decade, there has been an exponential rise in fixed capital formation. On the other hand, the output per unit fixed capital has been approximately constant. Why?

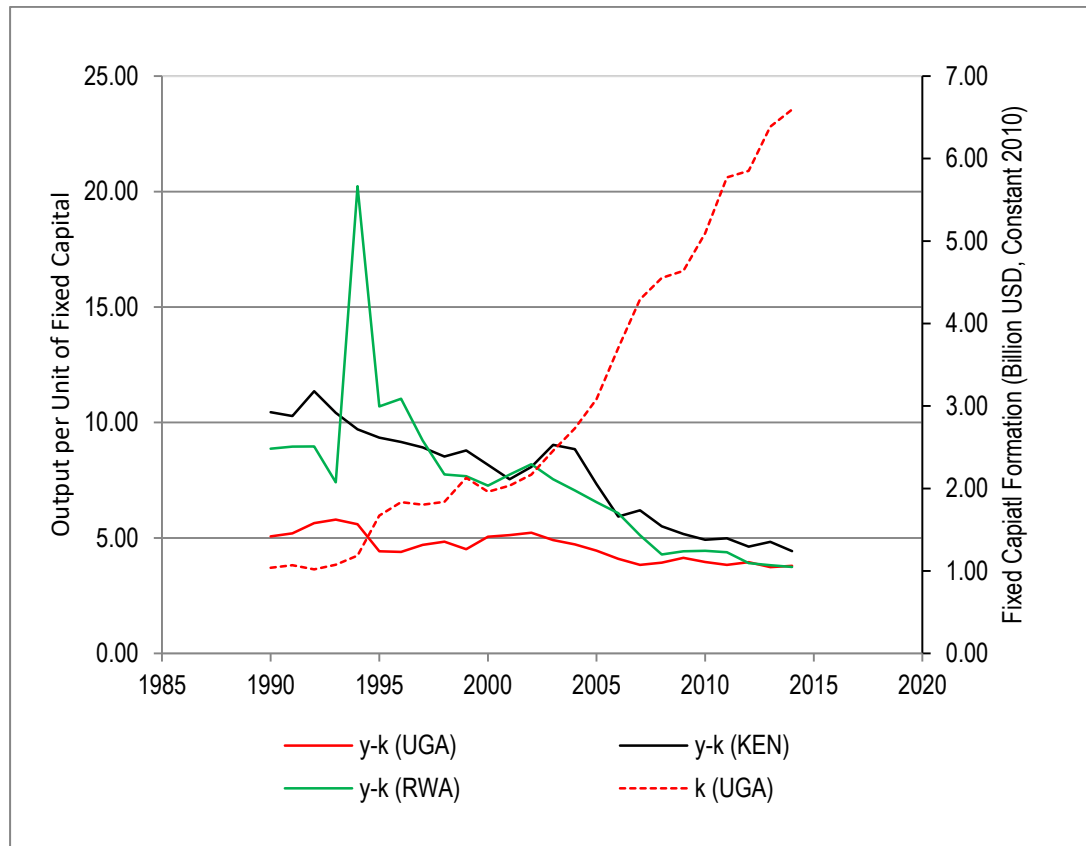


Figure 35: Output per Unit of Fixed Capital Formation

Notes:

1. Data from World Development Indicators and Ministry of Finance (UGA)
2. The elasticity of GDP w.r.t. fixed capital formation is 0.7 – 0.8.

This thesis observes the poor return on fixed capital formation (RFCF) in Uganda. RFCF is a good proxy for the efficiency of a country's attempt at 'taming' its physical environment. Therefore, the country is challenged to better integrate strands of investment in the physical environment – and infrastructure is a key strand. The complexity of that integration must be the main appeal of PPP.¹⁵⁴

The low return on fixed capital formation must be a crucial consideration in examining PPP in the country. It is a warning that the demand base of the country

¹⁵⁴ While gross fixed capital formation has average 24% of GDP over the past decade, public infrastructure investment entailing private capital amounts to less than 2% (data from WDI, World Bank). Moreover, further enquiry on this subject will benefit from triggers generated by the scatter in Appendix D.5.2. Moreover, the observation of poor return is an important output of the research. On a pedagogical note, the questions of this section are a reminder on the fundamental epistemological argument of case study. It explicates reality. Questions rising from that explication are the main product. Any intrinsic generalisations (conclusions) are a secondary product (cf. Sec 1.5).

may not support the increasing supply of infrastructure. A more integrated approach in investment is required. That integration implies complexity, and hence appeals to PPP.

Further, the lower return of fixed capital formation in Uganda (compared to other EAC countries) could stifle regional integration – and consequently the use of PPP on transnational projects. However, Figure 35 shows a convergence in the returns on fixed capital. However, this convergence seems directed to an inefficient use of fixed capital, which must concern the region. To this end, private finance could provide the requisite warning to the state actors. However, the private sector will not express such concern as long as the complexity of improving return on infrastructure is placed solely under the state, and wrapped in ‘demand risk’.

Therefore, contrary to common thinking, financing of infrastructure in Uganda (and the region) is not the biggest challenge of the sector. A bigger challenge is improving returns on investment. This is where deeper complexity resides. Consequently, it is on this complexity that PPP is most required.

For this shift in thinking to be realised, first, a deeper understanding of PPP is required. PPP must not be viewed as primarily a conduit for high outturn finance. It is a platform for solving complexities in the delivery of public service by joining the state and private sector.

Secondly, private finance and expertise should be willing to engage on the fronts of sternest complexity. These fronts are non-ergodic spaces (cf. conceptual framework Sec 1.3). PPP projects are forcing functions (excitations) in a complex space of the state, market and society. All the three are under the irrational constraint of the institution.¹⁵⁶ Therefore, private investors should be able to engage in incremental and reflexive decisions (detailed in Chapter 6).

¹⁵⁶Societal values and norms do not necessarily succumb to rationality. That axiom draws from the Northian definition of the terminology (cf. Sec 2.4.2.1).

5.2.3 Summary

Let us summarise this Section 5.2 on three fronts – Timing, Equity and Structure (TES).

Timing: The timing of intervention in infrastructure development is crucial in any ordinary situation. However, given the low return on investment shown in this section, timing of investment is even more critical for Uganda. Over a decade of exponential growth in infrastructure investment under a regime of decreasing returns to scale¹⁵⁷ raise questions on the timing of the different streams of investment.

Equity: Generally, distributional effect of public investment is important. However, for a country with a high level of poverty and inequality,¹⁵⁸ distributional concerns become more important. Equity concerns point to the spatial position, timing and the structure of the projects (i.e. the connection between the actors, institutions and policy platforms).

Structure: Whether projects are delivered under PPP or not, their structure influences the immediate spatial environment, and high outturn projects will influence the policy environment too. In other words, the structure of major projects will influence the dynamical space of policy – defined on the three coordinates of the overarching framework in Section 1.3 (the state, market and society).¹⁵⁹

The TES framework challenges the country's exponential growth in infrastructure stock over the past decade. It raises questions that cannot all be answered in this thesis, which affirms the essence of case study: explication of reality raising questions that trigger further research (see Sec 1.5).

However, we can look even closer at the projects. The remainder of this chapter focuses on two of the most prominent projects developed under the banner of PPP. The aim is to illuminate these projects, and present even finer questions – knowing that none of the projects can answer questions arising from the TES framework.

¹⁵⁷ Elasticity of fixed capital formation is 0.7-0.8 (cf. Figure 35)

¹⁵⁸ Percentage of the population living on less than \$1.90 a day (2011 international prices): 35%; Gini Coefficient: 0.41

¹⁵⁹ Mega projects often standalone as items of policy and legislation

5.3 Bujagali Power Project

5.3.1 *Motivation*

This is an explication based on archival and document analysis. The interviews in this section (and indeed the entire thesis) serve a secondary semiotic purpose – providing leads to archival and contemporary documented material. The defence of this approach to policy work is provided in Section 1.5.4.

The aim of the section is to present views of the project from three views under the TES framework (i.e. Timing, Equity and Structure). In so doing, the sections will trigger questions about the investment, which questions subsequent researchers may pursue. In addition, the explication of this section illustrates the nonlinear and non-ergodic space of the policy space of Uganda – the overarching framework of the thesis.

Further, in asking questions that guide the analysis of the project, the goal is not deterministic answers. A search for deterministic answers would amount to seeking deterministic likelihood¹⁶⁰ estimates from realisations of a non-ergodic system. That would be irrational. Instead, for example, when the thesis asks if the timing of the project was prudent, the question provides an asymptotic guide¹⁶¹ to the analysis of the project. While a deterministic answer is not possible, the analysis illuminates the project. That illumination is the ultimate goal.

¹⁶⁰ The word 'likelihood' is used in a Bayesian sense.

¹⁶¹ A rich ground for this argument is physical science as a whole, and specifically, the rewards of the asymptotic search for the solution to the N-Body Problem (see Meyer et al. 2008).

5.3.2 A Background of SAP

First, the present project (BHP) is a second attempt. In the first attempt, AES Nile Power Limited (AESNP), a limited liability, privately owned and managed company, was established to develop, construct, own and operate a 200MW Bujagali Hydropower Plant and construct 100 km of transmission line which when commissioned, would be handed over to UETCL. The project cost was USD 582M.¹⁶²

Otherwise, BHP is a derivative of SAP. The project was mooted in the late eighties, and after over a decade of preparation, financial closure was set for 2001. However, this first attempt was foiled by allegations of corruption and the economic aftershock of the 2011 terrorist attack in the USA (see Box 15).¹⁶⁴

Box 15: Cancellation of the First Attempt at Bujagali Power Project

Following the joint IFC/IDA Board approval, the project encountered several difficulties, which eventually led to a pull out of AES and termination of the project with the Government in September 2003. The main issues confronting the project were threefold. The first was the withdrawal of export credit agency support due to the high level of perceived country and business risk in January 2002. This created a financing gap of about US\$234 million, for which a promising option was being pursued with the Multilateral Investment Guarantee Agency. Secondly, in parallel, there were ongoing investigations in the US, Norway, the UK and Uganda concerning allegations of corruption involving one of the engineering/procurement/construction contractors, and links to another possible private power generation project under preparation in Uganda. Thirdly, the private sponsor's global financial situation continued to deteriorate following a severe downturn in the global economy after September 11, 2001, a worldwide change in market conditions, and the shrinking of investor interest in emerging markets. Following intense discussions between AES and the Government, on August 13, 2003, AES announced its intention to withdraw from the project.

Source: World Bank Archives, Extract from Declassified Report No. 33722-UG

¹⁶² Sources: World Bank Archives, Report No: 22963-UG

The first attempt at BHP also faced stern objection from local communities on environmental grounds. However, an independent panel supported by the World Bank concluded that due diligence had been done (Source: World Bank Archives, Inspection Report 23998).

¹⁶⁴ Therefore, the idea of BHP was in the background of Public Enterprise Reform and Divestiture Act (1993) – the legislative platform of SAP. See Figure 36.

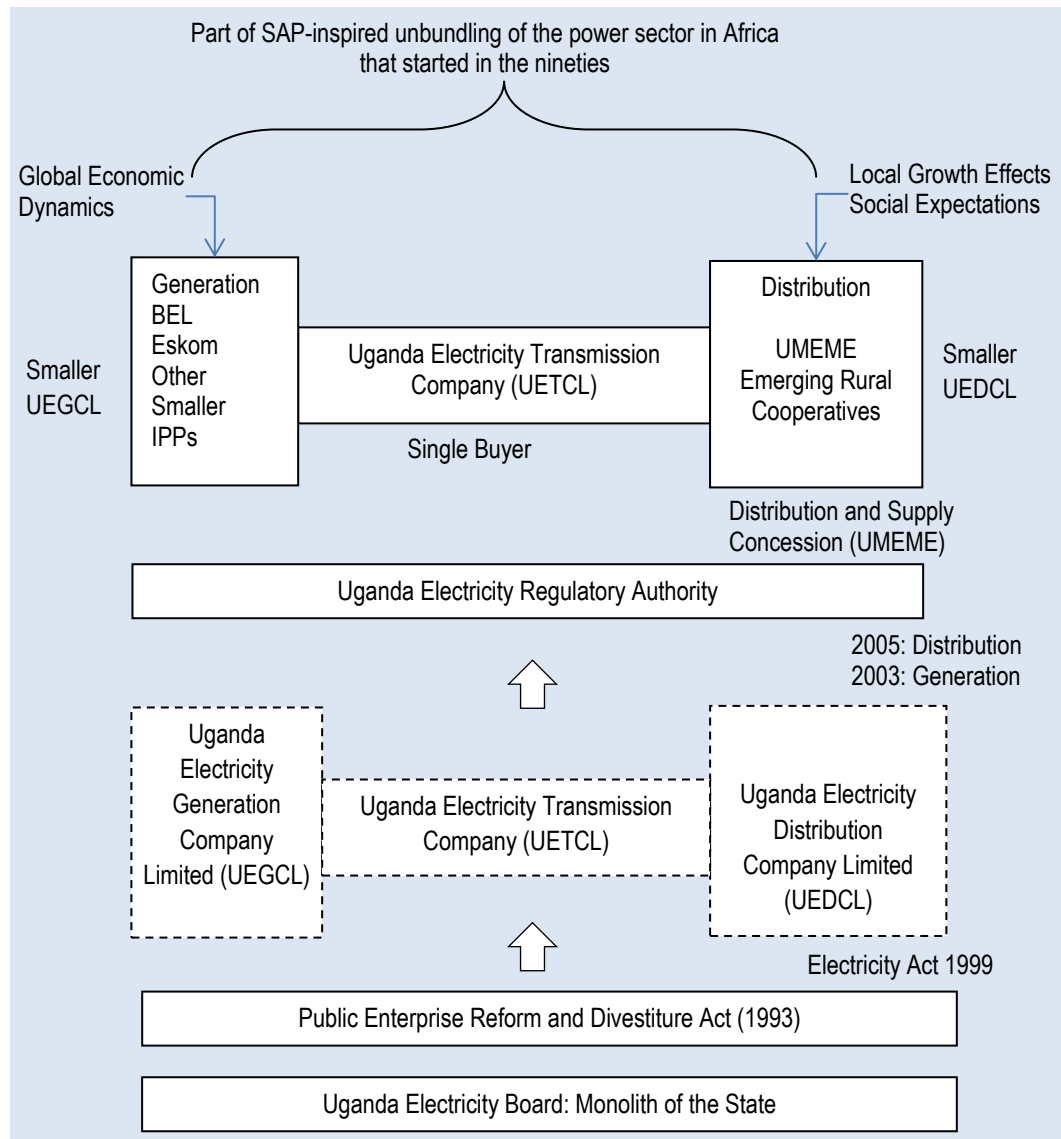


Figure 36: Reform of Uganda's Electricity Sector

Notes:

1. The Electricity Act (1999) unbundled Uganda Electricity Board (UEB) forming corporate entities in charge of Generation, Transmission and Distribution. All the three entities were incorporated in 2001.
2. In 2003, generation was concessioned out to ESKOM (U) Ltd under a 20-year contract. The responsibility of UEGCL changed to concession monitoring. The concession was restricted to the two main generation stations in Jinja- Nalubaale and Kiira Power Stations. UEGCL retained responsibility for the smaller generation points and for developing new generation stations.
3. The distribution network was also concessioned out to UMEME Limited, then wholly owned by CDC Globeleq of the UK.
4. Transmission remained the responsibility of UETCL, wholly owned by the state. Note further, UETCL is responsible for the grid [asset] operating at 33kV and above. The grid of lower voltage is the responsibility of the distribution function.
5. Sources: World Bank Archive, UEGCL, UETCL, UEDCL, IFC and AfDB

There was a second attempt at the hydropower project that culminated in the present 250MW station, and 100km 220kV transmission line. The new facility was commissioned in October 2012, increasing the generation capacity of Uganda from 130MW to 380MW. The project was developed under a 30-year concession to Bujagali Energy Limited (BEL). See details in Section 5.3.5.

Between the cancelled first attempt in 2005 and the 2012 commissioning of the new facility, the country used thermal generation stations. The World Bank estimated the cost of this gap-filling at US\$ 38.9¢/kWh.¹⁶⁵ The present weighted user cost is US\$ 11.0¢/kWh and the President is asking BEL to reduce the cost to US\$ 7.2¢/kWh.¹⁶⁶

5.3.3 The Timing

The background of Section 5.3.2 allows the following crystallisations on the timing of BHP. As SAP played out in the policy space of Uganda in the late eighties, it was projected that the generation capacity of the country would be increased by 200MW by the second half of the decade. However, the additional capacity was not realised until October 2012. The cost of the new capacity raises complications discussed in Sections 5.3.4 and 5.3.5.

The Bujagali project sits in a long and complex organisational history that must be illuminated in order to appreciate the institutional nuances of the PPP contract, and hence appreciate the challenge of timing.

The generation, transmission and distribution of electricity in Uganda was the responsibility of Uganda Electricity Board (UEB) until 1999. The Board was established as a corporate entity under the Uganda Electricity Board Ordinance (1951) and the mandate updated by the Electricity Act (1964 Revision).¹⁶⁷

Like any other corporate entity in Uganda, the Board was subjected to the upheavals of the seventies. However, it survived – it was intrinsic to the residual

¹⁶⁵ World Bank Appraisal Report No: 3842 1 -UG

¹⁶⁶ Data from BEL and the East African (see <http://www.theeastafrican.co.ke/news/Uganda-quietly-plans-takeover-of-Bujagali-dam/-/2558/2645286/-/item/0/-/hgpjcz/-/index.html>)

¹⁶⁷ Archive of Uganda Legal Information Institute

lifestyle in Uganda (cf. Sec 5.4 considers Uganda Railways Corporation, then East African Railways, which did not survive the stress of the seventies).

A stoppage is necessary at this point. The critic who may question this dig into history should realise that families that were served by the early UEB (independence time) continue as clients today. We cannot treat effects of these sectoral reforms as [memoryless] Markov chain when we face a constancy of agency.¹⁶⁸

Back to the UEB trail, the reforms of SAP that started in the eighties (Figure 36) played out in a complex space. Let us look at the three coordinates of the overarching conceptual framework (Sec 1.3). The state was remoulding. The structure had been damaged by the turmoil of the seventies. This turmoil did not spare budding actors of the market, which were also developing following the end of colonial rule (cf. Chapter 4). Perhaps worst affected was the institution. A new institution of 'chaotic capitalism' had emerged during the Amin regime.¹⁶⁹

Moreover, the broader world was still recovering from the economic downturn of the late seventies and early eighties, which triggered SAP.

Therefore, the policy space of BHP was complex (nonlinear and non-ergodic).¹⁷⁰ In considering the timing of the project, the goal is to illuminate the major strands of the space. It is not a deterministic mission to adjudicate whether the timing was optimal or not.

¹⁶⁸ This constancy of agency is straddled by the institution, which has resilience beyond the agencies. That is the import from North (1990) and Ostrom (1991 and 1998) to the conceptual framework of this thesis (Sec 1.3).

¹⁶⁹ The anecdotal account of Jamal V is lucidly informative: 'The allocation of shops began in February 1973, or so. The proceedings were televised, and broadcast, although not live. Major General Maliyamungu, Major Gowan and Col Ozo were in charge. It was a haphazard process that favoured the northerners....When they left, they just left their three brand-new Mercedes Benzes in the yard. The next morning they were gone. All abandoned cars were taken to the Kololo airstrip for "safe-keeping" A decision was made to auction them off.' Source: *Ugandan Asians: The Untold Stories*. The Daily Monitor, Uganda, 27 Sept 2012.

For the term 'chaotic capitalism' see Amonya(2016).

¹⁷⁰ A space the chair of the parliamentary committee on infrastructure (Parliament) captured as follows 'concept of PPP is not clear to government.' (Interview 21 March 2012, Kampala). The permanent secretary in the office of the prime minister put it this way: 'A lot of awareness is necessary at both the political level and senior technical offices.' (Interview 8 May 2012, Kampala)

The textual rendering above becomes clearer when we introduce a formal view. Let us refresh the dynamical system of the overarching framework (1.3.1). Moreover, let us look at this system through the Lagrangian lens:

$$\begin{cases} \frac{d}{dt} \left(\frac{\partial E}{\partial \dot{r}} \right) - \left(\frac{\partial E}{\partial r} \right) = Q \\ Q = f(\tau, e) \end{cases} \quad 5.3.1$$

Where:

E is the policy energy driving the provision of electricity to the people of Uganda. This energy reduces as the sectoral development programme is actuated.

r is the position of the energy development programme.

Q is total excitation (equivalent to generalised force in the Lagrangian language). It captures the effect of Northian institution τ and external effects e .

Let us take a closer look at 5.3.1:

1. The system in 5.3.1 is irreducible to a closed-form solution. The vectors of external effects e and Northian institution τ are multidimensional,¹⁷¹ leading to a complex and potentially explosive system. Therefore, the notion of 'optimal timing' is not open to generalisation.
2. However, between 1986 and 1995, the institution vector was reducible to a holonomic structure – it could be removed from the calculus of policy. The President doubled as Speaker, and the open space associated with the Movement meant that institutional effects could be minimised to insignificance (cf. Sec 4.2.6.2).¹⁷²

¹⁷¹ The cancellation notes of the first attempt at BHP (Report No. 33722-UG) illustrate this complexity. So do institutional issues of the project contained in Report No.: E464 of 1 March 2001 and Report RP70 of 31 March 2001 (both from World Bank Archives).

¹⁷² Also, look at Arrow's impossibility theorem and the imperative of 'dictatorship'.

3. External effects would overwhelm an economy struggling to recover as laid out vividly in Section 4.4. Worse, however, the challenges leading to, and following, the ouster of Amin could not allow the political actors to attend adequately to external effects. In the words of Makmot, 'We were totally swamped by the challenge of Amin.'¹⁷³

Therefore, when considering the timing of BHP, the goal is to use the attendant questions to illuminate the variables of the dynamical space, as this section does. It would be inappropriate to expect a deterministic answer. There is no deterministic answer, but opportunities and challenges along the different strands feeding the dynamical system.¹⁷⁴

5.3.4 Equity Effects

At USD 900million, the Bujagali Hydropower Project (BHP) was approximately 7.4 percent of the country's GDP at financial close in 2007. For that reason alone, it is worth asking: What are the distributional effects of the project?

This is a pivotal note. The thesis does not ask the question above expecting a deterministic answer. Instead, the question is an asymptotic guide in dissecting the project from an equity perspective. Understanding this approach is critical to appreciating the thesis, and the case study – as a methodology and an epistemology. The attendant defence is presented in Section 1.5. It is worth stressing that through this illumination, we are able to draw the state space of the project. Consequently, the thesis is able to use the analytic-synthetic approach to investigate definite structures of PPP (Chapter 6).¹⁷⁵

In 2001, the justification for BHP by the World Bank leaned to human rights (read, equity). The argument was rooted in 'benefits of the commonplace of goods and service' (Box 16). In 2007, the argument focused more on growth. The core thread

¹⁷³ In an interview of 24 May 2013, Kampala. Henry Makmot was State Minister for Finance, Obote II, and Delegate to Moshi Conference, 1979.

¹⁷⁴ This is the essence of case study.

¹⁷⁵ The moulded structures follow an incremental and reflexive frame in appreciation of the nonlinearity and non-ergodicity, which inhibits H-D type predictive models.

is ‘a more stable and dynamic economic base’ that would propel Uganda to ‘middle income status’.

Box 16: Equity Arguments for BHP by the World Bank

...At present, only about three percent of the population has access to electricity. While high growth performance during the 1990s has raised living standards, poverty remains pervasive and extensive. Much of Uganda's rural population remains isolated and has not yet received or seen the benefits of commonplace modern goods and services.

Source: World Bank Archives, Extract from Declassified Report No. 22963-UG (2001)

...Ugandan industrial growth has been constrained by spiralling energy and transportation costs, exacerbated by the current power shortages and both inadequate and poorly maintained infrastructure. By diversifying away from traditional exports and industries, such as the coffee sector, the Government is attempting to create a more stable and dynamic economic base. However, the infrastructure gap, particularly in energy and transportation, has placed extreme pressure on the cost of doing business in Uganda, especially for the manufacturing and horticultural sectors.

...Uganda's development objectives are articulated in the 2004 PEAP, the third version of its poverty eradication action plan. The 2004 PEAP restates the country's ambitions of eradicating mass poverty and of becoming a middle income country in the next twenty years. It promotes a shift of policy focus from recovery to sustainable growth and structural transformation.

