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THE BROADER CONTEXT FOR ICT4D PROJECTS: A MORPHOGENETIC ANALYSIS¹

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This paper demonstrates the value of Archer's morphogenetic approach (MA) in understanding and explaining the complexity of the broader context within which many developing country information and communication technology (ICT) projects are implemented. It does this by using MA's analytical and explanatory apparatus to examine the evolution of the context of public sector ICT provision in Kenya over the period 1963–2006. In addition to demonstrating the practical value of MA, the paper contributes to the Information Systems literature on ICT for development (ICT4D). The analysis identifies (1) global normative pressures, polity, the national socio-economic base, disruptive technology, and the emergence of multistakeholder networks as key forces in shaping the evolutionary trajectory, (2) the explicit treatment of time and temporality as key for understanding mechanisms underpinning the evolutionary process, and (3) the difficulty of cleanly isolating the implementation of individual public sector ICT projects from the broader context and ICT4D agendas. The discussion elaborates on the features of MA found to be particularly valuable in this study. The paper concludes that explicitly attending to time and temporality, and to the broader context for ICT4D projects, would contribute to the development of more nuanced accounts of such projects and a more emancipatory outlook for ICT4D research.

Keywords: Morphogenetic approach, ICT4D, temporality, networks, emergent social systems, agency and structure, broader context, information systems, development, critical realism

Introduction

This special issue called for empirical studies that are explicit about how they are informed by critical realism. In this paper, we respond by demonstrating the power of Archer's (1995) morphogenetic approach (MA) for generating insights about the process and relational dynamics of ICT project trajectories in complex contexts.

Interest in critical realism is growing in the Information Systems field, as a philosophy for IS research (Mingers 2004; Morton 2006; Smith 2006), and as a basis for developing approaches to examine the use of information and IT in complex organizational settings (Dobson et al. 2007; Mutch 1999, 2002; Volkoff et al. 2007). Archer conceived MA as the practical complement of critical realist philosophy, supplying an explanatory methodology grounded in adequate social ontology *and* of practical use for analysts. Mutch et al. (2006) illustrated the benefits of MA to explore the IS domain and highlighted its efficacy for analyzing connections at multiple levels of social organization from individual organi-

¹John Mingers, Alistair Mutch, and Leslie Willcocks served as the senior editors for this special issue and were responsible for accepting this paper.

zations to regional and national institutions. However, to date there are few empirical studies where MA has been applied in organizational settings (de Vaujany 2008; Morton 2006).

Our first contribution to this special issue is in adding to the small but important group of empirical studies in the IS literature deploying MA to develop insights that would be difficult to obtain otherwise (e.g., de Vaujany 2008; Horrocks 2009; Mutch 2002, 2010). This we do by identifying features of the approach that are useful in understanding the evolution of the ICT policy and context of public sector ICT *for* Development (ICT4D) provision in Kenya over the period 1963–2006. Our interest is in understanding the way in which this trajectory is influenced by its broader political and socio-economic environment. We use MA to reveal processes and mechanisms that explain how the trajectory emerged from the interplay of interactions at different levels of players in global, national, public, private, third sector, and civil society organizations (CSOs) and institutions.

Our second contribution is to the growing body of IS literature on information systems in developing countries. In an editorial for the 2007 *MIS Quarterly* Special Issue on Information Systems in Developing Countries, Walsham et al. made the case for extending the scope of ICT4D research to address the broader development context. They called for studies to be “*explicitly critical*,...and to draw on appropriate critical theories” (p. 324), arguing that research topics in this field are typically “deeply intertwined with issues of power, politics, donor dependencies, institutional arrangements, and inequities of all sorts....critical work can ‘open up the black box’ of accepted ways of doing things as an aid to deeper understanding” (p. 324).

By using MA to understand the evolution of the ICT4D context in Kenya, we show how it can open up the black box by explicating the deep structure of ICT4D contexts to generate causal explanations for observed trajectories. Our findings suggest that explicitly attending to the broader context may contribute to more nuanced accounts of IS project implementations in developing countries.