Source: World Bank Archives, Extract from Declassified Report No. 33722-UG (2007)

When the BHP project was launched in 2012, it was an excitation of the complex space of policy, defined on coordinates of the state, market and society. This complexity would cause a strain on the project. To understand this strain, we need to look at the different zones of stress within the policy space – and in particular, stress related to the tariff. In so doing, we will be identifying the most severe complexities of the policy space. Recalling that PPP is a platform and tool for managing complexity,¹⁷⁶ we will then be ready to assess the structure of BHP as a PPP project.

Let us do the price stress analysis (PSA). The rural poor in Uganda pay US\$ 4¢/kWh (approx. 12¢/kWh, 2011 PPP) for electricity, for up to 15kWh a month. In other words, at this tariff, a rural household can light five 20W electric bulbs for 5hr a day¹⁷⁷. For the household at the poverty threshold of \$3.10 a day (2011 PPP),

¹⁷⁶ PPP is a philosophy of government and a tool service delivery. The axiomatic argument for this statement is made in Chapter 3. An empirical demonstration of this argument lies in the adoption of PF2 in the UK (HM Treasury 2012)

¹⁷⁷ This is a low efficiency scenario. Many families use 5W LED energy-saving bulbs.

that tariff is equivalent two percent of the daily income. For the lower poverty threshold of \$1.90 a day, the daily bill is three percent of the income.¹⁷⁸

Therefore, at the current tariff, most of the rural poor can afford electricity. However, this tariff of US\$ 4¢/kWh is subsidised. The local regulatory authority calls it the ‘lifeline’ band, which resonates with the human rights perspective of the World Bank in the 2011 appraisal of BHP (Box 16). The lifeline band is subsidised by approximately 75 percent relative to the weighted domestic tariff. In conclusion, pricewise, the typical rural Ugandan is not in the critical price zone.¹⁷⁹ The challenge is access not price.¹⁸⁰

Let us look at the middle group – the small and medium-sized enterprises (SME), including rural agro processors. This group faces a step function of competition. A small difference in the price of their outputs has a big impact on their sales.¹⁸¹ Therefore, the starting point should be a comparison of the price of electricity in Uganda relative to other countries in the region (see Figure 37).

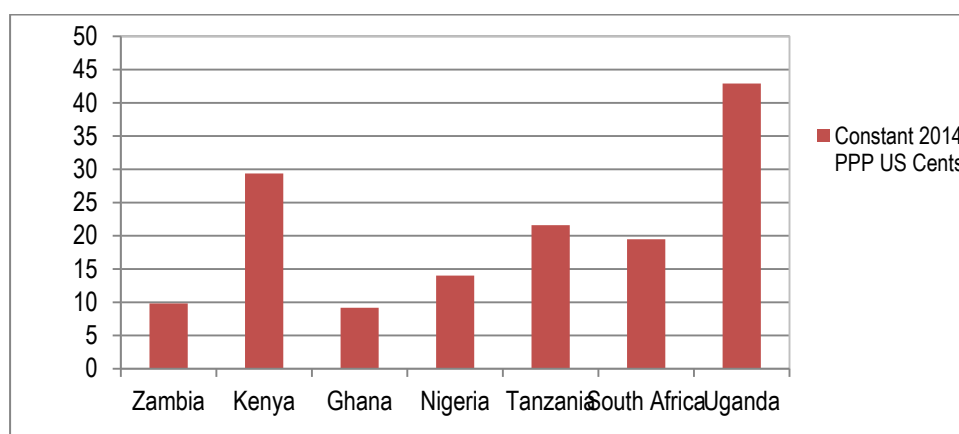


Figure 37: Commercial Price of Electricity in Selected SSA Countries

Sources:

1. Uganda Electricity Regulatory Authority
2. WDI (World Bank), PPP conversion
3. Estimates of Frost and Sullivan (www.frost.com/)

¹⁷⁸ Data from Uganda Electricity Regulatory Authority and WDI (World Bank)

PPP – Purchasing Power Parity is used in a context that avoids confusion with Public-Private Partnerships, and this note is true across the thesis

35 percent of the population live under the lower poverty threshold and 65 percent live under the upper threshold

¹⁷⁹ Unable to afford electricity outside the ‘lifeline’ band

¹⁸⁰ Only 18 percent have access to the main grid (Ministry of Finance Uganda, 2016).

¹⁸¹ This is a fact of regional competition.

The price stress reflecting in Figure 37 captures the most complex zone of the electricity space of Uganda. The commercial segment subsidises the rural poor as observed above (the tariff ratio is 0.75). The high-end consumer not engaged in industrial and processing enterprises pays US\$ 17¢/kWh (52¢/kWh, 2014 PPP)¹⁸². At a per capita income of US\$ 676 (current prices) and per capita annual consumption of 61kWh, the Ugandan belonging to the average household spends just over 1.5 percent of the income on electricity.¹⁸³

Therefore, the critical stress zone of the dynamical space of PPP around BHP is the manufacturing and agro-processing sector. To this sector, marginal prices are a step function. A slight increase in price has significant impact on competitiveness.

This stress analysis is at the heart of understanding PPP in Uganda, and BHP in particular. The critical zone of enterprise above places the strongest appeal for PPP (as a policy concept). It is the area of sternest complexity, and hence risk.¹⁸⁴

The next section addresses the corporate structure of BHP, and discusses the weakness of the structure in respect to the main complexity of the PPP space, industrial and agro-processing sector.¹⁸⁵ Note, the discussion progresses from the price stress associated with power consumption to the specific corporate structure of BHP – and how it relates to the price stress.

¹⁸² Consumption in excess of 15kWh a month

¹⁸³ WDI (World Bank) and Uganda Electricity Regulatory Authority corroborated with Uganda Bureau of Statistics

¹⁸⁴ To appreciate better the complexity of this space, we need to look beyond electricity. Agro-processing is a central activity of the critical economic group. However, land reform in Uganda is only taking shape (see for example Leeuwen et al. 2016). This reform is constrained by a strong institution pertaining to land, which makes the reform a high-energy nonlinear phenomenon and so does the derived agro-processing.

In addition to the land issue, the local capital market is young and changing fast. For an identification of the issues see Heikkilä et al. (2016), though the authors miss the appreciation of dynamical systems and consequently end up in the common trap of generalisation. Straddling all these issues of the agro industry is the institutional (and hence structural) product of change often presented simplistically as corruption.

¹⁸⁵ The generation cost of BHP is US\$ 11¢/kWh (ERA - UGA, 2016). As a comparative offshoot, with the assistance of the World Bank Group, Zambia auctioned solar energy supply in July 2016 and the lowest bid was US\$ 6¢/kWh. Caution, quick generalisation would not be helpful. Instead, this note should trigger new case research, which is the essence of case study. Details of the Zambia case at: www.ifc.org/wps/wcm/connect/industry_ext_content/ifc_external_corporate_site/industries/infrastructure/power/scaling+solar

5.3.5 The Structure

This section identifies the main actors of the project and the motivations at the interfaces of their interactions. The aim is to place BHP as a positional vector on the complex state space of PPP in Uganda. In other words, is BHP aligned to the sternest challenge of the PPP space? The structure is captured in Figure 38.

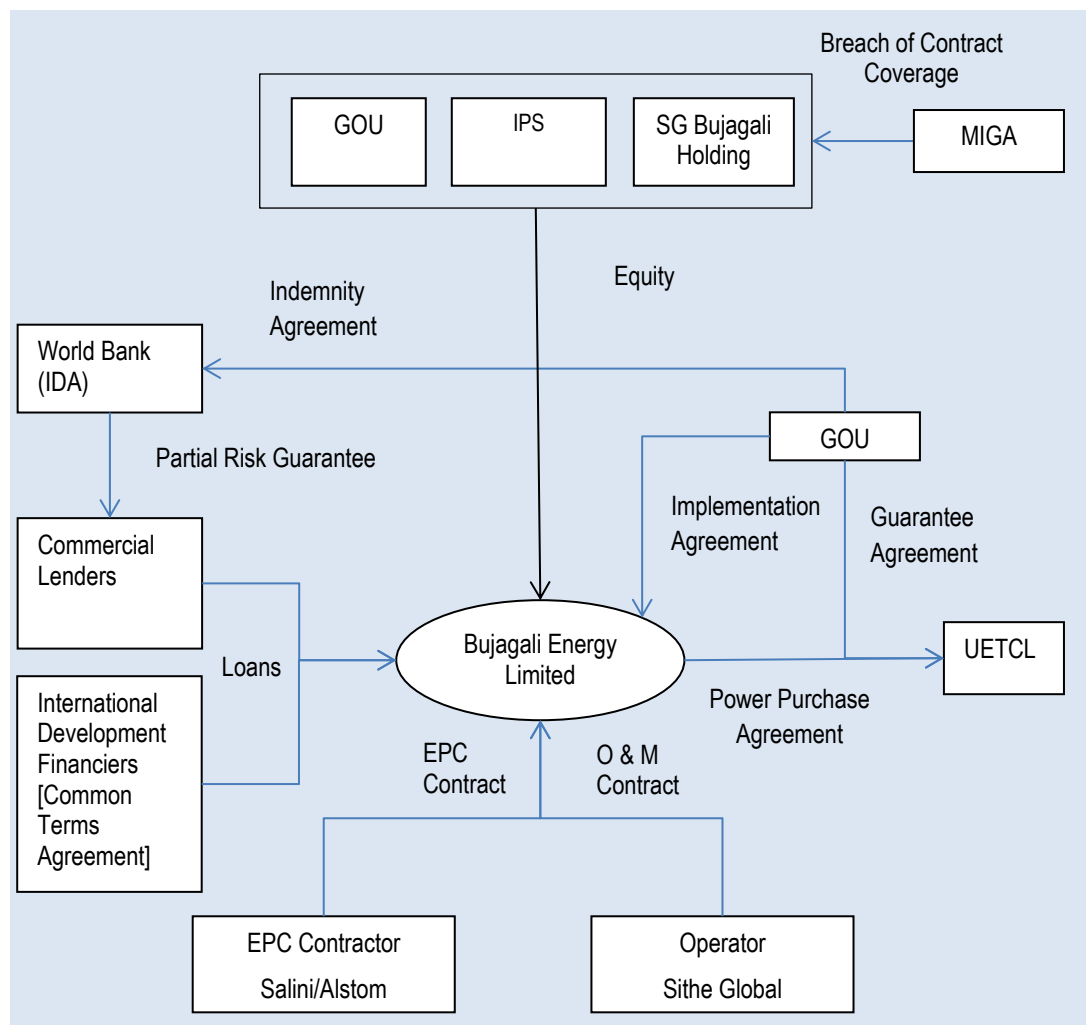


Figure 38: Corporate Structure of BHP

Notes:

The Parties

1. The Special Purpose Vehicle (SPV) called Bujagali Energy Limited, BEL) is a company registered in Uganda, and it comprises Sithe Global Power LLC (USA) through its special purpose affiliate SG Bujagali Holdings Ltd., (collectively, Sithe Global) registered in Mauritius and Industrial Promotion Services (IPS), an affiliate of the Aga Khan Fund for African Development (AKFED) of Kenya. The financing at financial close was US\$682M.
2. The state is excluded from the SPV, despite public equity of US\$20M (in other words, the Government is excluded from board decisions).
3. Multilateral and bilateral debt was provided by European Investment Bank (EIB), International Finance Corporation (IFC), African Development Bank (AfDB), Nederlandse Financierings-

Maatschappij voor Ontwikkelingslanden N.V. (FMO), Societe de Promotion et de Participation pour la Cooperation Economique (Proparco)/Agence Francaise de Developpement (AFD), DEG-Deutsche Investitionsund Entwicklungsgesellschaft MBH (DEG) and KfW.

4. Commercial debt was provided by Standard Chartered Bank and Barclays/Absa Capital
5. International Development Association (IDA) provided Partial Risk Guarantee up to US\$115M.
6. Multilateral Investment Guarantee Agency (MIGA) provided Breach of Contract Coverage [commonly, Political Risk Guarantee] of US\$115M. This is cover for sponsor's equity.

Partial Risk Guarantee

1. Overarching view: This is a catalyst for debt finance to the projects through commercial loans.
2. Maximum IDA liability is US\$115M. The Partial Risk Guarantee Agreements comprises:
 - an IDA Guarantee Agreement between IDA and the commercial lenders to BEL
 - the Indemnity Agreement between IDA and the Government of Uganda
 - a Project Agreement, entered into between IDA and BEL
 - IDA Guaranteed Facility Agreement between IDA guaranteed lenders and BEL.
3. Term: 16 years (through Loan maturity) with up to an additional 3 years after Loan maturity if there is an ongoing dispute with the Government.

Breach of Contract Coverage

- This is cover for equity finance.
- MIGA provided World Power Holdings SarL (Luxembourg) (WPH), a Luxembourg incorporated company (the Guarantee Holder), a guarantee covering its equity investment of up to US\$115 million in BEL via SG Bujagali Holdings Ltd. (Mauritius), a wholly-owned subsidiary of WPH incorporated in Mauritius. The period of coverage is 20 years, and it is protection against the risk of Breach of Contract by UETCL and the Government of certain obligations (cf. next note) under the Power Purchase Agreement (PPA), the Implementation Agreement (IA) and the Government Guarantee Agreement (GA). Specifically: the Termination Payment that would be owed by UETCL under the PPA when that Termination Payment is not paid by the Government in accordance with its guarantee of UETCL's payment obligation under the GA.
- Breach of Contract Coverage protects against losses arising from a repudiation or breach by the host government of a contract entered into with the guarantee holder, provided that a final and binding arbitration award or judicial decision has been rendered in favour of the guarantee holder and cannot be enforced against the host government. Compensation is based on the amount that the guarantee holder is entitled to recover from the host government in accordance with the terms of the arbitration award or judicial decision.
- MIGA's Convention provides for coverage under Breach of Contract in three different scenarios: (i) when the Guarantee Holder does not have recourse to a judicial or arbitral forum to determine the claim; (ii) a decision by such forum is not rendered within a reasonable period; or (iii) such a decision cannot be enforced.

Service Summary

- The primary PPP facility is a 250 MW, and construction of 100 km high-voltage transmission line now managed by UETCL
- BEL sells electricity to UETCL under a 30-year Power Purchase Agreement (PPA).

Capital Summary

- US\$900 million non-recourse
- US\$700 million long-term debt
- 16-year facility from EIB, AfDB, DEG & IDA PROG
- Barclays/ABSA & Standard Chartered
- 20-year facility from IFC, Proparco & FMO
- US\$180 million private equity (Blackstone & Aga Khan Foundation)
- US\$20 million public equity investment (pre-financing capital with no effect on SPV organisational structure – no board position).

Sources of Data:

- Sithe Global
- World Bank Archive
- Bujagali Energy Limited

The highlight of Figure 38 is the special purpose vehicle (SPV). While the state contributed equity drawn from the residual value of existing assets, the SPV excludes the state. This is common practice.¹⁸⁶ However, it is not the desired or asymptotic organisational structure of PPP. Recall, PPP is an instrument (and philosophy) for managing risk. Axiomatically, the PPP instrument is most useful at the point of sternest complexity, and risk. That zone of sternest challenge must be the ultimate pursuit.¹⁸⁷

The private party in BHP is shielded from the zone of critical price stress by the structure of international development led by the World Bank. The thesis calls this structure the supra-state¹⁸⁸ (see Figure 39). Therefore, the effective interface of PPP (w.r.t. BHP) is between the external market and the supra-state. The interface between the state of Uganda and the external market hardly exists. After all, when faced with a risk of significant financial loss, the external market falls back to the supra-state.

Consequently, the old institution of donor funding still governs the interface between the state of Uganda and the supra-state. It is a public-public relationship. However, the state of Uganda solely bears the risk of critical price zone (i.e. the risks associated with industrial enterprise in the country).¹⁸⁹

Therefore, even at the lower level of risk (restricted to asset delivery and management), the country would mould its institutions better by having a more

¹⁸⁶ For a detailed appreciation of this practice, see Amonya (2006). It details the history of road reform around the world, and the emergence of PPP. To the uninitiated, this history is rather unified. The attractor is the spaces created by war and economic distress. In low-income countries (or 'developing countries' in the old lexicon), the agent of change was the World Bank and the structure of change was the ease of rigidity – that is, it is easy applying the same 'model' across countries.

¹⁸⁷ This point cannot be overemphasized, and the UK experience offers a strong illustration. Moreover, this argument is axiomatic, and deeper than socio-economic disparities of jurisdictions – in this case, Uganda and the UK. HM Treasury (2012) resolved that public equity and board representation should characterise the SPV, and that decision drew from a deep empirical evidence of PFI-type PPP but this empirical product can be arrived at from an analytical and axiomatic approach. In fact, in a presentation to the [Chartered Institution of Highways and Transport \(CIHT\) in Cardiff](#) earlier that year, this author argued that the future demanded public equity in the SPV. That argument was axiomatic, and again, it preceded the HMT decision.

¹⁸⁸ This terminology is appreciated better when considered on a framework of juridical and de facto states formulated by Jackson and Rosberg (1982). In effect, the international development entities act as a structure above the state, and hence the terminology.

¹⁸⁹ Unless an expectation of future debt forgiveness is factored into the analysis (cf. 1999-2003).

direct exposure to the external market.¹⁹⁰ That quest will remain onerous given the perceived ‘business risk’ of the external market towards the state of Uganda (cf. Box 15).

Moreover, for long-term sustainability, the local market needs to have direct exposure to these forces of risk.¹⁹¹ In the present arrangement, the local market (including the asset managers) is merely part of the supply chain akin to their role in traditional donor funded projects. See Figure 39.

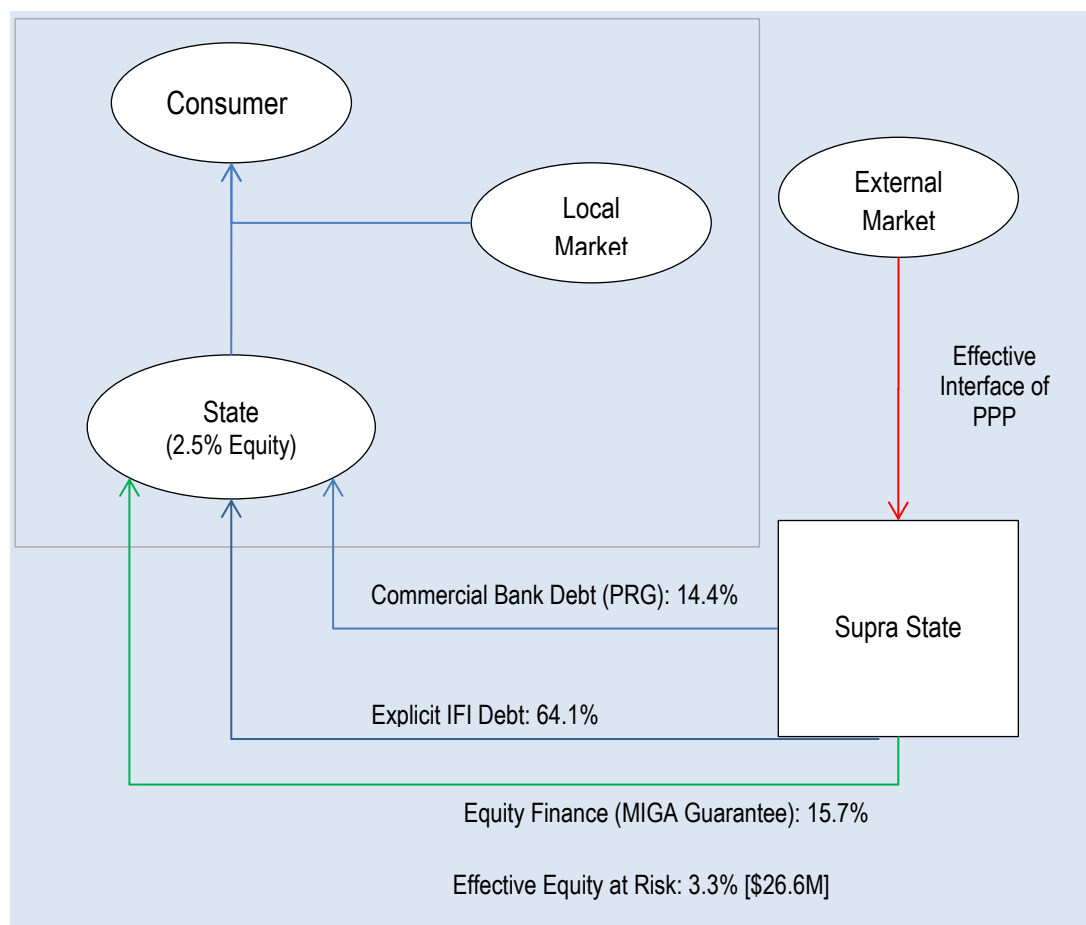


Figure 39: BHL - The Mechanics of Risk

¹⁹⁰ In the high-income countries, and particularly the UK, this interface was ameliorated by monoline insurers. Many of these insurers collapsed following the global financial stress of 2007/8 (see Raisbeck 2009, von Thadden 2009, and Demirag et al. 2011). Despite the demise of monoline insurers, the institutional benefit of the arrangement must not be overlooked.

¹⁹¹ This is required for the development of PPP as an object of economics but also as a remoulding of institutions. On the latter, the country's Deputy Secretary to the Cabinet put it succinctly in an interview on 7 May 2012 in Kampala: 'Our people must know it.' That 'knowing' leads to institutional remoulding.

In closing, the structure of BHP shields the external market from the most severe risk associated with industrial enterprise. The state is left bearing the risk. For sustainability, the state needs more direct exposure to the external market, and the external market should have exposure to the critical price zone.¹⁹² In addition, the local market needs direct exposure to the risks of PPP. This desire will not be achieved quickly. The long-term institutional building will need sub-national PPP discussed in Chapter 6.

5.3.6 Summary: The Challenge of a Non-Ergodic Space

As part of SAP, the electricity sector of Uganda was unbundled forming generation, transmission and distribution corporate entities. A major offshoot of the generation function is BHP. This 30-year concession is being managed in an environment of price stress. The consumer in Uganda faces the highest prices in the region. The most affected segment is the industrial and agro processing enterprise. This is a complex segment comprising many interwoven policy and institutional strands.

More formally, this project is a facet of PPP playing out in a nonlinear and non-ergodic dynamical space. Prediction of the long-term future would not be meaningful. Instead, an incremental and reflexive approach is required, and particularly at critical points of change when institutional effects can be controlled.

BHP was not designed to allow a joint effort by the state and private sector to manage the sternest complexity and risk. The project required proactive engagement of the state in a joint public-private direction of the project. In other words, the project required substantial public equity with significance on corporate governance (the SPV). Looking forward, sub-national PPP provides potential for building an institution of joint public-private direction of PPP projects. This is a subject of Chapter 6. First, we need to look at the other project, Rift Valley Railways (RVR) Concession.

¹⁹² The parlance goes 'PPP should align risk to the party best positioned to manage it'. We must look deeper than that statement. At the foundation, the need for joint management (i.e. public equity) emerges. That need led to PF2 (see HM Treasury 2012). However, in delineating responsibility from the joint underpinning towards the operational level, indeed the party best positioned to manage a risk item should bear it. Cf. Sec 3.3 and 3.4. Moreover, the force of that argument and the reality of the dynamical system is seen in the present attempt at renegotiating BHP (see Monitor 2016).

5.4 Rail Concession: Rift Valley Railways

5.4.1 *A Background of Common Man's Charter*

First, the dissection and view of this project is motivated in a similar way to the last (the Bujagali project) in Section 5.3.1. The section also uses the TES framework. However, equity or distributional consideration is less pronounced in RVR than in BHL. The reason is simple. The rail sector deteriorated so dramatically in the seventies and eighties that the SAP reform could only salvage it for freight transport.¹⁹³

While the 25-year Rift Valley Railways (RVR) concession is a derivative of the privatisation of the rail sector under SAP, the institutional structure of the sector traces back to colonial rule, and subsequently to the institutional and policy node of CMC. Unlike the electricity sector, the rail sector was regional. It traces back to the East African Railways of the colonial times. Following independence, CMC became the policy underpinning for the rail sector. This is a nuanced but critical point to understanding rail reform in Uganda.¹⁹⁴

Moreover, by considering the rail and electricity sectors in a single research, we are able to illuminate the institutional strands from CMC to SAP. These strands define the policy space of Uganda (cf. conceptual formalisation 1.3.1).

5.4.2 *The Timing of RVR*

In 2005, the governments of Kenya and Uganda jointly tendered for two 25-year concessions for the rehabilitation, operation and maintenance of the rail route, which was then managed by Kenya Railways Corporation (KRC) and the Uganda Railways Corporation (URC).

¹⁹³ The collapse of the EAC in 1977 was a fracture on railways in Uganda – more so than the electricity sector. Ravenhill (1979) called the EAC 'the most sophisticated regional cooperative arrangement in the Third World'. Stated differently, the collapse of the EAC was a tremor in regional integration, and the rail sector that stood as a truss on the regional bloc, would not survive this tremor. Cohen (1993) and Bachmann and Sidaway (2010) bring this history to bear on the present effort towards a tight collaboration in the EAC.

¹⁹⁴ For the post-colonial history, see O'Connor (1965). The rail sector was a feature of the East African Community. CMC was the Ugandan chapter of the socialist policy stance of the sixties, which bound the region.

The tenders were awarded to two SPV companies (concessionaires) under the holding company Rift Valley Railways Consortium (RVRC), which would own 100 percent the two concessionaires.¹⁹⁵ See the corporate details in Section 5.4.4.

5.4.3 Equity Effects

The dynamical system of the conceptual framework 1.3.1 plays out on a relatively stable socio-economic stratum. That is, the dynamics of policy does not have an instant impact on the economic mapping of the society. For example, policy actions will transform the broader rural lifestyle long-term (relative to the time function of the policy actions). This lag is a simple truism but it is vital to appreciating this section. It allows us view the nonlinear and non-ergodic dynamical policy space as supplanted on a relatively stable socio-economic layer.

In the layered view above, the dynamical top will cause stresses in the underlying stratum. To that end, when considering a PPP action (excitation) like RVR, we ought to consider how the challenge motivating the PPP project induces stress in the underlying socio-economic structure. Consequently, we can ask if the structuring of the project responds adequately to the stress distribution. That is the essence of this section, and is akin to the price stress analysis in Section 5.3.4.

Let us see a formal view of the narrative above. Let \mathbf{R} be the vector of improvement in the rail sector, and \mathbf{S} the vector of impact on the underlying socio-economic groupings. Formally, and in suffix notation:

$$S_i = \vartheta_{ij} R_j \quad 5.4.1$$

Where:

ϑ is the [second-order] *susceptibility tensor* of the socio-economic system.

Let us do a susceptibility analysis of the socio-economic groups to the rail challenges of the country. Figure 40 shows a rural population predominantly reliant

¹⁹⁵ International advisers were appointed to guide the process - CANARAIL (Kenya) and the Corporate Advisory Services (CAS) of IFC (Kenya) and CANARAIL (Uganda). The transaction was the first of its kind for either country. The two SPV entities were companies incorporated in the two countries, RVR (Uganda) and RVR (Kenya).

on road transport. Rail passenger transport collapsed in the eighties.¹⁹⁶ Therefore, rural Uganda looks to road transport for physical connection with the world. Moreover, the rail system constructed in the early 1900s targeted sources of raw materials.¹⁹⁷ The early road user typically walked many miles to access a rail station. As the road network developed and vehicles became more available, the influence of rail as passenger transport diminished. Consequently, as the government considered the RVR project, the focus was freight.¹⁹⁸

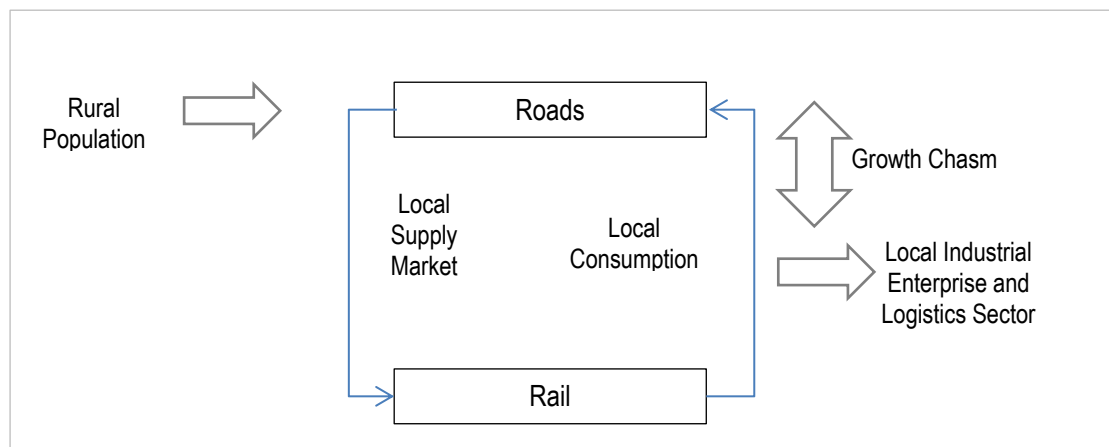


Figure 40: Susceptibility Mapping of Transport in Uganda

To a significant part of rural Uganda, the freight option of rail remains a potentially more efficient alternative for market access, which would contribute to closing the growth chasm evident in the low return on infrastructure investment (Sec 5.2.2).¹⁹⁹ However, at the preparation stage of project (2002-2005), the main demand nodes

¹⁹⁶ For this history, see (Obbo 1988, O'Connor 1965, and Nayenga 1981).

¹⁹⁷ Ibid. The key nodes were Kasese in the South-West (copper) and Pakwach (tobacco).

¹⁹⁸ An interview (21 March 2012, Kampala) with the chair of the sectoral committee on infrastructure (Parliament) and an MP from an old 'rail region' (West Nile) was revealing. He was not 'up to date' with progress of RVR. It reveals the removal of rail from the ordinary Ugandan (including their representatives).

¹⁹⁹ The puzzle of Figure 35 becomes clearer when seen against the background of this chasm. However, this complexity comprises many moving strands (see Sec 5.3.6). Moreover, this demonstrates the challenge of scholarship on growth. Econometrics premises on linearisation of complexity. That premise is challenged on a long timeframe (such as the institutional traverse of RVR and BHP, from CMC to date). Non-ergodicity emerges. The longitudinal structure and explication epistemology of case study becomes appealing.

were the major towns. However, the existing capacity (infrastructure and locomotive) could not meet this demand.²⁰⁰

In other words, the critical group was the urban industrial enterprise and agro processors. However, rail had the potential to spread agro processing (in particular) to rural Uganda.²⁰¹ Still, the immediate potential was the urban demand.

Consequently, politically rail was of lower priority compared to roads. Most of the voters lived in the rural area,²⁰² and most of the road network is unpaved.²⁰³ This distributional effect alone would lead to a constrained state more removed from the complexity of the RVR project.²⁰⁴ This observation provides an insight into the structure of RVR.

Section 5.4.4 presents the structure of the project. The structure shows the private sector solely bearing the complexity (and risks) associated with the critical group – the enterprise. State structure is removed from the management of this complexity.

5.4.4 The Structure

This section uses empirical data on corporate changes in the project from archival sources complemented by interviews. More significantly, the section uses the conceptual frame of nonlinearity and non-ergodicity of policy space to parse the set of empirical data.

Figure 38 shows the corporate structure of the project at its commencement in 2006. RVR Investments (Pty) Limited anchored by Sheltam Rail of South Africa was selected after international competitive bidding, the standard World Bank procurement process.

²⁰⁰ The due diligence estimated that in the 'more optimistic scenario' traffic would increase from 900,000 tonnes p.a. in 2002 to 2,388,000 p.a. in five years. The 'less optimistic' scenario had an increase to 1,565,000 tonnes p.a. Capacity improvement was the main concern. (Source: URC, CANARAIL, 2002).

²⁰¹ Cf. electricity issues Sec 5.3.4.

²⁰² 84% (Source: WDI, World Bank)

²⁰³ Only 10,000km of the 60,000km of classified roads is paved.

²⁰⁴ Moreover, in a series of interviews with the Managing Director of URC (Feb-March 2012), he pressed for a portion of the road fuel levy in appreciation of roads-rail interaction. However, that plea remained unsuccessful.

However, within two years the project had come under severe stress.²⁰⁵ The management of RVR described their challenge as 'huge backlog of deferred maintenance in tandem with systems upgrades, organisation structure and business process re-engineering'.²⁰⁶

The RVR investors committed to a complex challenge beyond the organisational and financial resources they had projected in their bid.²⁰⁷ Unlike the BHP (Sec 5.3.5), on the RVR project the private sector bore the severest complexity and risk. The challenge of the infrastructure and locomotive assets RVR identifies above was perhaps less onerous than the institutional challenge. They express the institutional challenge using the euphemism 'business process re-engineering'. This is a challenge that traces back to the institutional strains on the rail sector in the seventies.²⁰⁸ This challenge required a joint effort of the public and private sectors. The state needed to have an effective equity stake in the SPV – a stake that allowed continued joint decision-making.²⁰⁹ The state looked at RVR as an opportunity to develop the private sector, and yet the attendant institutional challenges were left to the RVR consortium.²¹⁰

Moreover, since commencement, the World Bank Group has acted as a stabilising stratum. The Bank looked at the project as a stimulant on their development

²⁰⁵ On 19 October 2008, the East African reported plans to 'open the way for other investors to inject capital into the troubled consortium'.

The 2008/9 annual operations report of RVR notes in the opening: 'A hostile Kenya and Uganda national assembly and press particularly in the first half of the year. The damage caused by the media reports cannot be wished away, fortunately, the Governments, the lenders IFC and KfW, have in the whole continued to be very supportive.' (Source: URC Archives, accessed April 2012)

Yet approx. a year earlier, August 2007, the Parliamentary Committee on Infrastructure (Uganda) was upbeat about the progress of RVR, and urging regional collaboration with South Sudan to extend the service in Uganda and South Sudan (Source: Parliamentary Archives, Uganda, Accessed March 2012).

²⁰⁶ 2008/9 annual operations report (p.4)

²⁰⁷ The restructuring and refinancing that followed in 2011 corroborates the distress RVR expressed in the 2008/9 operations report.

²⁰⁸ In a series of interviews with the Managing Director URC, Feb-March 2012, the challenge of the institution was salient. The sector drastically deteriorated following during the Amin regime, including the collapse of the East African Railways and the EAC.

²⁰⁹ Cf. Sec 5.3.5 on the axiomatic argument for public equity.

²¹⁰ The concession agreement reflects this goal of developing the private sector, and the Interface Agreement (7 April 2006, Art. C1) in particular, stipulates that nationals had to join the SPV. However, nationals (individuals or corporate entities) could not have the statutory strength RVR needed in managing this complex field.

On the subject, the minister for transport said 'you must, as a government, facilitate its development' (Interview 06 March 2012).

terrain.²¹¹ Consequently, the project rescue leading to the 2011 restructuring (see Figure 42) was inspired by the World Bank, and in particular the IFC.

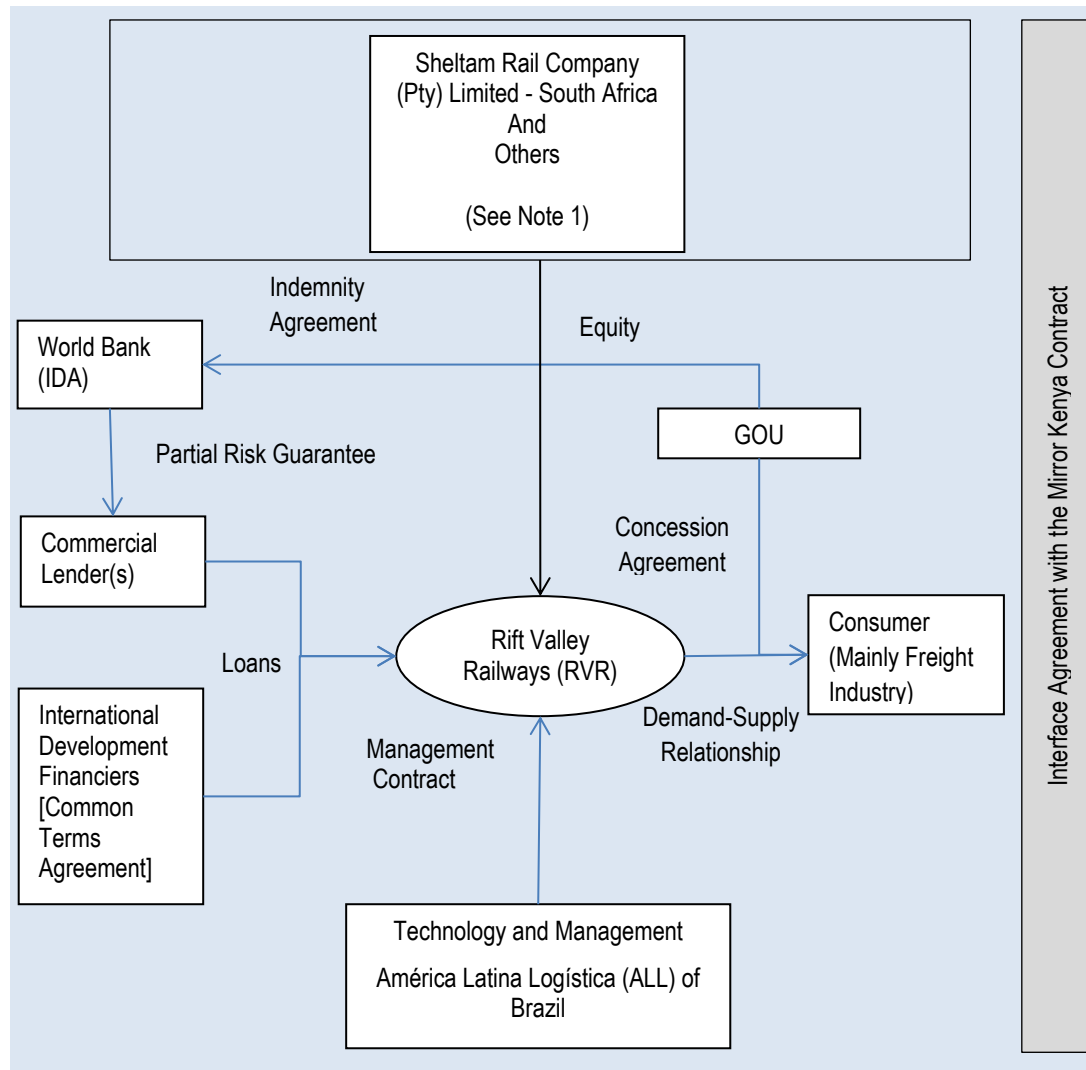


Figure 41: Original Structure of RVR, 2006

Notes:

1. The RVR Consortium was led by Sheltam Rail Company (Pty) Ltd of South Africa (61%), and its subsidiary Comazar Ltd of South Africa (10%). Other investors include: Primefuels (Kenya) Ltd, (15%) Mirambo Holdings Ltd of Tanzania (10%) and CDIO Institute for Africa Development Trust of South Africa (4%). RVR has set up a holding company, RVR Investments (Pty) Limited, which owned the concession companies in each country. The selection was selected following an international competitive bidding process that was completed in October 2005.

²¹¹ In reference to RVR, the World Bank Group said in 2007, 'Public-private partnerships are changing the face of infrastructure in Africa.' World Bank Archives: Joint Ministerial Committee of the Boards of Governors of the Bank and the Fund On the Transfer of Real Resources to Developing Countries, 6 April 2007, Washington DC. (Source: World Bank Archives)

2. The concession agreement required RVR Investments to divest at least 40% of its interests to nationals (Ugandans and Kenyans) within five years. By 2010, Sheltam Rail Company (Pty) owned 51% of the concession while Trans-Century of Kenya and Bomi Holdings of Uganda owned 34% and 15% stakes respectively.
3. The total project cost for the first five years was estimated at USD111 million. The project sponsors contributed USD47 million (approx. 42%) in equity and internal cash generations. The balance of USD64 million was covered by a USD32 million loan from the IFC - approx. 29% - (A Loan of \$22 million and C Loan of \$10 million) from IFC and another \$32 million loan from KfW.
4. The World Bank (IDA) provided Partial Risk Guarantee (PRG) for up to 27 years and in amounts of US\$ 45 million (Kenya) and US\$ 15 million (Uganda). The Guarantee Fee was 0.75% per annum on the guaranteed loan amounts payable six monthly in advance by the concession companies.
5. The concession agreement stipulated minimum investment of US\$ 5 million per annum. (Kenya) and US\$ 1 million per annum (Uganda) for the first 5 years. In addition, service quality would cause increase in freight volumes of a minimum 75% by year 5 and a minimum of 60% of GDP growth thereafter.
6. Traffic at financial close: Uganda, 130 million tonne-km and Kenya 1500 million tonne-km
7. Concession Fees: One-off Entry fee of US\$ 3 million (Kenya) and US\$ 1 million (Uganda), and 11.1% of gross revenue annually.
8. The concessionaire was contracted to improve the management, operation and financial performance of the route. For Kenya, the concessionaire will also be obliged to operate both freight and the passenger services.
9. The infrastructure comprises a total track length of 2350 km (1920 km in Kenya and 431 km in Uganda), with 219 locomotives (175 in Kenya and 44 in Uganda) and approximately 7500 wagons and three water ferries (approx. 6000 wagons and one ferry in Kenya and 1433 wagons and two ferries in Uganda).

Sources:

- World Bank Archive
- Qalaa Holding
- Trans-Century
- Uganda Railways Corporation

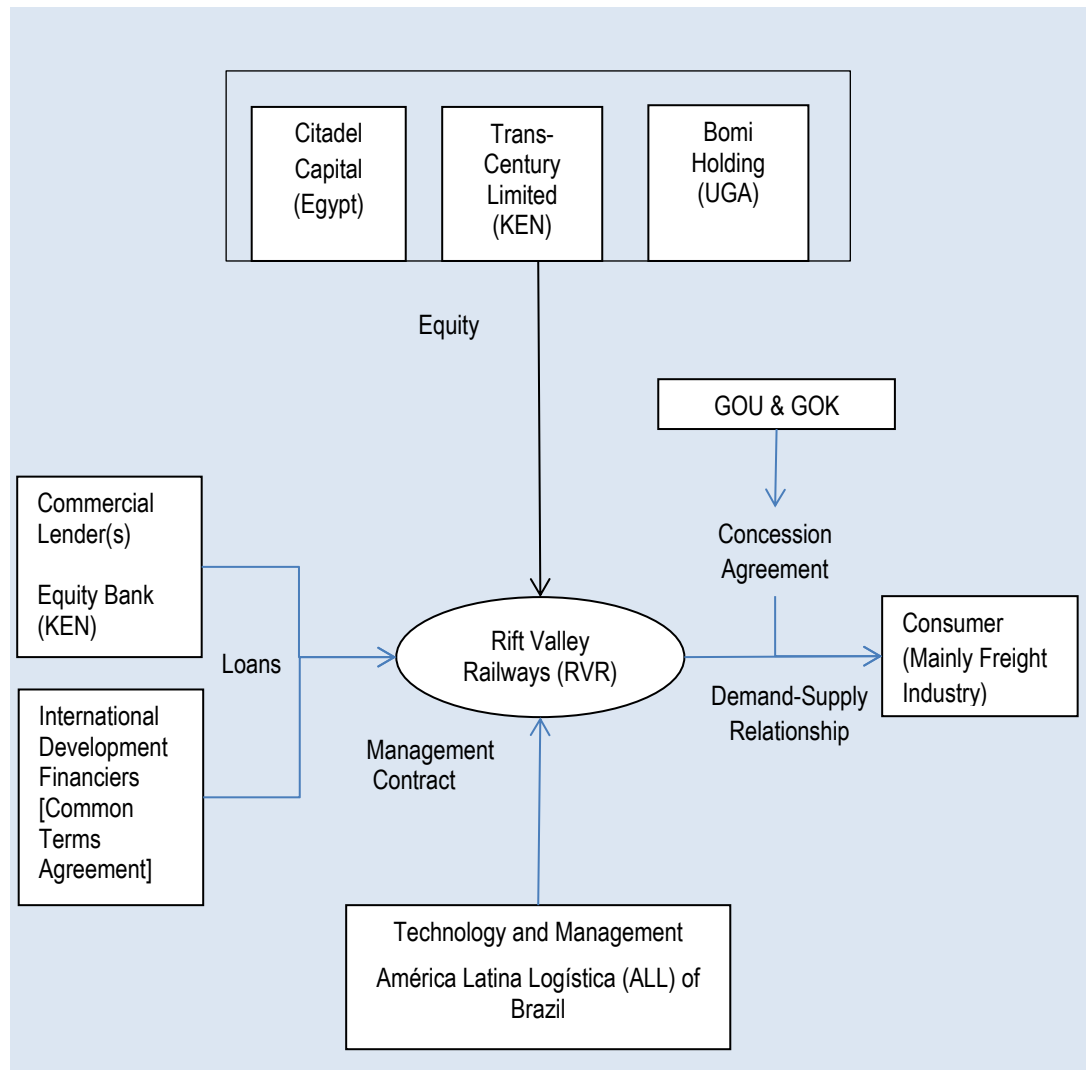


Figure 42: Restructuring of RVR, March 2011

Notes:

1. Equity holding (total, \$80 million) by August 2011: Citadel Capital (Egypt), through its subsidiary Ambiance Ventures owns 51%; TransCentury (Kenya), through its 100% owned subsidiary Safari Rail Limited owns 34% and Bomi Holdings (Uganda) owns 15%. In April 2014, Trans-Century ceded the 34% stake to Citadel Capital.
2. Citadel Capital changed name to Qalaa Holdings, which through its subsidiary Africa Railways Limited owns 85% of RVR.
3. Financial Commitment, August 2011: IFC providing \$42 million – a loan of \$32 million loan, of which \$10 million had already been disbursed, and an additional \$10 million in equity. Others are African Development Bank (\$40 million); Germany's KfW Bankengruppe (\$32 million); Dutch Development Bank FMO (\$20 million); Kenya's Equity Bank (\$20 million); Cordiant's Infrastructure Crisis Fund (\$20 million); and the Belgian Investment Company for Developing Countries (\$10 million)
4. Supplementary financial commitment Sept 2011: IFC and the IFC African, Latin American and Caribbean Fund (IFC ALAC Fund), \$10.1 million and \$20.2 million, respectively, are part of a \$110 million equity package for Africa Railways Limited (ARL)

Sources:

- World Bank Archive
- Qalaa Holding
- Trans-Century

5.4.5 Formal Summary: Non-Ergodicity and the Trail of the Institution

Let us look more formally at the complexity surrounding the RVR project. From the conceptual framework 1.3.1, the project is a point on the nonlinear state space. This space exhibits non-ergodicity along the trail of time.²¹²

The Lagrangian formalism 5.4.1 translates the conceptual framework 1.3.1, and examines PPP potential in the proximity of RVR (denoted R).

$$\begin{cases} d/dt (\partial K / (\partial \mathbf{r}')) - (\partial K / \partial \mathbf{r}) = Q \\ Q = f(\boldsymbol{\tau}, \mathbf{e}) \\ K \rightarrow R \end{cases} \quad 5.4.1$$

Where:

K denotes the potential for PPP in the country, arising from the interaction of the state (σ), society (χ), and market (κ).

\mathbf{r} is the state of the policy space or vector of the state, society and market. It can also be viewed as a matrix of the three (and consequently in upper case).

Q total excitation (equivalent to generalised force in the Lagrangian language). It captures the effect of Northian institution τ and external effects \mathbf{e} .

The challenge for PPP in Uganda in the proximity of RVR is seen in the strength of Q . The stress of the project coincided with the global financial stress of 2007/8. In addition, the project falls in an organisational field most affected by the institutional strain of the seventies.

²¹² This is axiomatic in the formalism of the conceptual framework 1.3. However, both RVR and BHP illustrate this non-ergodicity. On RVR, drawing back the vantage point 10 years (starting point), the trajectory made then is different from the present. These are different constitutive state spaces.

5.5 New Platform: The PPP Act

Both BHP and RVR concessions were developed on a legislative platform of Public Enterprises Reform and Divestiture (PERD).²¹³ This platform was a crystallisation of SAP. The PERD statute mandated the government as follows:

... the Minister responsible for finance shall have the power, in relation to a public enterprise, to enter into, execute, make or give, on behalf of the Government or such enterprise, as the case may be, such contracts, agreements, conveyances, deeds, leases, licences and other instruments, undertakings and notices as shall be necessary or desirable to give effect to the divestiture of the enterprise. (Art. 23 PERD Act 1993)

Moreover, when the East African Railways Corporation (EARC) was dissolved in 1977, the mandate for 'the construction, operation and maintenance of a railway, marine and [related] road services was placed on URC'.²¹⁴

Therefore, the mandate of PERD above was the basis for the privatisation of URC operations. This is perhaps the most significant point in the confusion between PPP and privatisation.²¹⁵

Therefore, beyond PERD, a legislative structure was required for the divestiture of services hitherto provided by government. At this point (the late nineties), the wave of PPP struck. Note, the challenge at this point is a shift in thinking from the privatisation of divestiture to the 'partnering' of PPP.

Let us look at the PPP Act (2015). Box 17 presents the definition of PPP in the Act.