The paper is organized as follows. In the next section, we provide an overview of the IS literature on ICT4D and show the need for an approach based on critical realist philosophy to address issues important in the field. In the sections that follow, we introduce MA and the features deployed in our analysis, and their relevance to ICT4D research. The next section describes our research context, process, and methodology. This is followed by our morphogenetic analysis of the case to develop the analytical history of emergence. In the penultimate section, we discuss insights obtained from our

analysis and how features of MA delivered these insights. The discussion raises questions about the framing of ICT4D in extant IS literature and we suggest some directions for future work, highlighting the importance of attending to temporality and the wider context.

ICT4D and Literature on IS and Developing Countries

ICT4D has emerged as a diversified field in IS research, investigating the relationship between ICTs and development. Emphasis on ICTs as a way out of poverty to “development” started in the 1990s, along with interventions by global powers, funding bodies, and donor agencies to promote the use of ICTs for better governance and improved performance of public and private enterprises. The developing country context is complex, characterized by interweaving of actors, agencies, and agendas of political, public, private, and third sector institutions, civil society, and foreign and global players. Reviews of ICT4D research reveal diverse philosophical, theoretical, and methodological stances adopted by scholars studying a range of projects at various levels of organization (Avgerou 2008; Walsham and Sahay 2006).

According to Brown and Grant (2010), ICT4D research is a “fragmented adhocism” and most of the work in it is actually about ICT *in* developing countries rather than ICT *for* development, while the term ICT *and* development conflates the two. They argue the difference is significant because “in developing country” work is usually judged against “for development” constructs, which may contribute to reports of continued failures of ICT *in* developing countries; they question the efficacy of research in the whole field. We use the term ICT4D to signal that our study is concerned with the development-related broader context for ICT in developing countries. We note the debate on terminologies and structuring of the field in discourse is at an early stage.

Walsham et al. (2007) observe that the majority of studies in this field use broadly interpretive methods, possibly because the issues and challenges of interest to IS scholars do not lend themselves to positivistic approaches. Both they and Avgerou (2008) emphasize the power of country-specific social and cultural dimensions in affecting and effecting ICT project outcomes. Others maintain that IS interventions need to factor in problems associated with development *per se* and scholars need to acknowledge the importance of development contexts in influencing outcomes (Madon 1994; Prakash and De' 2007). Elsewhere, positivist models and frameworks that posit a simple relationship between ICT deployment and

achievement of development goals are criticized for neglecting to account for the socio-political contexts in which they are deployed (Avgerou 2000, 2003; Brown and Grant 2010). IS literature advocating greater engagement with the broader context highlights the importance of developing multilevel perspectives, engaging with the time dimension, and developing critical accounts of ICT deployment in developing countries. Walsham et al. advocate engaging with wider definitions of development and with different levels of analysis, including individual, group, organization, sector, national, and international actors.

The broader context contains political, economic, and social factors that immediate IS project actors can do little about directly (e.g., the material and ideological relations between regions or countries that may alter the landscape for national development and constrain policy choice and resource allocation decisions). Considering the broader context thus entails examining the roles of donors, foreign technical assistance, external financing mechanisms, and discourses that, according to Schech (2002), imply that the West has the key to develop the South.

Most studies in Walsham et al.'s review or published in their *MISQ* Special Issue engage with specific levels of social organization at different scales ranging from the national to the individual. Other scholars have developed and tested multilevel frameworks to guide ICT4D research, generating a diversity of frameworks, deploying different dimensions to discriminate between levels (e.g., Alvarez 2003; Gerhan and Mutula 2007; Korpela et al. 2001; Sein and Harindranath 2004). Approaches deployed to integrate multiple levels and actors include institutional theory (Bada et al. 2004; Kimaro and Sahay 2007), multimethodology (Hosman et al. 2008), actor-network theory, and structuration theory (Braa and Hedberg 2002).

Walsham et al. make a case for longitudinal studies, arguing that in the complex context of developing countries, change processes are often slow, taking place over several years, and unstable political contexts can impede or delay maturing of projects. Alongside this are calls for new epistemological and ontological perspectives that ensure history is factored into accounts of social transformation (Clark 1990; Sumner and Tribe 2004; Wallerstein 1991).