²¹³ In 1993, the government enacted the Public Enterprises Reform and Divestiture (PERD) Bill. The Act sought to 'provide for the reform and divestiture of public enterprises; to establish the Divestiture and Reform Implementation Committee charged with the implementation of the Government's programme on the matter and for other related matters'. (Source: Parliament Library, Uganda)

²¹⁴ 1992 URC Act

²¹⁵ This confusion was evident in my interview with the official across government, including the Chairman of the Parliamentary Sectoral Committee on Infrastructure (21 March 2012), the Secretary to the Cabinet (15 March 2012), Top Management of Ministry of Works (14 March 2012), and Head of National Planning Authority (NPA) on 8 Feb 2012. Moreover, the NPA was removed from the development of PPP in the country, though it should have been at the centre of this emerging node of policy.

Box 17: Definition of PPP (Uganda)

... "public-private partnership" means a commercial transaction between a contracting authority and a private party where the private party performs a function of the contracting authority on behalf of the contracting authority, for a specified period, and

(a) acquires the use of the property, equipment or other resource of the contracting authority for the purposes of executing the agreement;

(b) assumes substantial financial, technical and operational risks in connection with the performance of the function or use of the property; or

(c) receives a benefit for performing the function through payment by the contracting authority or charges or fees collected by the private party from the users of the infrastructure or service, or both;

Source: PPP Act, Uganda, 2015

A few points stand out in the definition. First, it views PPP as a transfer of state function to the private sector over a limited period. In other words, according to the definition, the services of PPP are a responsibility of the state primarily. Looking across the world and deep in history, this position is indefensible. The early development and management of infrastructure was performed by the private sector. The turning point was the Second World War (see Amonya 2006).

Further, the Act defines PPP as a 'commercial transaction'. Indeed the delivery point of PPP is a transaction. However, focusing on the delivery end overshadows the foundational challenges and opportunities of PPP. PPP is a philosophy of government. It requires agents of the state (government) to mould into institutions that appreciate the private sector and vice versa. Therefore, on the CSF frame,²¹⁶ the PPP Act is too restricted on construction and function.

Otherwise, the definition requires that the private sector assume 'substantial financial, technical and operational risks in connection with the performance of the function or use of the property'. This clause is important. It provides the necessary space for a closer cooperation between the state and private sector, striving for the asymptotic goal of PPP. This space was constrained in the earlier PPP Policy framework (2010).²¹⁷

²¹⁶ See Amonya (2016) for the Construction-Structure-Function completeness of definitions.

²¹⁷ During my interview with the Deputy Secretary to the Cabinet (who was the interface between Cabinet and technocracy in respect to PPP), he realised the definition of the framework needed review. He noted the need to 'embark on serious dialogue on PPP immediately'. (Cabinet Secretariat Kampala, 07 May 2012)

A further study of the PPP Act shows that it stipulates Competitive Dialogue as a means of delivering complex projects (Art. 35). What is the structural integrity of this component of PPP, given the nonlinearity and non-ergodicity of the PPP space in Uganda? This is one of three structural issues considered in Chapter 6. The second issue is the suitability of the Act in respect to the distributional appeals of PPP emerging from the dissection of BHP and RVR. In particular, how does the structure provide for sub-national PPP? On the third, the complexity of PPP is a challenge of knowledge. What is the structural strength of the provisions [of the Act] for capacity building associated with PPP? The three are discussed in Chapter 6. Let us close by clearing the confusion between PPP and privatisation.

PPP is not privatisation. Neither is it a fusion of the state and private sector to homogeneity – that perfect blending is not possible. However, that perfection provides us a target when faced with the risks of complexity. The pursuit is asymptotic, and an advanced stage entails public equity in the SPV.²¹⁸

Moreover, PPP law does not completely define PPP practice in a country. That is a mundane statement but the reason is more nuanced. PPP law is a structure in a nonlinear, and non-ergodic space. Institutions matter²¹⁹ (cf. the conceptual framework, Sec 1.3).

Consequently, the definition of PPP in the 2015 Act (Uganda) is not the definition in this thesis. The thesis appreciates the asymptotic character of PPP explicitly, and hence the definition at the start of the thesis, spelling out that the aim of PPP is to mutually manage project risks and share ensuing rewards.

Moreover, from an interview with the Executive Director EPRC (the country's main policy think tank) of 7 March 2012: 'Unfortunately, EPRC did not contribute to the policy.' Therefore, PPP in Uganda developed as a foreign policy object removed from local research organisations.

The framework considered PPP a way of high outturn financing of infrastructure while keeping the state away from the associated management risks. It did not pay due attention to the need for joint management.

²¹⁸ Cf. a metamorphosis in PPP in the UK following the 2007/8 financial crisis and leading to PF2 (see HM Treasury 2012 and a more detailed discussion in Sec 3.5).

²¹⁹ Again, let us draw from the UK – and the reason is simple, the UK is deeper in the practice of PPP. The practice of PFI cannot be divorced from the institutional reform of the construction sector, see Latham 1994 (*Reconstructing the Team*) and Egan 1998 (*Rethinking Construction*). These two policy strives sought a 'partnering' - less adversarial work environments. This institutional landscape defined PPP practice in the UK, and it continues to guide the delivery of infrastructure. It is a marked difference from the eighties (cf. Sec 3.3).

The dynamical character of the PPP space causes stress in the structure of PPP. Chapter 6 considers three components of the PPP structure and analyses the components against the dynamical state space of PPP. Consequently, it synthesises structural components better suited for the dynamical space.

5.6 Chapter Summary

Observing the rail space in 1967 (at CMC formulation), the present state space could not be predicted. Looking ahead 30 years, a trajectory of neither sector (rail nor electricity) can be estimated. It is a non-ergodic space. It requires an incremental and reflexive analysis. However, we can analyse structural components of PPP and synthesise structures that are more robust, and hence reducing the stresses on PPP identified in this chapter. That synthesis is the motivation for Chapter 6.

Chapter 6.0 Synthesis: Three New Structural Components of PPP

PPP knits diverse issues and actors on a long timeframe. In Uganda, the space of that knitting is particularly complex. Chapter 5 attests to that statement. Scholarship can illuminate the complexity. However, it cannot do so assuming that a stable long-term solution exists in a vast pool of data, and all that is required – the H-D framework to ‘drag out’ the concrete solution. No. The space is intractable. It is a non-ergodic dynamical system. The syntheses of this chapter are anchored on an incremental and reflexive approach that the non-ergodic space demands.²²⁰

6.1 Motivation of the Chapter

Let us look back at the overarching framework in Figure 1. The wave of PPP striking Uganda has features (called compositional structures) that can be analysed against the dynamics of the policy space of the country. Therefore, while Chapter 5 considers the incipient interaction of PPP and the country’s policy space by analysing ongoing projects, this chapter looks deeper. It identifies three of the compositional structures and interrogates them, drawing from the dynamics discussed in Chapter 4.

The results are syntheses (prototypes) of the attendant compositional structures, adapted to the complexity of the country and kindred juridical environments.

Strategy of Adaptation: The syntheses of this chapter draws from three published papers that went through double-blind peer review. Let us look at the strategy of adaptation of the three papers, noting that each paper feeds a section below and the papers are detailed in those sections. Each of the three papers is abridged in two respects. First, the background is reviewed, and is shortened where necessary to avoid repetition of material already presented in the preceding chapters of the thesis – except to refresh fundamentals. Secondly, the argument interfacing the existing structure (of PPP) and the new synthetic one is also abridged. Again, the argument is shortened because significant parts of that material already exist in the

²²⁰ This preamble translates the exacting calculus of the thesis to textual imagery, which should make the chapter more accessible.

thesis. However, the material already presented is well referenced to sections of the preceding chapters.

6.2 Critique of Competitive Dialogue – Synthesis of Capability Search

Overview: The PPP Act (Uganda, 2015) stipulates Competitive Dialogue (CD).²²¹ The use of CD traces back to European Council Directive 2004/18/EC of 2004.²²² In other words, CD is an established structural component of PPP, and it is directed to the procurement of the most complex projects. This section dissects CD and synthesises a structure better suited to the dynamical space of Uganda. Finally, this section is adapted from Amonya 2016(a).

6.2.1 Synopsis

The path from policy to service delivery is not always clear. The technology, including engineering and management, may not be known. Consequently, the public sector invites the private sector to participate in devising the specification. That is the essence of CD. The contracts of PPP are long, lasting decades. Consequently, they engulf many variables, resulting in complexity. However, CD is anchored on competition in an environment that protects intellectual rights, which means a platform of state strength. The paper takes a vantage point built on three countries – Sierra Leone, Somalia and Uganda – to interrogate CD from a perspective of state structures strained by institutional tension. The paper buttresses on case study, as epistemology and methodology, and IRC [and non-ergodicity] as lens. The paper shows that, applied in the three jurisdictions, projects developed from CD would lack structures of adaptation when faced with distress. Such situations could be fatal. Consequently, the paper develops Capability Search (CS) as a more adapting procurement strategy. Unlike CD, CS is a search for intellectual tools, not for specification. The joint public-private entity hinged on CS incrementally adjusts the delivery path as reality unfolds. Therefore, CS appreciates the non-ergodicity of the PPP space. That is, the state space—the trajectory at a project onset—changes along the project life in an unpredictable way. Yet, CS faces a challenge of inadmissibility of agreement-to-agree in common

²²¹ Ibid. Sec 5.5

²²² Referenced in Sec 6.2.3 below

law,²²³ and the rigidity of the mainstream financing structures that rely on long-term forecasts.²²⁴

6.2.2 Background

Consistent with the rest of the thesis, the conceptual framework of the paper is nonlinearity and non-ergodicity. The methodology and epistemology is case study. The paper opens with a discussion of these fundamental aspects.

The hypothetico-deductive (H-D) approach dominates research (Amonya 2015). Given that dominance, which is an attempt at mimicking the deterministic world of physical science, the foundation of case study requires explication.

The H-D approach, as applied in social science, premises on stationarity. Generalisation, including all forecasts, hinge on reduction in evolutions of state space to a stationary process. The result is a structure with time-invariant moments of the probability distribution. Formally:

A process $y = \{y_t, t \in \mathbb{Z}\}$ defined on a probability space (X, ψ, μ) is [strictly] stationary if

$$\mu(y_{t_1}, y_{t_2}, \dots, y_{t_n}) = \mu(y_{t_1+k}, y_{t_2+k}, \dots, y_{t_n+k}) \quad 6.2.1$$

Where:

X is a set of outcomes (sample space), ψ are the events (σ -algebra subsets of X), and μ is the probability function ($\mu: \psi \rightarrow [0, +\infty)$).

Note: For an ergodic process, the sample moments converge to the population moments.

Therefore, the H-D frame lays a proposition on the evolution of state space, and seeks to test it through experimentation. However, since social science does not enjoy the opportunity of control of physical science, perspectives (partial observations) of reality are used for the test.

Within the timeframe of the observations, variations will emerge constituting non-stationarity. Moreover, the sources of these variations will not be identifiable, and

²²³ Common law regards such contracts incomplete (see Posner 1999 and Burton 1980).

²²⁴ Dewatripont et al. (2005) present fine details on the mechanics of debt finance on PPP projects.

they may be inaccessible. However, if these sources can be assumed away with a reasonable level of confidence, then the ensuing model is regarded sound. However, to refresh, this decision would be limited by the boundary of state space, the intensity of illumination, and the frame of time. Of the three, the middle one (illumination) can be improved. That is the essence of case research.

A stronger illumination of a capsule of reality leads to a better comprehension of it. In the definition of Polanyi (1958: 6), such illumination is addition to knowledge, that is, 'a better comprehension of reality'. Therefore, a case study does not need the buttressing of the H-D frame to be epistemologically secure. To the contrary, H-D generalisation may fatally assume away important variables – unless Hirschman's 'hiding hand' (1967: 10) is imported. Simply put, Hirschman argues that humanity is better off moving into projects on a premise of an erroneous trajectory, and subsequently summoning intrinsic creativity as the challenges of the error come to bear. This paper, like Flyvbjerg and Sunstein (2015), takes a contrary position.

However, and this is the point often missed, the two approaches [case study and H-D] do not have to be in tension. Case study has the potential to highlight variables that improve H-D generalisation – but any generalisation should pay respect to non-ergodicity by either working at the margin of time or sticking to intrinsic generalisation (see Johansson 2003).

Further, the case methodology hinges on an axiomatic position that connects complexity to variety. The complex interwoven strands of reality lead to a cascade of questions. Therefore, a variety of tools is required in the illumination of the reality. That way, the interstices of the case capsule can be opened. Consequently, by definition, the case approach entails the use of multiple tools, and so does this paper.

For extended consideration on misunderstandings of case study, Flyvbjerg (2011) would be a good retreat. On the evolution and challenges of the H-D approach, see Amonya (2014 and 2015).

6.2.3 The Existing Structural Component: Competitive Dialogue

The section examines CD, asking how the procurement tool can be used in the socio-economic context of SSA. So, what is CD? What is its construction, structure and function (CSF)? See Amonya (2015) for a discussion of CSF, a frame used for explicating complex concepts.

Competitive Dialogue is a synthesis of technology. It was developed by the European Commission (EC) and presented first in Directive 2004/18/EC of 2004 (see Burnett 2009 and Hoezen et al. 2012 for this history). The tool (CD) was devised for situations where policy objective cannot be translated into service specification. In these situations, the requisite technology (both management and engineering) is not clear. Therefore, CD seeks to synthesise technology. Fig1 identifies CD amongst other procurement procedures. While the others seek tenders on receiving expressions of interest, CD lays the stage for dialogue. The dialogue is expected to yield project specification.

Consequently, CD is built on two premises. First, the private sector can contribute significantly to the synthesis of the technology. Secondly, the state as structure provides an adequate platform for managing competition amongst private actors in the lead to the service specification.

This section examines the two cords of premise in the context of three countries of SSA, and pursues the remoulding necessary. The paper focuses of Sierra Leone, Somalia and Uganda – three states that have experienced tensions of protracted violence in the past two decades. Note: The paper recognises the most recent challenge of Somalia including Somaliland. To that end, the pre-1991 geographical demarcation is used without any prejudice.

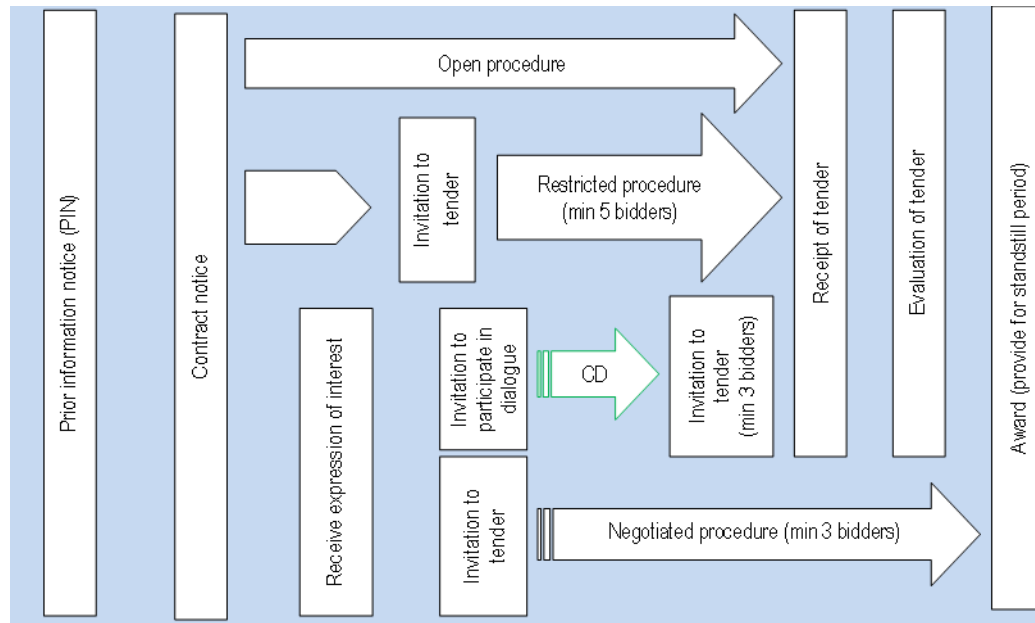


Figure 43: Competitive Dialogue

Notes:

1. The challenge of CD rests in the objective not the procedural components individually.
2. The objective constitutes a rigidity, leading to stress in dynamical spaces. CD seeks to reduce an m dimensional field to a single dimension: $\mathbb{R}^m \rightarrow \mathbb{R}$.

6.2.4 Abridged Illustration of Nonlinearity and Non-Ergodicity

This section abridges Sections 4 and 5 of the paper. It is the most significant adaptation of the paper. The two sections of the paper illustrate nonlinearity and non-ergodicity of policy space. This illustration has already been made in Chapter 5 of the thesis.²²⁵

Therefore, it suffices to note that CD seeks a trajectory of state space at the outset of a project. However, any such trajectory will come under distress. Consequently,

²²⁵ Moreover, it is worth emphasising that the challenge of CD is explained analytically, and the explanation is autonomous to any empirical observations. However, I draw affirming and motivating empirical observations from the projects listed below. First though, recall that CD is a feature of the statutory PPP structure of Uganda (Sec 5.5), and this CD structure exists in the same nonlinear and non-ergodic space arising from Chapter 4 and illustrated in RVR and BHP (Chapter 5).

Salient project empirics (outside Uganda) affirming the structure and stress-challenge of CD:

- Abu Dhabi, Department of Transport, Policy Review and Project Development, 2008/9
- Ghana, Policy Review and Upgrading of Accra-Kumasi Road, 2008/10
- Egypt, Institutional Reform (Preparation for PPP), 2008/9
- Russia, Moscow – St. Petersburg Road, Project Preparation (Option Analysis), 2009.

The projects above highlighted parametric concerns of CD. For clarity, they are not a statistical sample from which generalisation was sought – since such generalisation was not required (the basic argument is analytic) and the generalisation would be inappropriate.

a new approach is required – one that is adaptive to the unfolding phases of non-ergodicity. This thesis presents Capability Search (CS).

6.2.5 *The New Synthetic Structure: Capability Search*

Competitive dialogue invites intellectual apparatus to wade through complexity seeking an optimal solution. A contract will only emerge at the end of that exercise, while intellectual rights must be protected along the competition²²⁶. The institutional vortex associated with nonlinearity and non-ergodicity would distress the exercise of CD.²²⁷ That is a micro-level outlook of the dialogue. At the macro, the moulding state structures would struggle to offer protection [of intellectual rights].

Capability search hinges on solution-at-the-margin. Instead of seeking solutions in the hazardous vortex, CS seeks a set of intellectual tools suitable for the visible state space. To that end, it starts with a situational analysis of the policy environment. Thereafter, it considers the policy objective. On the basis of that environment-objective analysis, CS explores and invites suitable private sector expertise. Note the difference, CD digs for a solution across the continuum of time so it can yield a specification. On the other hand, CS seeks to seat an adaptive team in the vortex. The team should then be trusted to incrementally develop solutions, and hence ‘solution-at-the-margin’.

This incremental approach to managing the infrastructure space traces back to post-War scholarship, and notably Braybrooke and Lindblom (1963). More recently, Talvitie (2006) has advocated for ‘experiential incrementalism’. This paper builds on that trunk of scholarship while focusing on CD, as a compositional structure in the wave of PPP hitting an infrastructure space conceptualised as a non-ergodic dynamical system, leading to CS.

The search for capability is an installation of the foundation for a technological transformation. Formally:

²²⁶ Protection of property rights is one of the twin cardinals of the state. The other is monopoly over violence (see North 1981). The paper feeding this section (Amonya 2016) discusses these cardinals in detail. For avoidance of confusion, that paper is an offshoot of this doctoral research.

²²⁷ Here the paper refers to the institutional vortex illustrated in the composite case of three states – Uganda, Sierra Leone and Somalia (recognising the present state distress). However, this illustration of non-ergodicity has been made in Chapter 5.

$$T: \mathbb{R}^g \rightarrow \mathbb{R}^3$$

6.2.1

Where:

T is the transformation PPP

g is the number of government entities (ministries, departments and agencies, MDAs) that are interlocked by the complex challenge in focus.

In effect, as a management technology, PPP under CS narrows a raft of concerns across MDAs to three measurable interests (real-valued space, \mathbb{R}). These are private equity, public equity and debt.

The three resulting dimensions of 6.2.1 are private equity, public equity and debt. This taxonomy of PPP interests draws from a conceptualisation of PPP as a dynamical system whose manifold covers the three dimensions. This system, discussed in Amony 2016(a), formalises as follows:

$$\dot{\mathbf{S}}(t) = A(t)\mathbf{S}(t) + B(t)\mathbf{P}(t) + C(t)\mathbf{U}(t)$$

6.2.2

Where:

$\mathbf{S}(t) \in \mathbb{R}^3$ is the state space of the market comprising three interests (private equity, public equity and debt) – the ‘real’ risk

$A(t) \in \mathbb{R}^{m \times 3}$ is a matrix of project risks distributed to the three market interests

$\mathbf{P}(t) \in \mathbb{R}^3$ is the impetus of PPP (funds seeking investment), impacting the country exogenously

$B(t) \in \mathbb{R}^{m \times 3}$ captures PPP risk factors aligned to the three markets

$\mathbf{U}(t) \in \mathbb{R}^3$ is the force of technological change [exogenous] attributed to the three interests

$C(t) \in \mathbb{R}^{m \times 3}$ captures the environment of technological change.

The vector space of interests \mathbf{S} in equation 6.2.2 reflexively interacts with the environment \mathbf{U} . However, under common law jurisdiction, CD would assume this environment static. Otherwise, the specification crafted following CD would require an agreement-to-agree structure, which common law does not admit. Common law

regards such contracts incomplete (cf. Posner 1999 and Burton 1980). Given the institutional vortex of nonlinearity and non-ergodicity, this rigidity of CD (static specification) bears the potential of fatal distress.²²⁸

Moreover, to account for the rigidity of CD, private equity and debt will assume the boundary of the vector space **S** in their risk analyses. That is inefficient and expensive to the ultimate principal, the people (users of the facility). It shows up in high expectation of returns.

The search for capability under CS is an acceptance of the dynamical character of equation 6.2.2. However, mainstream private actors would struggle with this regime. They have to interact with rigid structures in the background – not just the law identified above, but also the financing structures.

Moreover, at every scale and instance of PPP, there is reflexive interplay between the institution [norms and values] as structure and the agents (cf. structuration, Giddens 1984). Formally:

For a set of agents *a* and institutional strands *i* belonging to a community *C*, a relationship *R* exists between the agents and institution. That is:

$$\forall (a, i) \in C: T: aRi \quad 6.2.3$$

The agency-institution reflexivity is depicted in Figure 44. The fundamental goal of CS, as a tool of PPP, is to lay a new institution of partnering, and hence provide a requisite platform for infrastructure science (physical and social) as formalised in 6.2.3. The change is a delegitimation of the existing institution.

²²⁸ This sentence has been adapted to the thesis. The original sentence made reference to the institutional vortex of the 'three states'.

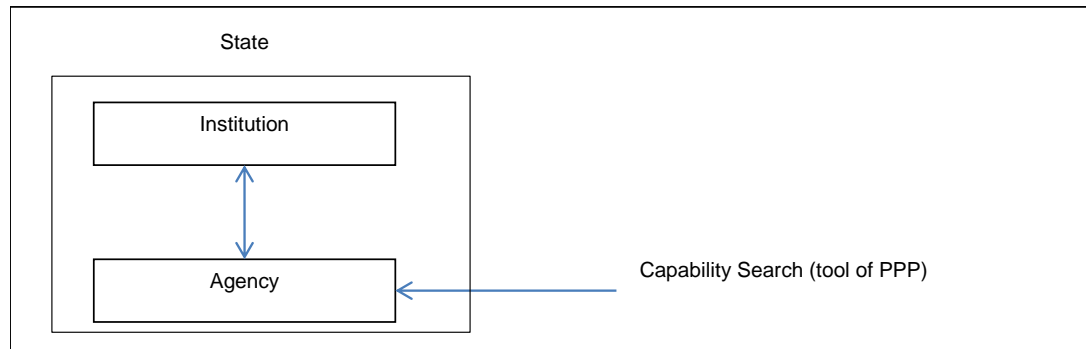


Figure 44: Structural Action of PPP

The main concern of the proponents of PPP will be the rate of convergence to the new institution. That concern, as a continuum, formalises as follows:

$$\nabla \cdot (\mathbf{f}_i \circ \mathbf{f}_a) \quad 6.2.4$$

Where:

\mathbf{f}_i is a vector function capturing the influence of the existing institution on the agency

\mathbf{f}_a is the institutional influence of PPP on the agency.

The derivative can be simplified in short-term analysis. In that situation, the institution can be considered a scalar function, which reduces to a proxy weighting w in risk analyses. Here is the new formulation:

$$\nabla \cdot (w\mathbf{f}_a) = \mathbf{f}_a \cdot (\nabla w) + w(\nabla \cdot \mathbf{f}_a) \quad 6.2.5$$

If institutional strength is considered constant across the agency then $\mathbf{f}_a \cdot (\nabla w)$ vanishes. The challenge of organisational change then reduces to the building of a new agency underpinned by a new PPP institution. This is the common practice reflected in the plethora of PPP capacity building work across the world. They cannot hold in the long-run because of 6.2.5.

The strength of CS resides in its potential to segment institutional change, and hence make an appropriate use of equation 6.2.5. In contrast, CD assumes away institutional evolution. Along the life of the project, these evolutions will bring the service specification, and the contract, under distress. However, CS must be

wrapped in a team that can understand institutional evolution, as it applies the science of infrastructure.

This newly synthesised tool (CS) finds an epistemic position on a wider manifold of scholarship concerned with the uncertainty of social space. Braybrooke and Lindblom (1963) crystallise their struggle with the uncertain social space by arguing for a 'strategy of disjointed incrementalism'. Writing in the same year, Arrow (1963) shows that a stable and surjective structure of policy is impossible in a democracy – devoid of the rigidity of autocracy. Therefore, if we hold to Fukuyama's flow of the liberal frontier (1989), the vortex of policy space captured in this thesis cannot be ignored neither can CS.²²⁹

6.2.6 Conclusion

Enquiry seeks to predict, explain, or simply to illuminate reality. The last is the domain of case study. In appreciation of complexity, case study dissects reality in a longitudinal way using a variety of tools (numerical, textual, or hermeneutics). The primary object of study is the illuminated reality as an addition to the broader comprehension (body of knowledge).

This case study attends to competitive dialogue (CD), a tool of PPP, which is most prominent from a procurement perspective yet its impact permeates public policy and management. The European Commission created the tool (CD) for complex projects. On these projects, public actors cannot map out the delivery paths or specifications for the motivating policy objective. Consequently, the public actors seek private sector participation.

The premise of CD is competition in an environment that secures intellectual rights. Therefore, CD rests on the functionality of the state. Chapter 4 of this thesis illustrates this distress. The political, social and economic tapestry of Chapters 4 and 5 forms a vantage point for viewing CD. The resulting view, using IRC as lens, is an institutional vortex. Three streams of institution swirl around the object of CD.

²²⁹ This sentence has been adapted to the thesis. However, the entire paragraph is more significant. It shows a management tool (CS) synthesised in respect to no-ergodicity, and found to align with another school of thought (instrumental incrementalism). This demonstrates that case study approach provides a raft of scholarly triggers – a point that Flyvbjerg (2006) and others have relentlessly driven through scholarship.

The first is the socialist stream following independence. Secondly, the institution of chaos of the late sixties and seventies emerges. Finally, the capitalist stream underpinning SAP is attempting to gain prominence.²³⁰

That vortex does not suit CD. The competing institutional streams would strain the cords of CD. The paper moulds a new tool. It is capability search (CS). It is more adapting than CD, seeking a combination of intellectual tools not a defined path, as does CD, as the basis of contract. The joint public and private project vehicle, hinged on CS, then incrementally changes the path to service delivery as the reality unfolds. That way, CS respects the non-ergodic reality of the PPP space, and hence avoids potentially fatal distresses. However, CS faces legal and financial challenges. Common law does not admit agreement-to-agree, characteristic of CS. In addition, the main financing structures of infrastructure are built on the rigidity of forecasting – yet CS argues that these rigid models, including the stochastic but ergodic ones, will crack and collapse under non-ergodicity.

Finally, being an analytic construct, CS is a nudge on the front that argues against empirical testing as the definitive gate of scientific knowledge. Particulars of reality allow us to construct a combination of them, and the product is no less a scientific crystallisation. That is the essence of prototyping in physical science. While recognising the challenge of testing in social science, the principle of prototyping holds as this construct of CS illustrates.²³¹

²³⁰ The paragraph has been adapted to the thesis.

²³¹ I presented the full synthesis at the 14th World Congress on Transport Research held at Tongji University, Shanghai, 11 July 2016. However, preliminary and constitutive aspects of the construct was discussed at the following conferences:

- Africa Investment Exchange: Transport and Infrastructure, London, 10 June 2016: I presented the reality of the dynamical space of public policy, which is the main driver of Capability Search.
- World Road Association (UK) annual conference, Cardiff, 31 October 2012: Here I laid out the exponential attribute of PPP, a key motivator of Capability Search in nonlinear and non-ergodic settings such as Uganda.

6.3 Prototype of Sub-National PPP (SN-PPP)

Overview: A central challenge arising from BHP and RVR projects in Chapter 5 is the absence of significant public equity, and the attendant participation of the state in the direction of the projects. Moreover, both projects point to distributional effects as a policy change. The SPV structure of the present practice removes the state from project direction, and hence prevents joint management of the sternest risks of PPP. Yet, looking ahead, growing distributional concerns will lead to more complexity of PPP projects. The two issues (organisational structure and distributional concerns) are structural attributes of the existing wave of PPP. These structural challenges are manifested as PPP plays out in the dynamical space of the country. This section presents a prototype of sub-national PPP that addresses the structural challenge, and hence better suited to the dynamical space. The section is adapted from Amonya and Okello (2014).²³²

6.3.1 *Synopsis*

This section addresses the equity challenges of PPP captured in the empirical exposition of Chapter 5, and the stresses associated with the structure of the SPV. A prototype of Sub-National Public-Private Partnership (SN-PPP) is presented. The prototype appreciates the unique power of the individual in the country (in contrast to institutions), and seeks to leverage this uniqueness as institutions build. The prototype comprises three modules: Local Infrastructure Group (LIG), District Infrastructure Fund (DIF), and a Special Purpose Vehicle (SPV) that incorporates public equity. This SN-PPP structure ameliorates the stress zones in the traditional structure shown under BHP and RVR in Chapter 5. To this end, the methodology is analytic-synthetic. The analytic stage dissects and analyses the existing structure against prevailing forces (i.e. Chapter 5), and this synthetic stage builds a more robust structure. The synthesis uses archival data complemented by interviews.²³³ In addition, the motivation for SN-PPP can be traced back to the 'growth chasm' of Section 5.4.3, and the reality of the nonlinear and non-ergodic dynamical space exposed in Section 1.3.

²³² This author wrote the paper and the colleague (Dr Robert M. Okello) did the internal review.

²³³ See Sec 6.3.3

6.3.2 Background

In the existing structure of PPP, the SPV is a private entity. Typically, a private equity firm leads the SPV. Private equity firms lead both BHP and RVR.²³⁴ This hinge on private equity is seen across the world.²³⁵ Moreover, the UK experience shows this private equity front being reinforced by traditional asset managers (construction companies) evolving into infrastructure funds, and the traditional construction firms taking the role of private equity managers.²³⁶

The evolution in the structure of a section of UK construction firms in response to PPP offers a rich background of contrast for Uganda. First, it illuminates the excitation of the PPP space of Uganda, and this excitation is a step function.²³⁷ More pertinently, while the evolving company in the UK emerged from the 2007/8 financial crisis facing a new SPV structure (i.e. requirement of public equity),²³⁸ the Ugandan firm that seeks to join PPP faces a private SPV structure.

The private SPV structure suffers severe distress in nonlinear dynamical spaces. In BHP, the price stress zone of industrial and agro processing enterprises is placing the SPV in distress.²³⁹ In RVR, the challenges of asset management and demand strained the project leading to a restructuring (Sec 5.4.4). In each of these two cases, the state is intervening following distress. However, the essence of PPP is

²³⁴ In this case Blackstone Group and Qalaa Holdings respectively, see Chapter 5

²³⁵ See de Lima Ribeiro and Gledson de Carvalho (2008) and Ippolito (2007)

²³⁶ The hinge on private equity is typical of the 1510 projects overseen by the Infrastructure and Projects Authority of the UK (Source: HMT Database).

For example, a FTSE listed leading construction firms in the early PFI times (early to mid-nineties) used 18 PFI projects as seed portfolio in creating an infrastructure fund. This fund is a closed-end listed investment company registered in Guernsey, and currently holds 38 projects in its portfolio.

²³⁷ Note, BHP had no local private entity in the SPV. As regards RVR, Bomi Holdings was a business without expertise in infrastructure management. In a later interview with the leadership of the Capital Markets Authority, Uganda, (March 2016), the situation of the country was generalised as 'businesses without bookkeeping'. The minister for transport had earlier (April 2011), he decried the lack of 'private sector to hire'.

On the evolution of the UK firm, recall the move to 'partnering' Latham (1994) and Egan (1998).

For further research, this comparative picture offers a rich platform for analysing 'delegitimation' of institutions (see Amonya 2010 and 2014). However, the present work is a thesis in policy science without the privilege to stop and look deeper into such management issues. However, such offshoots of further research options affirm the epistemological place of case study.

²³⁸ See HM Treasury 2012

²³⁹ The President is calling for a renegotiation of the contract ([Daily Monitor, 7 Dec 2016](#)).

to present distress while acknowledging complexity. This situation is an appeal to public equity, which joins the state and government in management decisions.

Moreover, in both BHP and RVR the long-term challenge resides in the rural poor population. In the case of BHP, through price regulation, the enterprise segment subsidises the rural poor. On RVR, the long-term challenge is closing the growth chasm, which is a challenge of the rural poor (Sec 5.4.3, Figure 40).

Therefore, the private SPV structure needs public equity and the long-term challenge resides in the rural poor. That need is the essence of the prototype sub-national PPP (SN-PPP) synthesised in the next section.

6.3.3 *Towards Prototype Sub-National PPP*

The synthesis of the prototype SN-PPP uses data from the roads sector. For context, data presented in Table 4 (Sec 5.2) show that doubling the length of paved roads is associated with approximately 30 percent increase in per capita income ($\eta=0.34$). Assuming growth in real GDP of 6 percent over the next 20 years, that elasticity would imply Uganda doubles the length of paved roads. In that case, the country would need to upgrade an extra 10,000 km of the road network to paved standard. The upgraded road network would largely comprise the present feeder roads traversing rural Uganda.

Figure 45 presents the prototype SN-PPP. The SPV comprises a private local infrastructure group (LIG) and a district fund. The LIG comprises individuals with institutional attachment to the local area and community organisations.

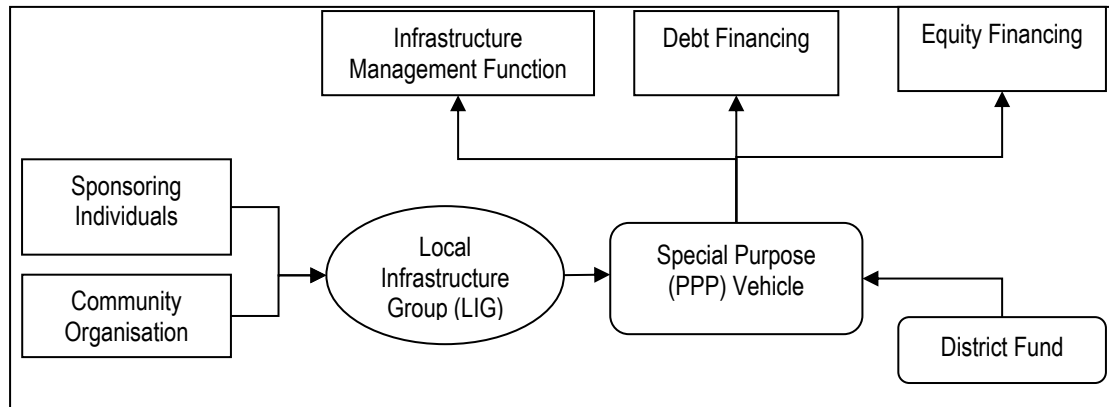


Figure 45: Prototype SN-PPP

Let us place this SN-PPP structure on the dynamical system formalised in 1.3.1. The relationship of the sponsoring individuals and the local community provides a generalised coordinate of the vector of institution τ . These are individuals originating from the local community and bound by the local institution.²⁴⁰ Moreover, the institutional cord extends to expertise and finance of the diaspora.²⁴¹ Consequently, the institution provides a natural linearisation of a complex space.²⁴² Moreover, while stresses in the market (κ) will affect this LIG team, they will not seek exit clauses akin the PE firms. The institutional trunk binds them.

Further, the novice to this SN-PPP structure will likely question the return on investment of LIG, and particularly the individuals. The premise to this question is the low capacity to pay (CTP) of the rural poor. However, that fear misses one basic fact – at present money is expended on the management of these rural faculties. SN-PPP simply offers a more efficient vehicle for using this money. The

²⁴⁰ This statement captures an attribute of the urbanisation of Uganda that the uninitiated reader may not appreciate easily. Most of the urban more educated Ugandans maintain links with their rural homes. These individuals will likely belong to associations in their urban locales that seek to develop their rural areas. Moreover, these associations will have roots with kindred associations in leading universities. An example is the [Kigezi Kampala Residents Association](#). All bound by a common set of norms, values and practices (i.e. the Northian institution).

²⁴¹ In the case of Kigezi, the association is [International Community of Banyakigezi](#).

²⁴² Note that this linearisation has a spatial boundary but not a time one. It is a stable critical point. The values, norms and practices of the Banyakigezi, for example, do not fluctuate with time.

efficiency strength of SN-PPP hinges on the equity positions of all the parties,²⁴³ including the district fund.

Let us look deeper at the district fund. The requisite structure for this fund exists (see Figure 46). The force of adult suffrage undergirds service delivery in local governments. However, the central government still provides a control mechanism for the action of local elected leaders. This control hinges on the presidency. The choices of adult suffrage culminate in the District Service Commission and District Administrative Officer. The two have the authority to moot and develop a district fund, which inspires SN-PPP.²⁴⁴

²⁴³ The explanation in this section benefitted from workshops I led in Uganda in June/July 2012 that looked at the SN-PPP prototype.

Local communities will not always afford shares in the LIG. However, both the state and the international development have subsidized infrastructure delivery in rural communities. In this case, the two would facilitate the local communities become equity holders. Since the publication of the paper, the Swedish International Development Cooperation (SIDA) is piloting the creation of equity holders in rural electrification of the West Nile region of Uganda (see Onzia and Muturi, 2015). However, this effort does not tap the institutional strength discussed in this section – and PPP policy is at its infancy (the Act became effective in October 2016). SIDA considered companies in rural areas. This prototype SN-PPP synthesises a potentially more robust and efficient corporate structure hinging on the strength of the institution.

²⁴⁴ Cap 11 Art 190 Constitution of Uganda, 1995: *District councils shall prepare comprehensive and integrated development plans incorporating the plans of lower level local governments for submission to the National Planning Authority.*

Figure 46 benefitted from interviews with the research team of the Parliament of Uganda in 2012/3. They provided the leads to relevant archival and contemporary documents.

The urge for SN-PPP was vividly described by the National Planning Authority. The head said, 'I know PPP can help build better schools, hospitals...and improve agriculture in rural areas. We really need to learn about PPP though...You asked about the role of EPRC [Economic Policy Research Centre], we did not interact with them on this issue.' (Interview 8 Feb 2012, Kampala). That interview captures both the economic need and the challenge of knowledge. SN-PPP addresses the economic need. The Joint Research Model in Sec 6.4 address the challenge of knowledge.

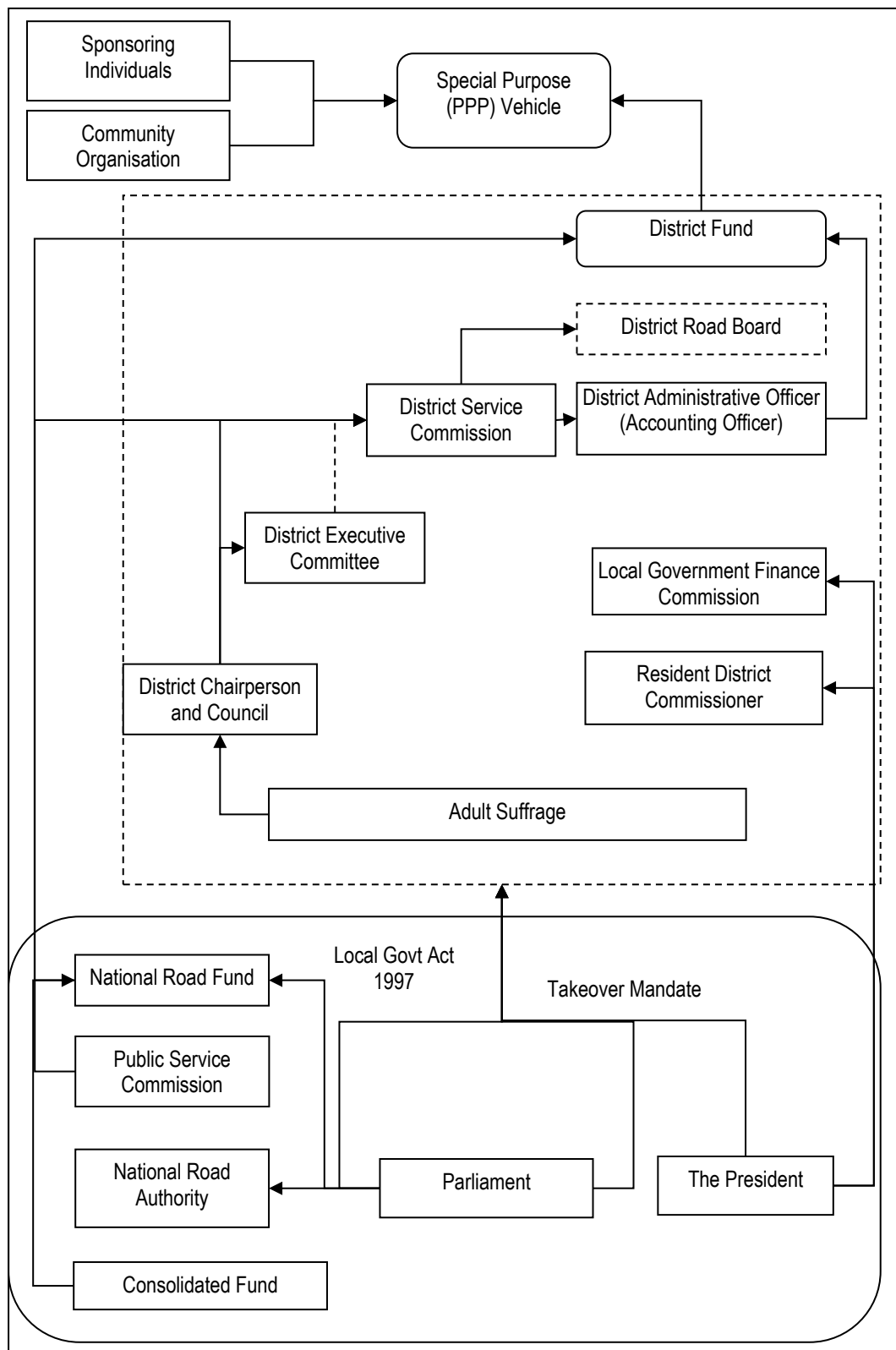


Figure 46: The Arena of Local Government

Source: Developed following an analysis of statutory documents from Parliament Library (Uganda) and interview with the Parliament research team in 2012/3.

6.3.4 Conclusion

This section presents a prototype SN-PPP structure. It is a product of an analytic-synthetic process (ASP). First, the existing structure of PPP is dissected, illustrated by empirical project data in Chapter 5. In other words, the excitation function is analysed. Thereafter, the policy space of application of the existing SPV is assessed. This space is nonlinear and non-ergodic leading to stresses in the SPV structure. The prototype SN-PPP structure is synthesised drawing on elements of the policy space, and with a goal of reducing the stresses encountered in the existing SPV structure. The prototype takes a long-term view of the development challenges of Uganda, and relies on the generalising strength of the institution.

Finally, this is the second of three ASP products developed in this thesis. The first was Capability Search in Section 6.2, which responds to the structural challenge of Competitive Dialogue. The third is Joint Research Model, which responds to the challenges of Donor Dependency Model. The three strands of challenge depict the composite structure of the wave of PPP, and this composite structure is viewed using a single conceptual framework – nonlinearity and non-ergodicity of policy space.²⁴⁵

²⁴⁵ The conceptual frame is introduced in Chapter 1, drawn through literature review in Chapters 2 and 3, and the frame is placed in the policy space of Uganda in Chapter 4 – developing into the project empirics of Chapter 5.

This SN-PPP prototype is an offshoot of the space provided by the 2006/7 financial crisis. The crisis halted the PPP market in the West. The hinge of monoline insurers disappeared. This space allowed me to question the future of PPP in Africa, and Uganda in particular. I presented the concept of SN-PPP at the Second Session of the UNECE Team of Specialists on PPP held in Geneva, 03 December 2009. Following Geneva, I presented the emerging synthesis at the following conferences:

- Public-Private Partnerships in Uganda - Gauging the Landscape: A Presentation to Permanent Secretaries (Uganda), Cabinet Secretariat, 08 May 2012 – my argument for SN-PPP hinged on the growth chasm (Sec 5.4.3).
- Technical Committee on Transport Economics and Social Development (PIARC), Meeting of Policy Makers and Academics, London, 22 October 2012: My argument focused on dynamical systems, distributional challenges of transport investment and consequently, the appeal of SN-PPP.

6.4 The Challenge of PPP Science

Overview: The diffusion of PPP presented in Chapter 3 embeds a structure of knowledge refinement (read, research) that the thesis calls the Donor Dependency Model.²⁴⁶ That model latently guides the development of PPP policy. Therefore, it is a structural component of PPP as a policy object in the country, and this third synthesis addresses that Donor Dependency Model.

The challenge of knowledge refinement of PPP resides in the interdisciplinary character of the subject. The interdisciplinarity of PPP complicates research on the subject.²⁴⁷ The paper feeding this section examines the existing approach to this challenge of knowledge. It identifies the Donor Dependency Model, and proposes Joint Research Model, which is not only right but also fits better the dynamical space of the country.²⁴⁸

Finally, remember, science (read, research) is a structure in policy. Policy is a cross-product of science and politics (Sec 2.3). A structure for refinement of science will always reside in policy. However, the structure may be implicit. In the case of PPP in Uganda, that structure of refinement is donor-dependent (see Sec 5.5 and 6.4.3 below). This section is adapted from Amonya (2010).

6.4.1 *Synopsis of the Paper*

The mechanics of policy has a trunk extending beyond PPP, and the country. A key actor, the multilateral development agency (and particularly the World Bank) is a common plank across many countries. This paper analyses empirical data from SSA guided by case study methodology and epistemology. The paper identifies the Donor Dependency Model of policymaking across these countries. However, in response to the complexities of each country (arising from nonlinearity and non-ergodicity), the paper synthesises Joint Research Model. This model hinges on the

²⁴⁶ To refresh, recall the role of PPIAF in the development of PPP policy in the country (summary Sec 3.6), and the absence of local agents captured in Section 5.5.

²⁴⁷ In the reflection of Paul Collier of Oxford University, PPP is a 'new challenge to scholarship'. This note draws on his remarks at the annual Growth Week of the International Growth Centre, LSE, 23 September 2014, entitled: Financing Africa's Future: Infrastructure, Investment and Opportunity.

²⁴⁸ It is right that a people determine their future. Moreover, the challenges of Article IV demands a new approach to research (cf. Sec 4.4.4).

interdisciplinary demand of the transport sector – and PPP is a present reality of this sector.

6.4.2 Background

This paper captures an important part of the history of PPP in Uganda, and Africa at large. In the early to mid-2000s, as BHP and RVR projects were being designed, the wave of PPP was sweeping Africa. In broadening our view (beyond the two projects of Uganda) and across Africa, we are able to illuminate aspects of this wave of PPP hitherto hidden.

From the late eighties, the main policy concern of Africa was HIV. This health concern swept across the transport sector and other policy areas. It was the main sociological challenge of the time. Therefore, the wave of PPP hit a policy space dominated by another wave – the HIV wave.²⁴⁹ The emergence of these two waves on moulding state structures,²⁵⁰ affirms the overarching framework of nonlinearity and non-ergodicity.

The wave of PPP was characterised by the request for ‘PPP Specialist’ on most transport projects. That request provided a trigger for deeper enquiry. Specifically, how could this ‘PPP Specialist’ be equipped to illuminate the complexity of the policy space? It was a challenge of interdisciplinarity. The complexity of the policy space provided a framework of enquiry,²⁵¹ and a quest for methodological rigour led to case study.