Understanding the complexity of the broader context entails accounting for what influences are at work *and* an attempt to understand how they generate observed systemic outcomes. History matters. The relation of the here-and-now to the past is lived out as stakeholders engage with past influences and present contingencies, and strategize and act to maintain or

further their desired position in the world. We suggest a realist stance would serve well to analyze the connection between the broader context, historicity, stakeholder positions and actions, and the emergence of systemic outcomes.

Realist Approach and Morphogenesis ■

Critical realism is historically associated with underdeveloped economies: difficulties in applying orthodox economics in such contexts led Bhaskar to rethink the status of ontology in the philosophy of science. MA is compatible with the first and second stages of Bhaskar's work, and is a tractable, comprehensive approach within which we can model and theorize ICT4D change in complex contexts.

For critical realists, reality is emergent and stratified. Higher levels are emergent from, but irreducible to, lower ones: each level has properties, appropriate to it and different in kind from those of levels above and below (Bhaskar 1978). Access to reality is conditioned by layers of possible understanding: the *empirical* is that which is directly experienced, the *actual* is apprehended through events and occurrences, and, at the deepest level, the *real* comprises *generative mechanisms* that give rise to events and empirical observations. The *real* is not directly observable: it can only be inferred from conjecture about the sorts of mechanisms that would give rise to events and observations we apprehend.

Critical realism holds that things in social reality have *causal powers* (capacities to act and bring about change in reality). *Causal explanation* lies in defining these things with their *causal powers* (termed *generative mechanisms*) that would account for empirical observations. *Causal outcomes* follow from mechanisms acting in contexts. The relationship between *causal mechanisms* and their effects is not fixed but contingent. Thus *causal explanations* are not furnished by observing correlations between recurring patterns or regularities of association between variables and events. Instead, causal explanation derives from articulating *generative mechanisms* that would account for the observed regularities.

Reality is conceived as an open system, and given its stratified emergent nature, we cannot reduce one level into another. Consequently, there is an ontological gap between natural necessity and contingent relations. Causality in open systems is, therefore, evaluated as tendencies: *causal powers* may be present for a given *generative mechanism* but are not always exercised; their actualization and effects are, in most cases, context-dependent and are evaluated as such (Collier 1994). Social entities exist in contingent dialectical relationships:

human interactions influence social systems, motives and intentions are important causal mechanisms, and the social system is a source of ideas and intentions by supplying people with reasons for their actions and decisions. In practice, adopting a critical realist stance makes researchers conscious of implicit assumptions and ontological commitments (Markus and Robey 1988).

The Morphogenetic Approach

MA furnishes the analytic apparatus to tease out the relationship between structure, agency, and outcomes by making explicit the mechanisms that connect situated actions and systemic outcomes. In this next section, we outline the main concepts of MA and the terminology that we deploy in our analysis of the Kenyan case.

Morpho (shape) and *genesis* together convey that society has no pre-set form, and that shaping is the product of social relations, through agents' actions, from which emerge intended and unintended consequences (Archer 1995). While form is not predetermined, it is not totally contingent: some relations are internal and necessary to the social system (e.g., landlord and tenant in a system of property rental) and others are external and contingent (e.g., where two entities can exist without each other). MA provides a method of conceptualizing how the interplay between structure and agency can be analyzed over time and space. The focus is on the process of emergence by which structure and agency shape and reshape each other to account for variable social outcomes over time. *Morphogenesis* occurs when agential interactions result in transformation of the system; *morphostasis* prevails when the interactions reproduce the existing system.

Theoretically, Archer draws on the work of classical sociologists: David Lockwood's "Social Integration and System Integration" for analytical dualism and David Buckley's *Sociology and Modern Systems Theory* for the idea of morphogenesis (Zeuner 1999). In MA, Archer explicitly uses time and timing to analyze the stratified nature of social reality. Each stratum has *causal powers* that are irreducible to those of its components. Temporality is used to separate the parts and the strata, and emergence explains the linkages between the strata and the unfolding of relations over time.