The ensuing archival analysis and interviews crystallised the Donor Dependency Model as the structure process of policymaking.²⁵²

²⁴⁹ See pp.48-49 of the paper

²⁵⁰ Following the turmoil of the seventies and eighties addressed in Chapter 4 and even deeper in Amonyia (2016)

²⁵¹ Delineated in Figure 1 of the paper

²⁵² Interviews with faculties (and graduate students) from Makerere University (Uganda); College of Science and Technology (Rwanda); Fourah Bay College (FBC, Sierra Leone); Kwame Nkrumah University of Science and Technology (KNUST, Ghana); University of Dar Es Salaam (Tanzania); University of Nairobi (Kenya); University of Ibadan (Nigeria); University of Malawi; University of Pretoria (RSA); University of Zambia, University of Botswana. Asian perspective provided by Bangladesh University of Engineering and Technology (BUET) and University of Colombo, Sri Lanka. The interviews were conducted in 2008/9.

6.4.3 The Existing Structure: Donor Dependency Model

The archival data and interviews across SSA showed that the local science agents²⁵³ in the transport sector were removed from the making of policy. Donor agencies and key political actors²⁵⁴ dominated the policy arena. While donor entities employed local science agents, the local agents did not consider their contribution significant to the policy process. On the other hand, a chasm existed between local agents of science and the political actors.

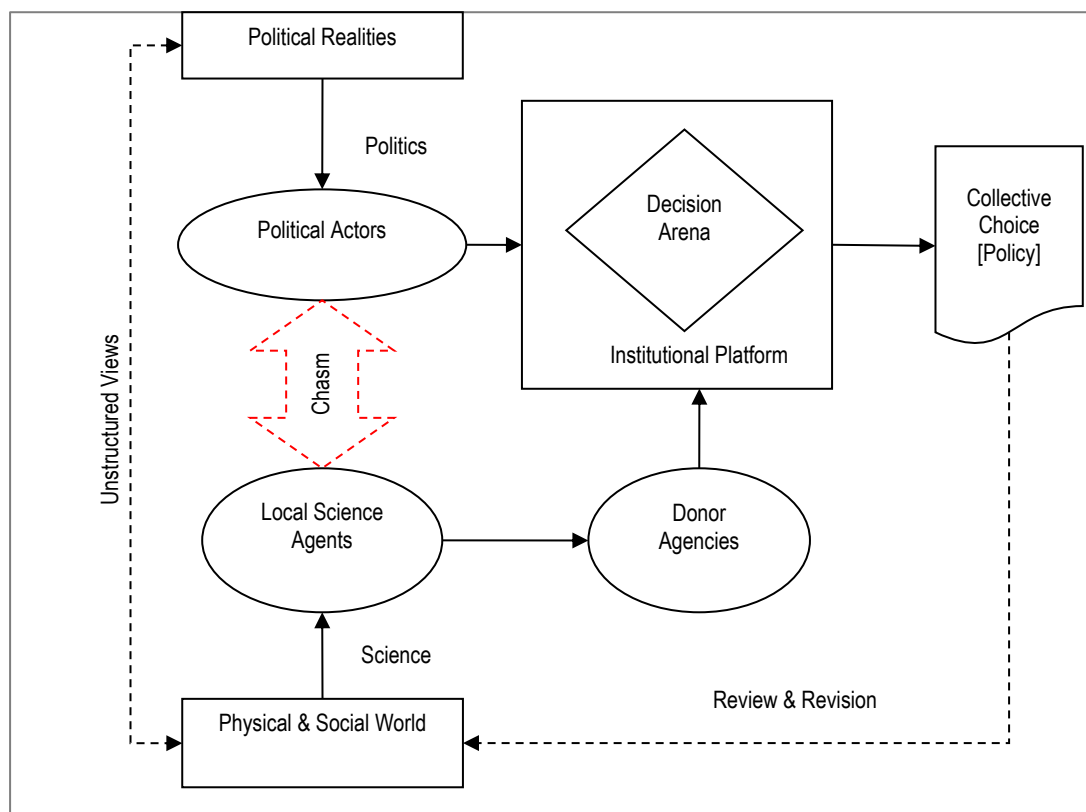


Figure 47: Donor Dependency Model

The multilateral entities (and their programmes) included the World Bank, DFID, IFRTD Eastern and Southern Africa and DANIDA

The local policy makers interviewed were drawn from Uganda, Kenya, Rwanda, Tanzania, Cameroun, Côte d'Ivoire, Ethiopia, Ghana, Malawi, Mali, Mozambique, Namibia, Nigeria, South Africa, Zambia, and Zimbabwe. The interview included the following: consulting firms engaged in international development work AECOM, Roughton International, Gitec Consult Embh, Intech Beusch & Co, and Mott MacDonald.

The research also benefitted from my lectures on transport institutions and policy to graduate students in SSA universities.

²⁵³ These are local graduates (often with postgraduate education in the West) engaged in local transport projects. The group is interdisciplinary. It includes engineers managing and appraising transport assets, economists involved in feasibility study, and social scientists involved in environmental and social impact assessment. Recall, the terminology 'science' takes a Northian sense.

²⁵⁴ Mainly the ministers of transport, finance and the presidency

The findings above may not seem interesting at first encounter. However, a look at the health centre²⁵⁵ (and particularly the HIV/AIDS initiatives) showed local agents more involved and enchanted on the policy process. This difference led to a deeper analysis of the Donor Dependency Model and synthesis of the Joint Research Model as the way forward for the transport [and infrastructure] sector.

6.4.4 From Donor Dependency to Joint Research

The health sector was not affected by the chasm between local science agents and political actors seen in the transport sector. There was an overlap between agents of science and actors of politics.²⁵⁶ In addition to this overlap of agency, there was an overlap of organisation between the local research centres and the donor agency. Moreover, this overlap was reinforced by a link between local universities and foreign ones (mainly drawn from the donor countries)²⁵⁷. Let us look at this bond of relationship on a background of non-linearity and non-ergodicity of policy space (**S**).

Most regional countries experienced post-colonial policy nodes similar to CMC, and the SAP wave of the eighties and nineties.²⁵⁸ In addition, the dynamical interaction of the state (σ), society (χ) and market (κ) is typical to all the SSA countries²⁵⁹. However, we observe stability around the space of health research (compared to transport). The external effects ϵ and institution τ are generalised.²⁶⁰ In effect, we have the excitation function of the overarching framework 1.3.1 removed.

²⁵⁵ This research was attracted to the health sector on observing that, unlike the transport sector, the health sector had thriving local research centres. This observation emerged in a search for local policy think tanks in SSA. At that time, I led a DFID programme that sought to bridge the gap between policy and academia in SSA and Asia. This work (running along my doctoral work) facilitated the thesis.

²⁵⁶ The sixteen SSA countries analysed in the research were characterised by a medical doctor as minister for health, and the role permanent secretary was similarly aligned. These were political actors drawn from the agency of science, and maintaining the link with science in the course of their political efforts.

²⁵⁷ In all the sixteen countries, there was an active partnership between the leading local medical school and an overseas university. These actors fed the local research initiatives.

²⁵⁸ See Amonya 2016b

²⁵⁹ See a detailed analysis of these post-colonial effects in Amonya (2016)

²⁶⁰ This is reflected in the commonality of effort (local and international) seen in joint organisational structures like Joint Clinical Research Centre (JCRC) in Kampala, and the bind of the medical professional (institution).

In addition, the resulting homogenous function (excitation removed) seems to lie in the neighbourhood of a critical point. The alignment of the state, society and market create a generalised coordinate ϖ ,²⁶¹ which eliminates the attendant three vectors (σ , χ , κ). Moreover, the investment vector \mathbf{p} seems to come to equilibrium with ϖ . In particular, on HIV/AIDS there was an alignment of the investors (the pharmaceutical companies) and the local research centres²⁶².

In summary, the HIV/AIDS sub-space presents a zone of stability within a dynamical and non-ergodic policy space. However, this stability is possible because of the epidemic.²⁶³ It forced policy actors and the population to rise above institutional tensions. Here we see equilibrium of a nonlinear space forced by crisis, and this equilibrium allows linearisation on the Euler-Taylor framework.²⁶⁴

Let us see how the situation of the health sector informs the challenges of the transport sector captured in the Donor Dependency Model (DDM, Figure 47). An important cause of the chasm in DDM is the disciplinary inertial frame of both the local and international science agent.²⁶⁵ The challenge of the sector is interdisciplinary. The sector is a complex interweaving of issues, and hence nonlinearity and non-ergodicity. This complexity underpins policy, which Parsons (1995) considers a new discipline of interdisciplinarity.²⁶⁶ The wave of PPP brings

²⁶¹ Recall the alignment of science agents and political actors in health. In addition, these science agents typically had training in public health, and hence a base in sociology stronger than the counterparts in the transport sector.

²⁶² Each of the centres were in dialogue with the pharmaceutical companies.

²⁶³ Allen and Heald (2004) call the defusing of institutional tension 'engagement', which is the more common terminology on the policy arena.

²⁶⁴ This means the nonlinear space can be linearised using an incremental and recursive approach.

²⁶⁵ In the interview with 76 actors of the transport sector drawn from local universities, policy makers and the donor community, the term 'silos' dominated the comments. They thought the graduate joining the transport sector was not equipped to tackle the interdisciplinary challenge of the policy space, and hence engage in the dialogue of the space. However, the local graduate did not have the means to the policy space – unlike the graduate joining the head office of the donor community.

The inertial frame of disciplinary focus is better illustrated using the analogy of the Titanic. In this common parlance, the mechanic of the deck concentrates on the local improvement unconcerned about the bigger picture.

²⁶⁶ Robinson (1953 and 1972) provides an appreciation of this concept from the viewpoint of rational choice economics.

48).²⁶⁷

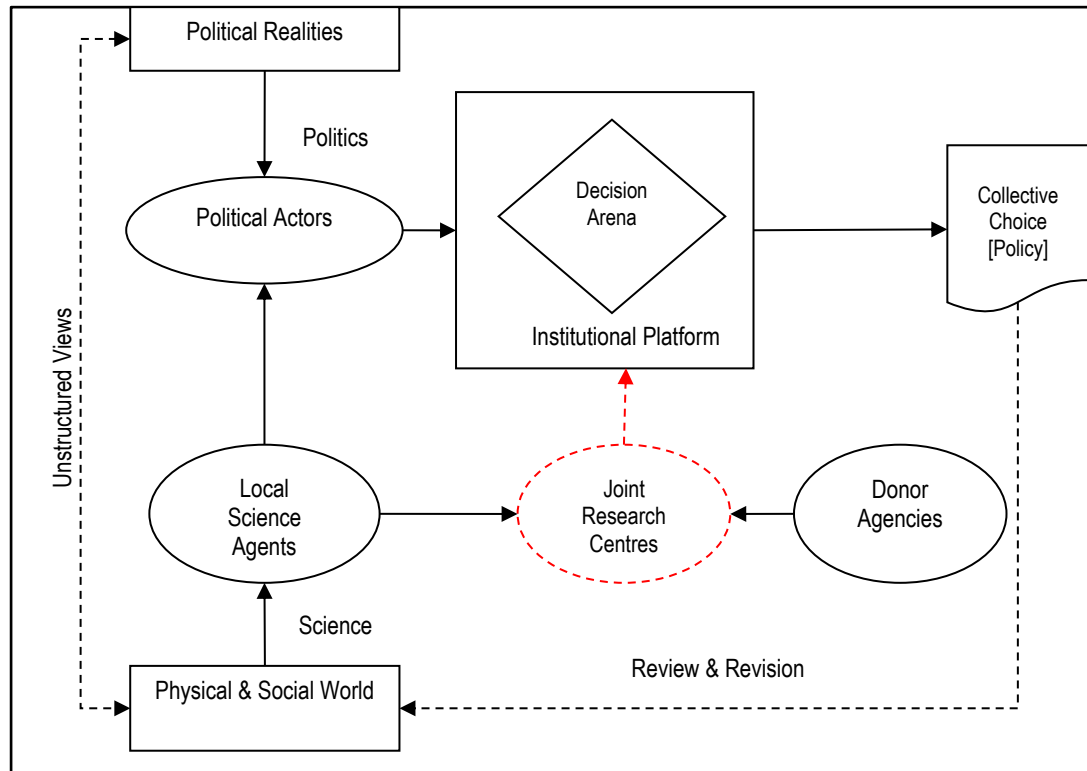


Figure 48: Joint Research Model

²⁶⁷ Recall, the initial trigger of the paper adapted in this section was the emergence of the ‘PPP Specialist’ – an interdisciplinary demand on a landscape of disciplinary rigidity.

6.4.5 Conclusion

A structural analysis of the wave of PPP must not be divorced from its knowledge refinement. The mechanics of refinement (better understanding) is a core component of the structure of PPP.²⁶⁸ This Section 6.4 presents Joint Research Model as a more robust structure than the Donor Dependency Model. The Joint Research Model hinges on interdisciplinarity in pursuing a better understanding and application of PPP. This is the third and last product of the analytic-synthetic process.²⁶⁹

²⁶⁸ To appreciate this point better, recall that policy is a cross product of science and politics - drawing from the fundamentals of Bacon (1915), Northian state and Kuhnian science). Moreover, for comfort of cohesion, this is a thesis on policy science framed on nonlinearity and non-ergodicity.

²⁶⁹ Besides the Seventh International Conference on Traffic and Transportation Studies (ICTTS), Kunming, China, August 3-5, 2010, the synthesis has benefitted from the following conferences:

- Uganda Institution of Professional Engineers, 15th National Technology Conference, Kampala, 20 May 2010 – this is an annual meeting of local and regional academics, policy makers and practitioners. This was a validation dialogue.
- UNECE Team of Specialists on PPP Workshop, Moscow State University, 03 December 2009: The chasm between policy makers and agents of science (research centres), and particularly in light of PPP, was salient.
- World Bank, Sub-Saharan Africa Transport Programme (SSATP), Annual General Meeting, 20 October 2009, Lilongwe (Malawi): My paper *Governance in Transport: A Quest for Interdisciplinarity* explained the complexity of PPP, and hence the quest for interdisciplinarity. This was a significant platform for gathering empirical data feeding the synthesis of the Joint Research Model.
- 88th Annual Meeting of the Transport Research Board, January 2009, here I laid out the core challenge of transport policy and the emerging reality of private finance. The related paper (Amonyia 2009) was an important feed to the synthesised Joint Research Model.
- Third International Transport Economics Conference. University of Minnesota, 2009. I placed to scrutiny my initial set for parameters for the Joint Research Model as well as SN-PPP. The presentation was entitled *Roads in the Maze: A Search for Recession Exits. Road Financing in Africa and the Global Economic Downturn*.
- Third International Transport Economics Conference. University of Minnesota, 2009. Roads in the Maze: A Search for Recession Exits. Road Financing in Africa and the Global Economic Downturn.
- UK Department for International Development, Global Knowledge Partnership, Workshop, 23-25 Yaoundé, 2008. This platform of regional policy makers and academics provided a test for my early parameterisation of the complexity of transport policy in Africa.
- Annual Roads Conference, Dar es Salaam, 2008: This was a meeting of local and regional academics, policy makers and practitioners. I was teasing out the main parameters of the complex space of policy in the region in light of PPP.

6.5 Actuating the Syntheses

How do we move the three new structural components of PPP from synthesis to policy? The need for times of stability has been reiterated in Sections 6.2-6.4, which times allow linearisation of the space. This section consolidates that prescription with an illustration.

First, the absorption of these syntheses will be selective not holistic. For example, take the prototype of sub-national PPP in section 1.1. It comprises many strands. The most salient of them is a new corporate structure that includes public equity. The latent strands include knowledge refinement – ever improving appreciation of the mechanics of PPP. The other latent strand is distributional. That is, the institutional structure between the corporate actors and the broader society on the subject of social equity. These strands are connected on the frame of nonlinearity and non-ergodicity, and the attendant prescription (the incremental and reflexive approach).

Let us look at the absorption and internalisation of the sub-national PPP prototype. Consider a simple case where the three strands are pulled out to form a new policy package. The new policy package now resides in a dynamical space. Let us define that space as follows:

$$\dot{s} = f(s, m, y; \gamma_t) \quad 6.5.1$$

Where:

\dot{s} is time rate of change of state structure, and a similar expression applies to market vector m and society y . Notations have changed from 1.3.1 to facilitate the discussion that follows.

γ_t is the dominant institutional strand.

Note that 6.5.1 is nonlinear and non-ergodic.²⁷⁰ Along the life of a PPP project (e.g. 30 years), the binding institution γ_t will change leading to non-ergodicity (cf. Sec 1.3.1).

²⁷⁰ The non-ergodicity arises from the changing character of the institution (see Amonya 2016a and Sec 1.3)

Further, let us consider a moment of stability (calm and reflection).²⁷¹ When a country stops to ponder, \dot{s} approximates to zero. This fixed point allows us to linearise 6.5.1, and hence define and execute trajectories of policy. Formally:

$$\dot{s} = f(u^*) + f'_s(u^*)(s - s_*) + f'_y(u^*)(y - y_*) + f'_m(u^*)(m - m_*) \quad 6.5.2$$

Where:

$u^* \equiv (s, m, y)$ at the fixed point

f'_s is partial derivative of the policy space w.r.t. the state and likewise for society and market.

We will now extract the coefficients of the partial derivatives and form a Jacobian:

$$\mathcal{J} = \begin{bmatrix} f'_{sc} & f'_{sk} & f'_{sq} \\ f'_{yc} & f'_{yk} & f'_{yq} \\ f'_{mc} & f'_{mk} & f'_{mq} \end{bmatrix} \quad 6.5.3$$

Where \mathcal{J} captures the following changes:

f'_{sc}	Disposition of state structures to business
f'_{sk}	Internalisation of scientific research into state structures
f'_{sq}	Equity strands in state structures (primary and secondary legislation)
f'_{yc}	Structures of business in the society (e.g. cooperatives)
f'_{yk}	Strength of the link between society and scientific research
f'_{yq}	Alignment of institutional strands of society and PPP investors
f'_{mc}	Relationship between local and international markets
f'_{mk}	Disposition of the local market to scientific research
f'_{mq}	Values of the national PPP market w.r.t. equity.

Let us look at the stability of the policy space as calm emerges (the fixed point). Consider the diagonal of the Jacobian 6.5.3. Take the case of symmetry and negative eigenvalues. The PPP space is stable. What does this situation mean to the delivery of policy?

²⁷¹Unfortunately, these moments often follow extreme stress, and particularly war.

A negative f'_{sc} in the neighbourhood of a fixed point means that a change away from the instant situation of PPP would be associated with a government that is less disposed to business. The government becomes less business-like as we drift away from PPP. To put it differently, PPP should compel government to be business-like so much that when the people look at their country removed from PPP, they see a less business-friendly government. That is a major challenge to the design and communication of PPP.

Secondly, let us turn to f'_{yk} . This is the relationship between society and scientific research. Do the people associate PPP with a better understanding of the mechanics of the policy space? This is perhaps the biggest challenge to PPP. As PPP policy was being formulated in Uganda, policy makers (let alone the broader society) did not understand the concept.²⁷² Moreover, the diffusion of policy knowledge in post-independence Africa hinged on the elite – the ‘children’ of communities who had attended universities.²⁷³ While reliance on ‘our children’ has reduced with advance in technology and spread of education, the role of the elite remains important. Societies expect their own elite²⁷⁴ to go back and explain the future. When the elite do not understand crucial waves like PPP, we have a problem.

Third, let us consider f'_{mq} . This component captures how the PPP market addresses social-equity concerns in the conduct of their business. Put differently, what is the relationship between the market and the underprivileged of society? This is a deep matter of trust between society and the market. Unlike the first two, this component will be evident in mature PPP environments. Action at policy implementation can set the relationship on the right path but the results will emerge only gradually. However, ultimately this relationship should be stronger in the PPP era than pre-PPP, and hence a negative eigenvalue.

²⁷² See Sec 5.5

²⁷³ See Sawyerr (2004) for contemporary reflection on this diffusion of knowledge.

²⁷⁴ Often absorbed in politics

That was an illustration of how the calculus of dynamical systems can help the policy maker design and manage PPP at the point of calm (the stability point). Particularly, the illustration shows how the strands of sub-national PPP can be absorbed and managed. Note though, the stability points are outside the control of the policy maker. Regrettably, they arise from severe political distress, including war. What happens outside the points of stability?

Outside the points of stability, attempts to introduce new structures of PPP are likely to be futile. That is a simple guidance of the calculus of dynamical systems. The new imported pieces of policy will be lost in the whirlwind of the dynamical space.²⁷⁵ Note however, even PPP attempts starting at points of stability will come under severe distress unless the stability is maintained – unless the new holonomic institution remains in place. Moreover, even if the system stability is maintained, the projects will come under distress if the composite structure of PPP cannot withstand small changes. In other words, we face two conditions - the space must be stable and the structure [of PPP] must be suitable.²⁷⁶

The two projects of Chapter 5 (BHP and RVR) illustrate the two conditions – space stability and structural suitability. Both projects derived from SAP and the system stability of the mid-nineties.²⁷⁷ However, two decades later, that stability had long been lost.²⁷⁸ Anyway, the composite structure of PPP was unsuitable, inspiring the three syntheses of Sections 6.2-6.4. Looking ahead, the country will continue to question the use of the stability of the nineties for SAP. Research such as this thesis and Suruma (2014) are merely at the start.

Therefore, to refresh the opening question, moving the three new structural components of PPP from synthesis to policy is a matter of serendipity. That is tough but true. We do not know when and where the next points of stability will

²⁷⁵ It takes us back to the portrait of conceptualisation 1.3.

²⁷⁶ Nudge is a salient word in the policy world at present. It is associated with the 2017 Nobel Prize in economics, awarded to Richard Thaler (See Sunstein and Thaler (2008) for part of the background work). The scholarship of Thaler is outside PPP and yet it pertains to policy change using incremental means. The 'nudging' of Thaler (or indeed the incremental-reflexive approach of this thesis) would not be effective outside the points of stability.

²⁷⁷ Reflect on Sec 4.2.6.2

²⁷⁸ Recall we are discussing stability of a dynamical system and not political control. In the late eighties and early nineties, the entire country subscribed to the then situation and awaited a new dawn. That stability could not last in a non-ergodic setting. Moreover, note that the challenge to PPP extends beyond Uganda. See Amony (2016b) for experiences in other SSA countries. Yet, these challenges should not diminish the potential of PPP as a solution to the complexity of service delivery (Chapter 3).

emerge.²⁷⁹ However, we should address the structural challenges of PPP in light of what we know – the reality of nonlinearity and non-ergodicity. This thesis does just that. Moreover, to explain the complex past and attempt to predict the future, policy science must reach more to what we know about the sentient physical world. It must draw more from physics.

6.6 Chapter Summary

This chapter has presented three products of an analytic-synthetic process. All the three structures are in response to stresses in the existing PPP structure, which structure is an excitation on the nonlinear and non-ergodic policy space of the country.

The first synthesised structure was Capability Search in Section 6.2. It is a response to the structural challenge of Competitive Dialogue. The second is a prototype of Sub-National PPP (SN-PPP), which includes public equity. The prototype SN-PPP is in response to the stresses in the existing structure of the Special Purpose Vehicle (SPV), and the appeal of distributional considerations emerging from the empirical data in Chapter 5. The third is Joint Research Model, which responds to the challenges of Donor Dependency Model embedded as the structure of science (scientific research) in the wave of PPP.

The three strands of challenge depict the composite structure of the force of PPP, and this composite structure is viewed using a single conceptual framework – nonlinearity and non-ergodicity of policy space. This conceptual frame is introduced in Chapter 1, and drawn through literature review in Chapters 2 and 3. The frame is a background to the exposition of the policy space of Uganda in Chapter 4, and the empirical data on PPP in Chapter 5.

²⁷⁹ These points of stability are not exclusive to the aftermath of war. The charisma of political leaders can create moments of stability. The birth of PPP in the UK is an example (cf. Sec 3.3). Recall to look beyond PFI to the spread of 'partnering' projects across the country and the change in the institution of construction away from the adversarial approach of the past decade (cf. Latham 1994, and Egan 1998). Whatever a person's political persuasion, the captivating emergence of Tony Blair cannot be denied – the 1997 victory speaks for itself. However, regrettably war remains the dominant source of stability, and the mushrooming of the Bretton Woods Organisations is clear. For reflection, see Kapur et al. (2011).

Chapter 7.0 Summary and Concluding Remarks

This thesis illuminates the policy space of PPP of Uganda, and shows it is a nonlinear and non-ergodic dynamical system. Consequently, this policy space does not subscribe to stable long-term trajectories. Therefore, improvements to the policy path require an incremental and reflexive approach. This approach instructs the three structural components of PPP synthesised in this thesis.

7.1 The Defining Strands

A reader might ask, 'What do I know about PPP in Uganda from this thesis?' That would be a wrong starting question. The correct one is, 'What is the frame of "knowing" in this thesis?'

The frame is case study.²⁸² Case study is an epistemology of explication. Consequently, it is a methodology of variety. That duality of the terminology contrasts with reductionist approach of the Hypothetico-Deductive (H-D) approach.

More formally, the H-D approach seeks to reduce a multidimensional state space to a single trajectory (the model). Case study appreciates better the nonlinearity of such space. Instead of premising on a critical point, it seeks to identify the parameters of the phenomenon.²⁸³

Consequently, a thesis built on Case study should be different in structure from theses that use the H-D frame. In particular, literature review should not be concentrated but integrated – as literature flows with the triangulations of the case. However, the reality of the process leading to this thesis demanded a major compromise on that functional structure of Case study.

²⁸² Note, the conceptual framework of the thesis is Dynamical Systems. However, the overarching epistemological framework is Case Study. That is, Case Study is the overarching framework of 'knowing'. Dynamical Systems is used within the epistemological space of Case Study. Note below that the intractability of Non-ergodic Dynamical Systems appeals to the epistemology of explication of Case Study. Finally, observe that the conceptual framework is enhanced using the Analytic-Synthetic Process to generate three 'concrete' objects of PPP policy – a demand of the process leading to this thesis.

²⁸³ Note: Strength of research tends to H-D as the state space reduces to a critical point, and the converse holds. This is a more formal argument than the ones propelled by leading scholars, and detailed Sec 1.5.

Consequently, Chapters 2 and 3 concentrate on literature review. Chapter 2 reviews literature on policy science on the background of the conceptual framework in Chapter 1 – nonlinear and non-ergodic space of policy. Chapter 3 looks at the literature on PPP policy. In Chapter 4, a structural explication of the policy space of Uganda follows the literature review. That explication hinges on CMC and SAP. Chapter 5 is an explication of the two most prominent projects in the ongoing attempt at PPP in Uganda – BHP and RVR.

Chapter 6 cements the dictate towards H-D, and particularly the longing for ‘concrete findings’. The chapter is a synthesis following the analytics of the PPP structure and the nonlinear (and non-ergodic) space of Uganda. The pieces of synthesis are ‘concrete’ outcomes. The first is Capability Search, which is a more appropriate replacement for Competitive Dialogue. The second is a prototype of Sub-National PPP (SN-PPP) in response to the distributional challenges of the policy space of Uganda, and the existing restricted understanding of the SPV as a strictly private entity. The third synthesis focuses on the structure of knowledge refinement, which is associated not just with PPP but policy refinement in its entirety. The Joint Research Model is presented as a more robust substitute for the dominant Donor Dependency Model.

Therefore, the chapter picks three constitutive components of the PPP structure, and synthesises substitutes that are more robust. That is, the approach is analytical-synthetic. Moreover, all the three syntheses have been published in scholarly journals through double-blind peer review.

Looking back, the reader who wants to know about PPP in Uganda will summarise: It is a nonlinear and non-ergodic space.

7.2 Highlights of Findings

Recall, this research is a case study. Therefore, underpinning the work is an ontology of complexity, a methodology of variety, and an epistemology of explication.²⁸⁴ Moreover, to borrow from Elsnar (2014:301), complexity is 'irreducible'. Therefore, a case study should not be expected to produce an array of deductions or findings.²⁸⁵ Nonetheless, the process leading to this thesis demanded 'findings'. Consequently, this section provides highlights of the case (the dissected phenomenon). These highlights are laid out below guided by the three research questions.

Research Question 1: *PPP is complex and nascent. Therefore, we must first ask, what framework can we use to investigate policy waves striking new policy spaces?*

The thesis presents a framework of nonlinearity and non-ergodicity of policy space. This conceptual framework respects the place of the Northian institution, and its controlling effect espoused by Ostrom (1998). In addition, the framework appreciates that policy space is not closed. It is open to external institutional and economic effects (i.e. excitation). The excitation is a forcing function on a dynamical system comprising the state, market and society. This new non-homogeneous function will experience dramatic changes along the life of the policy. In other words, it is a non-ergodic space. This is a stylisation of the conceptual framework formalised in Chapter 1.

The review literature in Chapter 2 reveals existing frames of policy that are derivatives of the fundamental dynamical construct. All the frames of policy reviewed in this chapter trace back to the indisputable – that policy space comprises many parts, which are interconnected and moving. It is a dynamical system. However, these existing frames are implicit in their appreciation of dynamical systems. This thesis is explicit. Uganda is a young high-frequency policy

²⁸⁴ Flyvbjerg provides leadership on this scholarship as discussed in Sec 1.5.

²⁸⁵ The 'findings', if we could term it so, is the entirety of the dissected phenomenon. The dissection is laid open so the 'reasonable observer' can ask incisive questions - see Scalia 1989 and 1997, and Maggs 1995. It is the ensuing questions that are most important, and they arise from a fine triangulation of the complex phenomenon. Epstein (2008: 1.15) puts it this way, 'Can you ask a new question? It's the new questions...that produce huge advances.'

environment. The explicit appreciation of dynamical systems allows a better understanding of PPP in the country's policy space. Moreover, Chapter 3 opens with a review of PPP-specific literature. The review shows that scholarship has not drilled down to the non-ergodic character of policy spaces of PPP. Therein resides a unique dimension of this thesis.

Research Question 2: *What is the origin and mechanics of diffusion of PPP?*

First, the thesis warns of the ubiquity and various use of the terminology (PPP). It considers PPP an exponential pursuit to a tight joint between the state and the private sector. The object of the pursuit is better management of complexity, and the attendant risks.

The thesis argues that the recent wave of PPP traces back to policy formulations of the nineties in the UK. These formulations trace back further to the Second World War, and subsequent feeds associated with economic crises.

Empirical analysis in Chapter 3 shows that the diffusion of PPP follows the logistic function. However, this function breaks down under the effects of non-ergodicity (manifested in economic crises and state instability, for example).

This chapter instructs that PPP must be a construction entailing public equity. The structure must be defined by joint risk management of complexity. Consequently, the function will be a duality of service and returns. In other words, the parties must incorporate public and private effects in tandem. That approach demands substantial public equity in the direction of PPP projects, and the present practice does not meet that requirement. New compositional structures meeting the requirement of public equity, and hence better suited to the dynamical space of Uganda are discussed under the third question below.

Research Question 3: *Being a new wave of policy, how do compositional structures of PPP interact with the reality of the policy space of Uganda?*

First, Chapter 4 lays out the reality of the policy space of Uganda. This space is characterised by two nodes – CMC and SAP. These nodes are a manifestation of institutional effects. CMC developed in the late sixties from the post-colonial

nationalist and socialist pursuits but it was halted by the undermining of the state structure in the seventies. As attempts to reinstate state structure continued in the eighties and nineties, the force of SAP hit the country. The arrival of PPP in the early 2000s encountered this SAP-driven space of policy. The legal frames of SAP were used to develop PPP until October 2016 when a PPP-specific legal frame was installed.

Chapter 5 is an empirical exposition of the early attempts at PPP in Uganda. The chapter considers two projects – BHP and RVR. These two projects provide an empirical illustration of the structure of PPP. In addition, the two provide finer exposition of the policy space of the country, and the stresses the PPP structure suffers as it interacts with the policy effects.

Consequently, the thesis uses an analytic-synthetic approach to develop improvements to three structural components of PPP. Chapter 6 presents the three syntheses.

The first is Capability Search. This new structure is in response to the susceptibility of Competitive Dialogue to the nonlinear and non-ergodic realities of the policy space. The second is a prototype of Sub-National PPP (SN-PPP). It is in response to the distributional challenges of the policy space of the country, and the existing restricted understanding of the SPV as a strictly private entity. The third is the Joint Research Model. This synthesis focuses on the structure of knowledge refinement (read, scientific research) associated with PPP. It is a more robust substitute for the dominant Donor-Driven Model.

Let us look at the future of these new structures. In applied physical science, kindred syntheses would be subjected to pilot schemes. Policy science does not have this privilege. However, the three synthesised structures provide focal points for policy dialogue. Already, each of the three has gone through the rigour of scholarly review, and reality check of policy workshops. Each of the three structures is drawn from peer-reviewed (double-blind) published papers. In addition, the three stand on the policy arena triggering questions from the ‘reasonable observer’. After all, as Epstein (2008: 1.15) says, ‘It's the new questions...that produce huge advances.’

7.3 Questions for Enquiry

Illuminating complexity is the essence of enquiry.²⁸⁶ In viewing an emerging phenomenon of policy (PPP in Uganda) as a nonlinear dynamical system, this thesis opens up a tapestry of questions. These offshoots (questions) are raised along the illumination, which is the essence of case study – an epistemology of explication.²⁸⁷ The most salient of the questions are captured below.

- i. How will the development of the capital markets affect the dynamics of PPP in Uganda?²⁸⁸ This question interacts with all the three syntheses in Chapter 6. It will illuminate further the strictures of finance and law identified in the synthesis of Capability Search (Sec 6.2). Secondly, it will explore further the mechanics of public equity at the core of SN-PPP (Sec 6.3). Finally, the scholarly challenge in the question refreshes weaknesses in the existing Donor Dependency Model of research (Sec 6.4).²⁸⁹
- ii. The 1995 constitution provides for devolution and regional collaboration of infrastructure management, and particularly roads.²⁹⁰ Will the need for sub-national PPP motivate this collaboration?
- iii. How will the evolution of state-agency mechanics in Uganda (and SSA at large) affect the evolution of PPP? Nascent states are continually remoulded by the agents (government).²⁹¹ However, the complexities that appeal to PPP require joint action of the state and private sector, leading to all the three syntheses in Chapter 6. Therefore, scholarship on PPP will be

²⁸⁶ See Polanyi (1962) on definition of knowledge as comprehension of reality, Ibid. Sec 1.5.2 and 6.2.2.

²⁸⁷ See Section 1.5.

²⁸⁸ This question extends across the continent, and appeal to an interdisciplinary collaboration of universities across the continent.

²⁸⁹ This is another opportunity to highlight that policy objects embed research structures (preamble of Sec 6.4). When a policy objects instructs on a path of policy, it premises in the existing framework of knowledge refinement (research) unless the object explicitly provides otherwise.

²⁹⁰ Art 178

²⁹¹ This is a fact of mechanics. Agents as a force will remould an underlying formative structure. The empirical evidence is the distress of states across SSA over the past five decades captured in Figure 32.

Further, Giddens's (2004) 'structuration' will be a useful sub-space in this enquiry.

richer by keeping focus on the remoulding of the state and its effects on PPP policy.²⁹²

However, the thesis raises broader questions that traverse the phenomenon of the case (PPP in Uganda). These broader questions follow.

- i. While the emergence of critical points is unpredictable, structures for exploiting these instances of stability can be constructed – building on the requisite incremental and reflexive approach presented in the thesis. However, critical points are associated with a background of distress of the state. Therefore, how can the external world (the supra-state) contribute to the construction of structures for critical points?²⁹³
- ii. Looking across the continent, if the nineties was a decade of SAP followed by a decade of debt cancellation, how will the present accumulation of debt associated with PPP play out? ²⁹⁴ Will the liberalisation of SAP emerge as an attractor of dynamical systems across the continent?

The future challenges scholarship. Policy is not made in a vacuum.²⁹⁵ What is in the space of policy and how do they interact? The literature reviewed in Chapters 2 and 3 does not explicitly tackle that question as a subject of physics. This thesis does. The conceptual Section 1.3 reminds us that, to define its space, policy science must draw explicitly from physics. It is by so doing that Paul Samuelson laid the ergodic foundation of economics.²⁹⁶ However, the challenge to policy science does not stop there. If a policy space is nonlinear and non-ergodic as this thesis argues, so what? How must policy makers proceed in such a space? Calculus instructs us to be incremental and reflexive. That instruction, emerging in

²⁹² It will be useful to conceptualise the cases as dissipative dynamical systems, and hence provide for the complexities of the remoulding.

²⁹³ Part of the answer is the Joint Research Model, which localises and institutionalises the challenge of knowledge. However, these critical points are associated with the collapse of agency of the state, for example through war or economic crisis (for instance, Uganda of the late eighties). In these situations, the contribution of the external world is required and yet that contribution should respect the complexity of the local policy space. The mechanics of that contribution of the supra-state is an area begging research. Further, Lyapunov Stability provides a space for this enquiry.

²⁹⁴ Recall, PPP places a debt obligation on the state through guarantees as seen on BHP.

²⁹⁵ cf. this remark in WDR 2017, Sec 1.1

²⁹⁶ Detailed in Sec 1.3.2

Section 1.3, weaves along the thesis and guides the syntheses of Chapter 6. However, these syntheses are but a set wrought for a specific phenomenon – PPP in Uganda, with plausible extension across SSA.²⁹⁷ Scholarship is challenged to produce and review more of such policy structures. At the same time, scholarship must look for opportunities that allow these new policy structures to be absorbed and internalised in policy making. However, those opportunities belong in serendipity.²⁹⁸

To close, policy science must always revisit the well of physics, and it should do so in the quiet of time. Yet, the mechanics of policy unfolds from history and is characteristically sociological. We are reminded that policy science is intricately interdisciplinary.²⁹⁹

²⁹⁷ Recall case study and intrinsic generalisation, Sec 1.5

²⁹⁸ Refresh Sec 6.5

²⁹⁹ Here, we must heed Parsons (1995).

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Appendices

Appendix A. Doctoral Theses: Appreciation of Case Study

Appendix A.1 Perspective Views

J. Barya: Ethos ID - uk.bl.ethos.290374 LAW, STATE AND WORKING CLASS ORGANISATION IN UGANDA: 1962-1987 – Warwick 1990

This is longitudinal, just like my research. It is a case study. However, that is not made explicit. Therefore, the epistemological role of the case study is missing. That notwithstanding, Barya takes a vantage point of trade unions and look back at Uganda. So do I. Except, I look at science and the policy process.

H.A Marquette: Ethos ID - uk.bl.ethos.392825 THE ORIGINS AND DEVELOPMENT OF THE WORLD BANK'S ANTI-CORRUPTION PROGRAMME – Durham 2002

This research addresses the World Bank, a strand in my work. However, it is primarily cross-sectional. It attempts to answer the question: Why and how did the Bank arrive at its current position on anti-corruption work? My research, on the other hand, does not seek a generalisation – a grand conclusion. It is a case study in the true sense of the terminology. It orders a complex phenomenon of science and policy in Uganda, teasing out the drivers and mechanics in a longitudinal way. The vantage point is PPP policy, which points to a lack of influence of local institutions of science in the policy process. It then makes a archaeological dig, tracing strands along the country's path that define contemporary policy, and hence explaining the failure of local science in instructing policy. The most salient strand is institutional tension and a wave of hastiness in policy action tracing back to independence. Could it be that at 50 years the country is simply too young and going through the metamorphosis of infancy – characterised by delegative democracy? That is a question for future research.

A. Patterson: Ethos ID - uk.bl.ethos.432488 SCIENCE, RISK AND PUBLIC POLICY : OPS, GM CROPS, BSE AND MMR : A COMPARATIVE STUDY OF THE USE OF SCIENCE IN POLICY-MAKING IN BRITAIN – Newcastle 2006

The thesis explores the role of science in policymaking in Britain against a background of a population anxious about the environmental effects of science. The author maps a debate, placing on one side the Sound Science group (hardly showing scepticism of the environmental effects of science) and on the other, the Precautionary group (who are sceptical). Using this organising framework, the research explores the advice of expert bodies in the formulation of four policies: 1) organophosphates (OPs) in sheep dip; 2) the

commercialisation of GM crops; 3) the BSE crisis during the period 1985 - 1998; and 4) the MMR vaccine policy. The research concludes that the Sound Science approach still drives expert community despite the government leaning to the precautionary approach.

Of pertinence to my research, first, it is an investigation of evidence-based knowledge in the government-society dynamics. On the methodology, data is not concentrated at a point in the research. That is one of the defining characteristics of case studies. They are longitudinal and exploratory, tracing and connecting strands. However, Patterson uses the Sound Science – Precautionary dichotomy as a hypothesis [to be tested.] It would seem the author yields to the hypothetical-deductive pressure – perhaps inadvertently. Question, is such a hypothesis testable (falsifiable)? That would require cross-sectional analysis akin to the statistical empiricism. Instead, the other would have emerged stronger with an ordering of the four situations [cases] using the Sound Science – Precautionary dichotomy as an organising lens. That leaves the phenomenon [collective of the four] open to assessment using another lens. My research uses Institutional Rational Choice – not as a hypothesis but an organising lens.

C. Testa: Ethos ID - uk.bl.ethos.405763 PUBLIC POLICY AND PRIVATE INTERESTS IN REPRESENTATIVE DEMOCRACIES – LSE 2003

This is an analysis of the mechanics of policymaking. The author analyses competition between lobbyists and ordinary voters in influencing policy, and the role of the institution of political parties. This research finds similarity with mine in the broad focus on policy, the mechanics, and the institution. However, my research takes a deeper look at the evolution of policy platforms and explicates ‘the institution’. Of course, the two works are driven by different questions o differences are expected. However, a deeper seat for policy platforms and the institution would provide a better anchor for the research. For example, the abstract [of Testa] opens as follows:

In democratic systems, citizens delegate to policy makers the authority to take economic decisions that affect the well-being of the entire community. The focus of this analysis is on the instruments available to private individuals to influence public decision-making and on the relative effectiveness of those instruments that we believe is influenced by democratic institutions.

The excerpt is loaded with words that required explication. For instance, it can be argued, when citizens delegate policy decisions, then they cut loose the string with that person

[delegate] for the duration of decision-making. When they choose representation, the connection is retained and reflexivity (a back-and-forth) is expected. Moreover, the connection may not be a string but rather an iron rod. This is the case of direct democracy, where technology allows every decision to be made by the people. The quasi case uses pollsters, but as technology improves, the decisions could be made in an instant vote – relegating ‘policymakers’ to mere decision nodes.

These are modern complexities. However, the Testa research loses the space for deeper macro thinking and rushes to employ set theory in a micro setting. The research demonstrates the tension between mapping macro drivers and a dash to the micro. Scholarship must appreciate both. My research aims to tease out the micro drivers of policy, and the mechanics that binds them.

J.I. Gershuny Ethos: ID - THESIS00684718 RATIONALITY AND PUBLIC POLICY MAKING – Sussex 1977

This is a true case study. It lays out a platform of social justice, and proceeds to explore policymaking in the transport sector. The author uses the ‘comprehensive rational argument’ a lens. That lens allows the closing effect of politics to be assessed. Of note is the following statement in the conclusion:

Imposition of closure on a technical analysis is a political act, and that the formulation of the terms of reference for a technical study is [should be] a normative and not a positive process.

The work appreciates that reality comprises many variables. The scientist [‘expert’] could reduce the number of variables and produce a naive (unrealistic) cross-sectional generalisation of a phenomenon. Alternatively, the scientist may produce a framework of options. This is a less imposing (less positive) approach. That is the challenge of comprehending reality.

However, there is another challenge. It arises from the interaction of science and politics. Politics provides closure for the policy alternatives of science. Should the procedure of this closure be explicated in the terms of reference of the scientist? How about the strictures provided by existing institutions and organisations, should these be explicated in the terms of reference? Moreover, how does the approach of the scientist (whether narrow and generalising, or broad and framing) influence the interaction of science and the closing effect of politics?

Gershuny's case study does not answer these questions. However, it provides a space (and stimulus) for these questions to be asked. That is the role of case study.

Looking back, the work could have delved deeper into 'the institution'. However, Gershuny did his research in 1977. He did not have the benefit of the present appreciation of the institution (cf. Douglas North and Elenor Ostrom).

Appendix A.2 Other Theses Accessed

Uganda

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- Tosh J.A. 1973. *Political Authority among the Langi of Northern Uganda, Circa 1800 to 1939*. School of Oriental and African Studies. University of London
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Case Study Approach

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- Al-Shahi M., 2011. *Interorganisational Collaboration in the Public Sector*. Brunel University
- Bishop S., 2011. *HRM in Public Private Partnerships: Working in a Health Production System*. University of Nottingham
- Common R.K, 1999. *Public Management and Policy Transfer in Southeast Asia*. University of York
- Ewelukwa N.O., 2009. *Actualising Economic Development through Privatisation Legal Reform: A General Assessment of Privatisation in Africa with a Specific Case Study of Nigeria and Sub Focus on the Nigerian Electricity Sector*. Queen Mary, University of London
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Haglund D., 2010. *Policy Evolution and Organisational Learning in Zambia's Mining Sector*. University of Bath

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Kayaga L., 2007. *Tax Policy Challenges Facing Developing Countries: A Case Study of Uganda*. MR37298. Queen's University (Canada)

Onok C.A., 2009. *Modes of British Imperial Control of Africa: A Case Study of Uganda, Circa 1890--1990*. University of Connecticut. 3367450

Rutakumwa W.R., 2009. *Uganda's Poverty Alleviation Strategies: A Policy Analysis*. University of Alberta (Canada) NR55607.

Udongo B.P., 2009. *Science Education Policy for Emergency, Conflict, and Post-Conflict: An Analysis of Trends and Implications for the Science Education Program in Uganda*. 3364688. University Of Maryland, 3307946

Case Study and Policy Search

Diaz Rosillo C.E., 2009. *All the President's Powers: Presidential Leadership and Executive Policymaking in the United States*. Harvard University. 3385542.

Ericson K.L., 2006. *The role of influence in the implementation of public policy. Pennsylvania HealthChoices: A Case Study*. The Pennsylvania State University. 3229395.

Klodnicki R.H., 2003. *Kingdon, Lindblom, and Lovell: Assessing Three Models of the Public Policymaking Process*. University of Denver. 3097882

Public-Private Partnerships (PPP)

Ahmadjian C.J., 2010. *Evaluating Alternative Public-Private Partnership Strategies for Existing Toll Roads: Toward the Development of a Decision Support System*. University of Massachusetts 3397682.

Alves L.F., 2006. *Stochastic Approach to Risk Assessment of Project Finance Structures under Public Private Partnerships*. The George Washington University. 3214152.

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Kumar M., 2009. *Institutional and Regulatory Economics of Public Private Partnerships in Infrastructure: Evidences From Stochastic Cost Frontier Analysis and Three Case Studies of Urban Water Utilities*. The George Washington University. 3359247.

Lee S., 2005. *Exploratory Modelling and Adaptive Strategies for Investment in Standard Services to Facilitate Public Service Networks*. The Pardee RAND Graduate School. 3200172

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Wang Y., 2010. *Recent Experience in the Utilization of Private Finance for American Toll Road Development*. University of Southern California. 3403664.