Those parts of a social system where change primarily depends on material resources are the *structural system*, while those that depend on ideas are the *cultural system*. Both evolve, emerging from actions and interactions of people organized in various ways as agents. Agent interactions relating to material resources to give rise to *structural emer-*

gent properties (SEPs) are referred to as *social interactions* (S-I). Those relating to ideas to generate *cultural emergent properties* (CEPs) are termed *socio-cultural interactions* (S-C). Agency emerges and is transformed through a staged process in the *morphogenetic cycle* (described below), with agential actions and interactions giving rise to *peoples emergent properties* (PEPs).

To summarize, *structural*, *cultural*, and *agential* emergent properties are irreducible to each other and are relatively enduring. In the morphogenesis of structure and culture, systemic structures are separable from people because they necessarily predate any incumbents or occupants. The *morphogenetic cycle* operationalizes the analytical dualism between structure and agency using temporal separation to map the relations between agential interactions and the emergence of *structural* and *cultural* systems. *Morphogenesis* is when change (*elaboration*) occurs in the social system in either one or both *structural* or *cultural* systems. *Morphostasis* refers to a state of overall stability of the social system.

The Morphogenetic Cycle

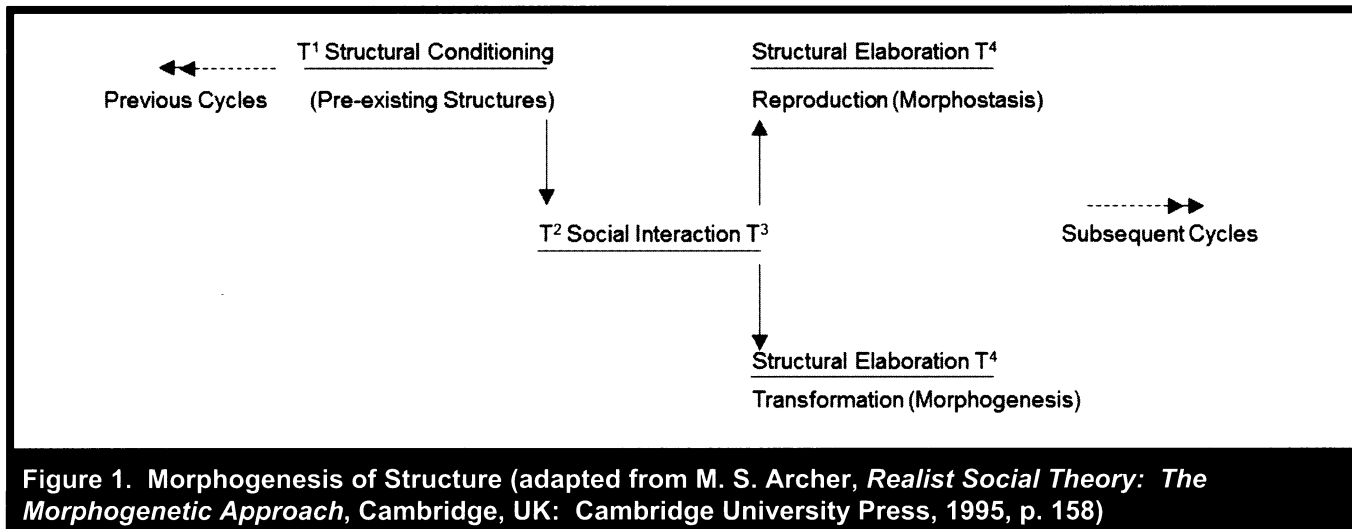
The principles of temporal separability and analytical dualism for structure and agency underpin two basic theorems of MA (Archer 1995, p. 157):

- Structure predates activities which transform it. Agents' interactions can only shape or transform the social system in which they find themselves; they do not produce the system, as it already exists, having emerged from past interactions of agents.
- Structural elaboration post-dates the action sequences which gave rise to it.

This sequence is captured in the morphogenetic/morphostatic cycle utilizing temporal analytical separation between structure and agency in three stages as depicted in Figure 1.

The cycle begins at a time T^1 , which corresponds to prior *conditioning* by the existing configuration of components in social reality. The intermediate period, T^2 to T^3 , corresponds to the mediating action of agency through *social interaction*. Emergent change leads to *structural elaboration* by time T^4 . During analysis, these time periods are identified empirically from a historical account of events.