Appendix B. Narratives on SAP

Case I: Scholarship

Privatisation did not fulfil its intentions since 1992 because: the government did not adequately facilitate citizen's participation in the process; privatisation was a conditionality reform driven by the World Bank and IMF which caused deviations from the overall priorities of improving services to merely disposing off public enterprises and the process lacked transparency, thus, exposed the process to corruption. It was also observed that though privatisation improved the efficiency and profitability of individual enterprises, there were no benefits realised by communities. (Mulengani 2009)

Case II: Media

While Umeme is almost as inefficient, and probably has worse customer service than UEB used to, the problem is not privatisation. Rather privatisation was done badly. We merely replaced a state monopoly with a private one. I have argued in this column before that UEB should have been privatised into regional electricity distribution companies. Something like Umeme Central, Umeme East, Umeme North, Umeme West. They would be independent compa]

Case III: Donor Actors

Common perceptions notwithstanding, consumers lost in none of the eight cases (table 2). They had modest gains in all three competitive cases (Senegal airlines, Uganda clay, Uganda telecoms) because while privatized firms grew rapidly, lag effects and heightened competition limited consumer benefits. Consumers had major gains in three of the five noncompetitive cases (Côte d'Ivoire electricity, Mozambique water, Senegal water) because of increases in access to services and in the quantity supplied. Price effects were minimal because access to investment capital allowed expanded coverage with only moderate price increases. The moderate gains in Uganda water reflect the counterfactual: consumers would have done as well without privatization because of good public sector management. (Jones et al. 2008)

Oh, yeah. The countries now in structural adjustment-they hover between, say, 25 and 30. On any given day there are 25 or 30 countries in Africa in structural adjustment, and I say that--on a daily basis it's not quite that bad, but I mean there are countries that are teetering along the edge of failure to maintain the program all the time because they are very difficult programs. Things don't move very rapidly. Those countries have now achieved over the last four years an average growth rate of between 2.8 and 4.2 percent. It depends on how you do a weighted or an unweighted average of their growth rates, which is higher than per capita, higher than the population growth rate. We're getting some per capita income growth, and it's the first time in fifteen years that this rate of growth has been achieved in Africa. Countries not in adjustment are achieving minus 2.5 percent GNP growth, which added to the population growth rate means the per capita income is dropping at the rate of over 5 percent per annum. And that's the difference, so that you could say that all of this gain could be wiped out by a drought, yeah, no doubt, and, you know, you could say that a lot of this is driven by a lot of aid. Absolutely true. The countries that are in adjustment are getting the aid; the countries without it are not, although countries without it are still getting a lot of aid. [Brookings Institutions, Interview with Edward V. K. Jaycox, Vice President (Africa) World Bank, 1984/96 05 April 1991]

Appendix C. Documents on SAP Accessed from Archives

Document	Year	Author/Owner	Source
First Structural Adjustment Loan (SAL) Approved	1980	World Bank	World Bank Archive
The World Bank: Its First Half Century: Brookings Institution - Interview with Edward V. K. Jaycox (Declassified 01/04/2012) ⁱ	1991	Brookings: Richard Webb, Devesh Kapur/ World Bank	World Bank Archive
The World Bank: Its First Half Century: Brookings Institution - Interview with Robert S. McNamara (01/04/1991, 10/05/1991, 03/10/1991) ⁱⁱ	1991	Brookings: John Lewis, Richard Webb, Devesh Kapur	World Bank Archive
The World Bank: Its First Half Century: Brookings Institution - Interview with Eugene Rotberg (02/11/1990) ⁱⁱⁱ	1991	Brookings: Richard Webb, Devesh Kapur	World Bank Archive
The World Bank: Oral History Programme - Interview with Willi A. Wapenhans (21/07/1991 19/08/1993) ^{iv}	1993	William Becker from George Washington University/Worl d Bank	World Bank Archive
The World Bank: Oral History Programme - Interview with Robert Picciotto (01/11/2000) ^v	1993	William Becker from George Washington University/Worl d Bank	World Bank Archive
World Bank Executive Committee Meeting WB IBRD/IDA 03 EXC-10-4535S 9 February 1981 - 15 June 1981: Digitized: June 21, 2012	2012	World Bank	World Bank Archive
Parliamentary Committee Report on Ministerial Policy Statement FY 2005-9	2005-9	Ministry of Finance (UGA)	Parliament Library (UGA)
Local Governments Act (UGA), 1997	1997	Parliament (UGA)	Parliament Library (UGA)
Public Finance Act (UGA), 1964	1964	Ministry of Finance (UGA)	Parliament Library (UGA)
Budget Speeches (UGA): 1967 - 2012	1967- 2012	Ministry of Finance (UGA)	Parliament Library (UGA)
Letter from AM Obote (President and Minister of Finance, Uganda) to the IMF, 04 Sept 1981	1981	IMF	IMF Archive
Statement by SM Kiingi, IMF Executive Board Meeting, 02 Jan 1980 to (ED, UGA, IMF)	1980	IMF	IMF Archive
Statement by SM Kiingi, , IMF Executive Board Meeting, 30 Oct 1981 (ED, UGA, IMF)	1981	IMF	IMF Archive
Statement by SM Kiingi, IMF Executive Board Meeting, 04 June 1981 (ED, UGA, IMF)	1981	IMF	IMF Archive

Document	Year	Author/Owner	Source
The Chairman's Summing Up at the Conclusion of the 1979 Article IV Consultation with Uganda Executive Board Meeting 80/1 - January 4, 1980	1981	IMF	IMF Archive
Sec IMF Executive Board, Report on 'Paris Club' Meeting (External Debt, Uganda), 17/18 Nov 1981	1982	IMF	IMF Archive
Sec IMF Executive Board, Report on 'Paris Club' Meeting (External Debt, Uganda), 01 Dec 1982	1982	IMF	IMF Archive
Statement by E Mitei, IMF Executive Board Meeting, (ED, TZA, IMF), 22 Feb 1984	1984	IMF	IMF Archive
Statement by I. Sangare, IMF Executive Board Meeting, (ED, GIN, IMF, Bloc Rep), 17 Feb 1983	1983	IMF	IMF Archive
Statement by I. Sangare, IMF Executive Board Meeting, (ED, GIN, IMF, Bloc Rep), 15 Sept 1983	1983	IMF	IMF Archive
Statement by UGA Rep, IMF Executive Board Meeting, 18 Feb 1983	1983	IMF	IMF Archive
Uganda- Enhanced Structural Adjustment Facility - Policy Framework Paper, 1995/96-1997/98 (EBD/95/151) Ref: 4229831995	1995	IMF	IMF Archive
Uganda- Enhanced Structural Adjustment Facility - Policy Framework Paper, 1996/97-1998/99 (EBD/96/143) Ref: 432959 November 4 1996	1996	IMF	IMF Archive
Uganda- Enhanced Structural Adjustment Facility - Policy Framework Paper, 1997/98-1999/2000 (EBD/97/121) Ref: 443206 October 23 1997	1997	IMF	IMF Archive
Uganda - Enhanced Structural Adjustment Facility - Policy Framework Paper, 1998/99-2000/01 (EBD/98/114, Cor. 1) Ref: 452712 November 9 1998	1998	IMF	IMF Archive
Uganda - Enhanced Structural Adjustment Facility - Policy Framework Paper, 1998/99-2000/01 (EBD/98/114) Ref: 453032 October 28 1998 www.imf.org/EXTERNAL/ADLIB_IS4/dispatcher.aspx?action=detail&database=ChoiceArchiveExecutive&prirref=125099083&parentprirref=125099083	1998	IMF	IMF Archive
Uganda- Enhanced Structural Adjustment Facility - Review Under First Annual Arrangement (DEC/9342) Ref: 381771 January 5 1990	1990	IMF	IMF Archive
Uganda- Medium-Term Economic And Financial Policy Framework (EBS/87/107) Ref: 353170 May 21 1987	1987	IMF	IMF Archive

Document	Year	Author/Owner	Source
Uganda- Memorandum of Economic and Financial Policies - Letter of Intent (EBS/00/64) G. Sendawula, Minister of Finance Ref: 485993 April 3 2000	2000	IMF	IMF Archive
Statement by IMF Staff Mission to Uganda (PR/09/120) Ref: 524280 April 9 2009	2009	IMF	IMF Archive
Statement by an IMF Staff Mission in Uganda (PR/08/266) Ref: 525497 October 31 2008	2009	IMF	IMF Archive
Beyond Macroeconomic Stability: The Quest for Industrialization in Uganda (WP/08/231) Ref: 526207 September 1 2008	2008	A.A. Selassie	IMF Archive
Statement by Mr. Abdallah on Uganda- EBM/86/111 (7/9/86) (BUFF/86/122) Ref: 341929 July 7 1986	1968	IMF	IMF Archive
Minutes: Uganda- 1993 Article IV Consultation; and Enhanced Structural Adjustment Facility - Extension of Commitment Period of Additional Arrangement (EBM/93/160-2 - Final)	1993	IMF	IMF Archive
Minutes: Uganda- Report on External Debt Renegotiation (SM/92/136) Ref: 396427 July 6 1992	1992	IMF	IMF Archive
Uganda- Request for an Arrangement Under the Enhanced Structural Adjustment Facility (EBS/94/157) Ref: 414659 August 15 1994	1994	IMF	IMF Archive

ⁱ Edward V. K. Jaycox: Chairman of the Board of Directors, World Institute for Leadership and Management in Africa. He was Vice President at the World Bank (Africa), 1984 to 1996. He managed the design and negotiation of structural adjustment programme.

ⁱⁱ Robert Strange McNamara: President, World Bank, 1968-81

ⁱⁱⁱ Eugene Rotberg, Vice President and Treasurer, 1969-87

^{iv} Willi A. Wapenhans, Vice President, World Bank, 1961-92

^v Robert Picciotto Director General for Operations Evaluation, World Bank, 1992 to 2002

Appendix D. Extended Insights

Appendix D.1 Chapter 1

Continued incisive look at PPP policy will benefit from the view policy as a cross-product of politics and science (cf. Bacon 1974 and 1915).

$$\mathbf{p} = \mathbf{y}(t, \mathbf{x}(t), \mathbf{u}(t)) \times \mathbf{s}(t) \quad \text{D.1.1}$$

In this formulation, politics \mathbf{y} is continually under strains from direct input to the competition space \mathbf{u} (accepted science and existing policy) and the structure of the space itself $\mathbf{x}(t)$. Meanwhile, the vector of science $\mathbf{s}(t)$ is a Kuhnian paradigm (Kuhn 1979 and 1991).

As a result, science emerges as a helix (Figure A1).

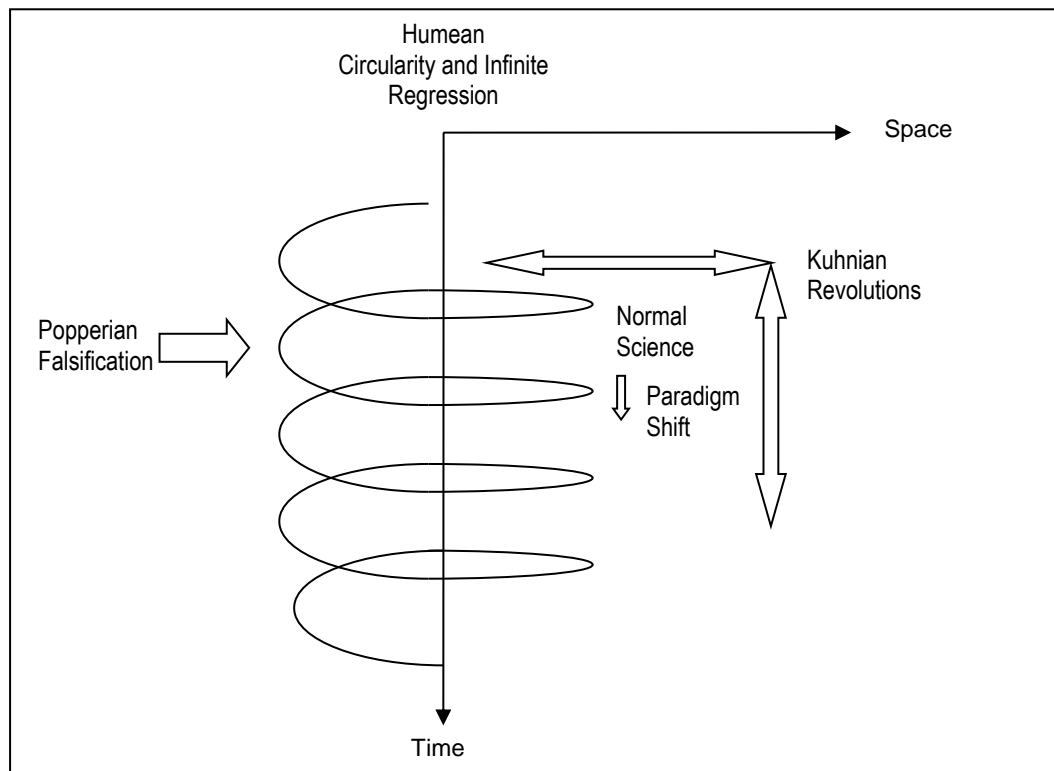


Figure A1: Helix of Science

Appendix D.2 Chapter 2

Post-Crisis Literature: Linearisation of Non-Ergodic Space

Crises offer critical points (in the formal sense of dynamical systems). Further insights on this chapter will be drawn from the 2007/8 crisis recession. To reflect on literature in the chapter, it is not a surprise that the main trunks discussed followed the Second World War.

Therefore, the use of Fourier formalisms and Taylor-Euler linearisation tools will be useful in understanding this decade – looking back years ahead. This thesis should hope for a more widespread application of dynamical spaces in understanding the policy spaces of today – and particularly, the policy space of Uganda.

Appendix D.3 Chapter 3

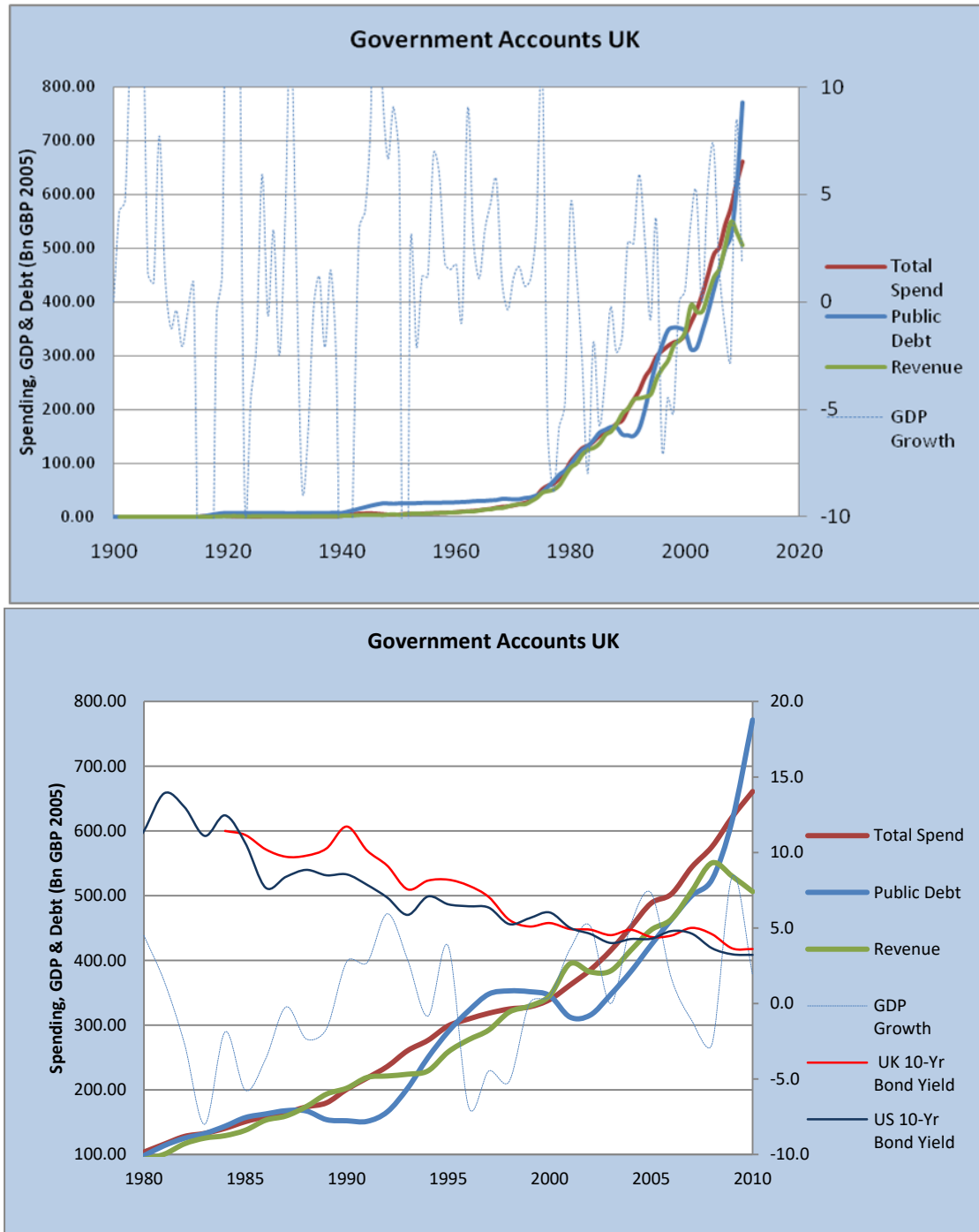


Figure A 2: Public Accounts (UK)

(Sources: UK Treasury, Bank of England & US Federal Reserve)

Appendix D.4 Chapter 4

Not used

Appendix D.5 Chapter 5

Appendix D.5.1 Infrastructure Investment: VAR Framework

The challenge of return on infrastructure investment in Chapter 5 can be investigated using the vector autoregressive (VAR) framework.

The VAR approach finds attraction in infrastructure-growth research because it makes no demand for theory. It is largely devoid of theory. It is, therefore, appealing to the empiricist persuasions. The foundation of this non-theoretical exploration of the realities of policy is credited Sims (1980).

A VAR model with n lags [VAR (n)] for vector Ψ of k endogenous variables is represented as follows:

$$\Psi_t = \sum_{i=0}^n A_i \Psi_{t-i} + D_t + \varepsilon_t \quad \text{D.5.1}$$

Where:

A_i , $i = 1 \dots n$ are $k \times k$ matrices of parameters; D_t is a vector of deterministic variables (constant and trend); and ε_t is a $k \times 1$ vector of [error](#) terms

A simple VAR (2) regression is given in Equation D.5.1, and developed in D.5.2. Here, GDP Y_t is specified as a function of its own lagged values and infrastructure stock G_t . However, infrastructure stock may be difficult to estimate. In that case, the regression may use capital formation (more readily available from national accounts) and work in growth terms.

$$Y_t = \sum_{i=0}^n \beta_i Y_{t-i} + \sum_{j=0}^n \alpha_j G_{t-j} + \varepsilon_{1t} \quad \text{D.5.2a}$$

$$G_t = \sum_{j=0}^n \beta_j G_{t-j} + \sum_{i=0}^n \alpha_i Y_{t-i} + \varepsilon_{2t} \quad \text{D.5.2b}$$

A simple Granger causality is deduced if the prediction of GDP is improved by adding lags of infrastructure capital. The hypothesis testing employs the F-test.

In spite the apparent simplicity of the VAR model, its mechanics is not without strenuous challenges. The variable must be jointly stationary. Otherwise, they have

Excitation of a Dynamical System 306

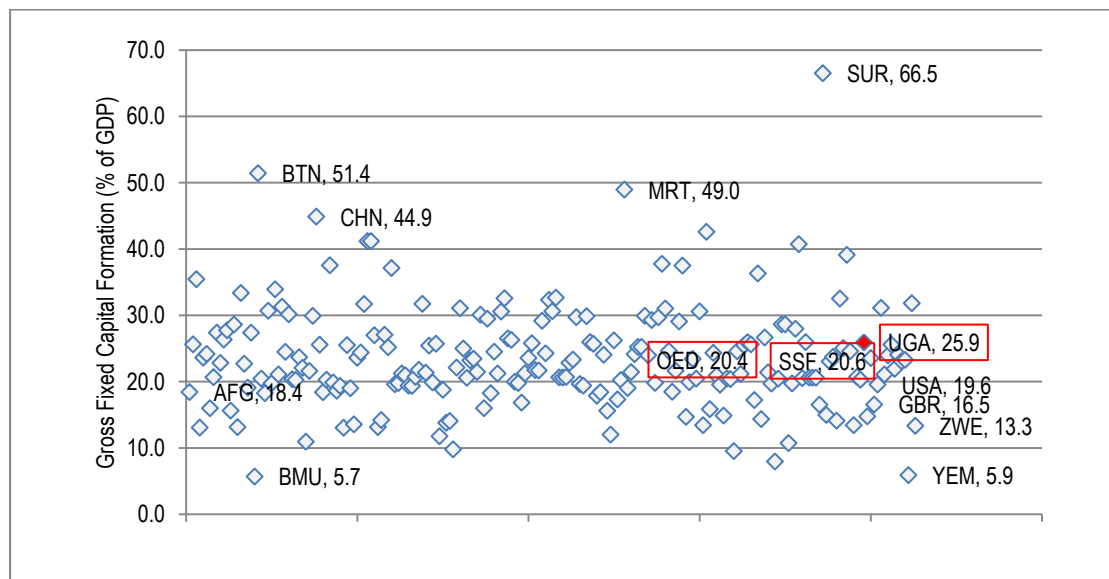
to be transformed by differencing. That exercise becomes particularly onerous if the variables are a mix of say stationary $I(0)$ and integrated of order 1 $I(1)$. In addition, VAR regression is very hungry for degrees of freedom - an additional lag means K^2 more parameters to be estimated. Moreover, it should not be forgotten that Granger causality could well miss the real causal effect outside the vector system being analysed.

The effect of infrastructure investment over time can be analysed by examining impulse responses (illustrated in Sturm, 1999).

However the VAR approach does little to improve our understanding of the transmission mechanism of transport investment. It lacks requisite theoretical foundation.

Appendix D.5.2 Gross Fixed Capital Formation: A Scatter of the World

Note the urge for Uganda (UGA) and the entire Sub-Saharan Africa (SSF) to invest more in ‘taming’ the physical environment, and approach China (CHN), before cooling down towards OECD. Cooling down means directing investment to non-physical effects like the soft aspects of healthcare. PPP will be at the centre of this dialogue.



Data Source: WDI (World Bank)

Appendix D.6 Chapter 6

The syntheses of Chapter 6 require an environment of infrastructure management attuned to non-ergodicity. This appendix presents insights on the construction of such environment – a canvas across government.

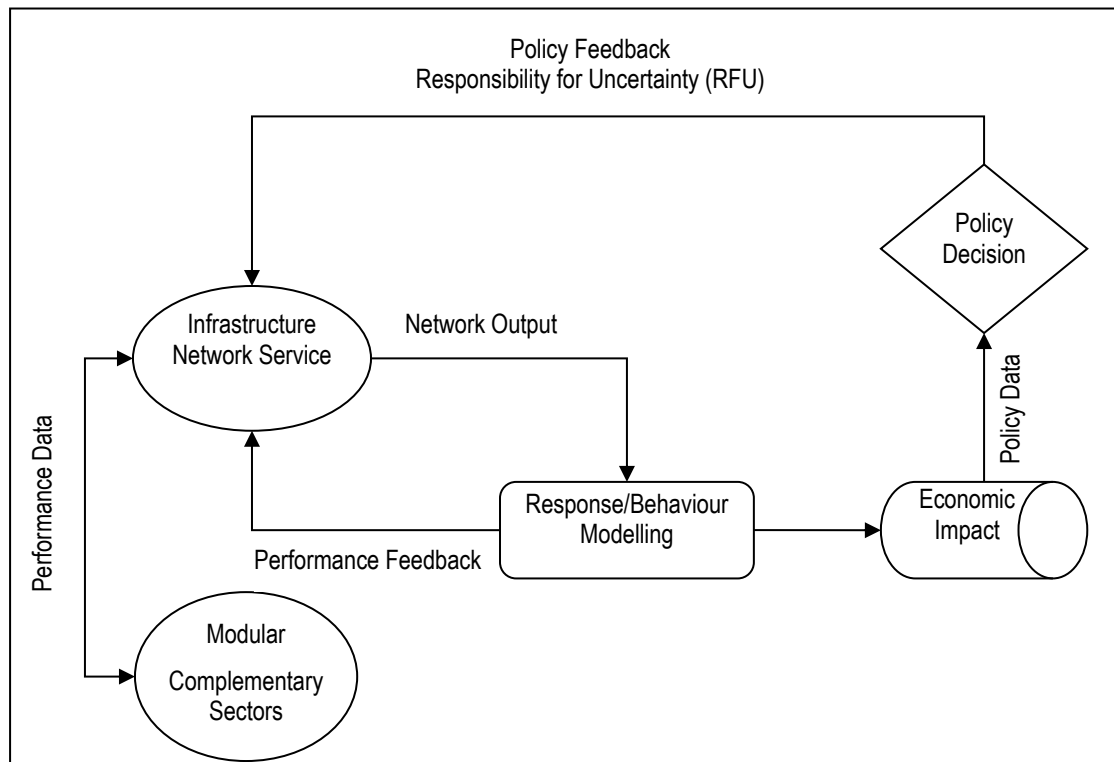


Figure A3: Infrastructure Management in a Non-Ergodic World

Notes:

1. Traditional impact analysis is deterministic and when stochastic approaches are used, the assumptions are ergodic (i.e. equal state and time averages).
2. The ergodic assumption cannot be completely avoided if predictions are to be made of social phenomena. However, the attendant uncertainty should be highlighted.
3. This frame uses the Responsibility for Uncertainty (RFU) provision so that politics absorbs the effects of uncertainty.
4. Nonetheless, the modular approach reduces the effects of uncertainty. Each module observes and adjusts the probability functions independently (akin to neural networks, see Pearlmutter 1989).
5. The measure-preserving transformation (mpt) for ergodicity is challenged. That is, for probability space (X, ψ, μ) , and transformation $T: X \rightarrow X$, for $E \in \psi$, $\mu(T^{-1}(E)) = \mu(E)$. The set E will capture time, comfort and safety effects of the network.
6. Even if the system were mpt, institutional influence results in different time and space averages.
7. The system improves recursively akin to the Kalman filter (see Harvey 1990).