Similarly, in the *morphogenetic/morphostatic cycle* for the *cultural* system the cycle begins at a time T^1 , which corresponds to prior cultural *conditioning* by the existing configu-



ration of the ideational components in social reality. The intermediate period, T^2 to T^3 , corresponds to the mediating action of agency through *socio-cultural interaction*, with emergent change leading to *cultural elaboration* by time T^4 .

Agency too undergoes morphogenesis as a three stage transformation process, from *person* to *agent* and then to *actor*. Persons are first transformed into *primary* and *corporate* agents in a *double morphogenesis* because as agents transform the social system, they also undergo transformation. *Primary agents* must become well-articulated and organized as *corporate agents* to affect structural or cultural modeling. Agents become *actors* in a *triple morphogenesis* when they assume a role in the social system, and can shape structure and culture as the voice for a given *corporate agent*.

Agency undergoes morphogenesis through conditioned social interaction as primary and corporate agents in different interest groups pursue self-cultivation to produce PEPs. Success for any group is dependent on access to resources (e.g., political sanctions, liquid assets, and expertise) that increase *negotiating power*. It also depends on relations to other corporate agents and the degree of interaction; stronger linkages contribute to *negotiating strength*.

Structural and *cultural* systems' *causal effects* are mediated through their *conditioning effects* on agent interaction. Decisions and action choices are made for reasons important to agents but contingent upon systemic emergent properties (SEPs and CEPs) and their powers.

Depending on their position in the social system, different sections of society have vested interests and associated

opportunity costs and strategies; some will prefer to maintain the status quo while others advocate change. As Mutch (2010) points out, Archer's later work (2003, 2007) addresses the question of *why* different agents in a given situation choose to act differently, due to individual differences in reflexivity. Although at an individual level a given course of action may appear advantageous, macro level second-order emergent properties may provide strategic directional guidance that conditions the actions of larger sections of the population. A given agent's situation or context may display coherence or tensions with its components, resulting respectively in *congruence* or *incongruence* of the systemic context (Archer 1995). A congruent context serves to discourage change; an incongruent context has a systemic fault line that conditions agent action to either contain it or realize it among different members of the population. Archer (1995, p. 217) identifies four *situational logics* that predispose agents toward specific courses of action by supplying reasons favorable or unfavorable to certain courses of action, arising from compatibilities or incompatibilities between social integration and system integration. Systemic level structural and cultural compatibilities and incompatibilities are not immediately apparent to agents but are reflected in day-to-day practical situations. The four possible second-order institutional level relationships are *necessary complementarities*, *necessary incompatibilities*, *contingent complementarities*, and *contingent incompatibilities*, predisposing agents to adopt four corresponding distinctive strategies. *Necessary complementarities*, which exist when there are necessary and internal linkages of a complementary nature between two systemic structures, will predispose the agents to interact in a mutually reinforcing way, adopting a defensive strategy of *protecting* the existing state of affairs. *Necessary incompatibilities* arise

when there is friction between structures that are connected by necessary and internal linkages, so the possibility of decoupling their activities and surviving is not available, thus predisposing agents to adopt a strategy of *compromise*, making adjustments to accommodate the friction. *Contingent complementarities* come into being when contingent relations arise that are highly compatible with the interests of some components and predispose the agents to adopt a strategy of *opportunism* to take advantage of what comes their way. *Contingent incompatibilities* may arise between components such that there is no incentive to seek a compromise, leading to competition, where agents become focused on a strategy of *elimination*.

Different groups stand to gain or lose depending on the situation obtaining. Situational logics *condition* strategic actions: success or failure for a given strategic course is conditioned in turn by relative agent placement in terms of bargaining power and negotiating strength.

Morphogenesis and Morphostasis of the Social System

Incidence of *morphogenesis* or *morphostasis* depends on the interplay between structure and culture with four possible pure combinations of morphogenesis/morphostasis and SEPs/CEPs (see Table 1).

Although material and ideational domains are autonomous, in practice they intersect in the middle section of *the morphogenetic cycle* during agent interaction. Generic opportunities for change arise when there is a hiatus in social and systemic integration. This relationship between the *morphogenetic cycles* for structure and culture is consequential because one domain may have a greater influence, or the possibility may exist for reciprocal effects between existing social structures and ideas in the social system. The interplay of structure and culture must thus be evaluated in explaining what actually happens following varied agent actions from empirical accounts of reality.

MA entails empirical investigation of actual events to establish what conjunctions obtain, and why, from considering anterior and posterior *morphogenetic cycles* for structure and culture and their interplay. The output comprises explanatory critiques (Bhaskar 1978) termed *analytical histories of emergence* in MA. They are retroductive, corrigible accounts of societal transformation over time. By definition, they can never be final; it is always possible to improve explanations with more or better data. We develop such an account to theorize change in the Kenyan ICT4D context.

The Morphogenetic Approach and ICT4D Contexts

IS studies in the interpretive tradition aim to use social science theories as sensitizing devices to view the world in different ways (Klein and Myers 1999) and to better understand how the social context is shaped by, and in turn shapes, ICT innovations. The definition of *critical* in ICT4D interpretive research has been broad, with different authors pursuing criticality differently (McGrath 2005), but there is general caution against instrumental reasoning in undertaking critical IS research (e.g., Avgerou 2005). MA cannot be charged with instrumental reasoning, which arises from the positivist account of causality as a constant conjunction of events (Bhaskar 1978; Smith 2006). To be critical requires research to engage with the subject in its context (i.e., it must engage with ontological issues beyond the subject while avoiding instrumentality). Taking the critical realist stance, MA addresses the problem of causality by, in effect, lowering its ambitions in comparison to positivism's universalism; it accepts that some grasp on reality is possible, and avoids interpretivism's potentially paralyzing relativism (Smith 2006).

Because reality is conceived as an open system, MA has almost unlimited scope in terms of what may be included in the analysis. For a given ICT4D initiative, *agents* comprise all stakeholders such as the project sponsors and owners, consultants, users, and any interested or affected parties. The *cultural system* is ideas about technology and development upon which people, agents, and actors draw. The *structural system* comprises anything associated with material relations between agents such as institutions, resources, legal and regulatory frameworks, government departments, international development and financing institutions (IFIs), CSOs, and private companies. The list is merely indicative; the approach requires that all of these be identified empirically and analyzed as an integrated social system. We will concentrate on how MA deals with context, with the need for a multilevel approach, and with time.

An analytical history of emergence for an ICT4D context from morphogenetic analysis should tell us with good reason why things are as they are now and where they could be heading, based on the causal tendencies of identified *generative mechanisms*. It is neither a prediction nor an interpretation subject to the observer, but a logical argument based on the best available empirical evidence. The constant recourse to evidence and revision of the argument may give an improved understanding of complex contexts and the possibilities for systemic change or reproduction (Horrocks 2009). We utilize these strengths to gain better understanding of complex ICT4D contexts, intending that this will be of practical value.

Table 1. Morphogenesis and Morphostasis of the Social System

Configuration	Description	Possible Outcome
Conjunction 1	Structural and Cultural morphostasis	Apparent stability of the social system despite any private misgivings.
Disjunction 1	Structural morphogenesis, Cultural morphostasis	Cultural elaboration as new corporate agents arise in the cultural realm.
Disjunction 2	Structural morphostasis, Cultural morphogenesis	Social regrouping as latent interest groups coalesce around alternative ideas and leads to structural elaboration.
Conjunction 2	Structural and Cultural morphogenesis	Social and socio-cultural interactions reinforce one another to result in structural and cultural elaboration.

Methodology

Background

Field investigations were done in Kenya, a developing country suitable for a study of this nature if we accept Young's (2001) description of it as an ideal post-colony in national and social character. Since independence in 1963, Kenya has remained within the Western political and economic sphere of influence.

Kenya's public sector underwent substantive reforms aimed at efficiency and "good governance" through the new public management approaches specified in IMF/World Bank loan conditionalities (Polidano 1999). Developments in the national ICT policy process, e-governance programs, and projects were key components of this shift in policy emphasis (GOK 2004). Until 2004, e-government was in early stages, while the national ICT policy was under development (APC 2004; Kaaya 2004). Developments in ICT policy formulation and e-government implementation were closely related through their implications for each other and through key personnel. A controversy-laden national ICT policy development process lasted over a decade, coming to a head in 2004 with a draft described as ill-coordinated, noninclusive, and geared to foreign interests (APC 2004).

Subsequent efforts invited greater participation with financial support from local and foreign partners in a successful multi-stakeholder process (Munyua 2005). We use MA to unpack these complex interactions, underlying factors and relationships, without conflating structure and agency, to identify significant causal mechanisms and how they work.

Research Approach

The data in this paper is drawn from a larger study (Njihia 2008). Based on Sayer's (1992) three types of research and

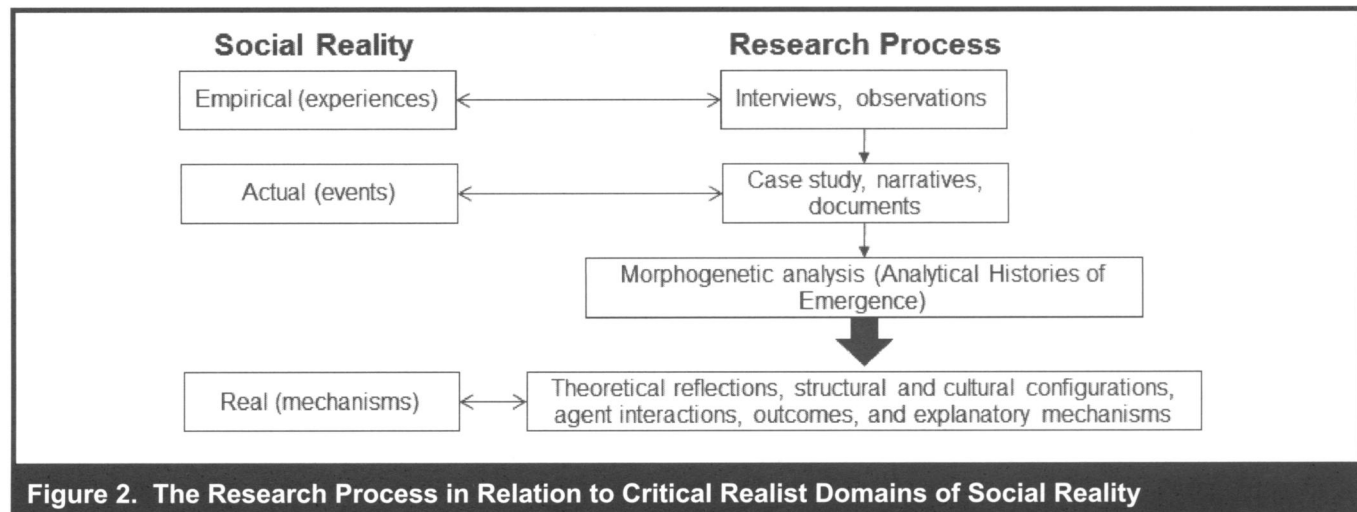
their location within the critical realist representation of social reality, *intensive* realist research was chosen to explain relationships between structures, mechanisms, and events in their context (Dobson 2001). Figure 2 illustrates how the research was organized under the critical realist paradigm relating critical realism's account of the three domains of social reality under investigation and steps in the research process.

We used an exploratory case study research design to meet the requirements for an intensive study into the deep structure of social reality, investigating a chronological chain of events. Our approach resembles Silva and Hirschheim's (2007) approach in their longitudinal study of change in Guatemala, and that advocated by Myers (2005) for providing contextual and historical accounts of e-governance initiatives and the full scope of the change process.

Data Collection and Organization

Primary and secondary data was collected from March to June 2006 in Kenya from people and institutions intimately involved with national ICT policy formulation and implementation. Three concurrent and related generic socio-systemic processes were identified at institutional and national levels in public sector ICT change: e-government systems development and implementation, national ICT policy reform process, and the interaction between them. These processes guided the selection of interviewees and drafting of the interview guide. Interviewees were obtained using official channels, and were chosen from institutions and their contexts to get as complete a picture as possible of the historical account and experience of public sector ICT in Kenya. The interview guide was adapted to each type of respondent and organization to ensure that important areas of interest were covered.

Specific project narratives and personal stories were recorded to provide detail and insight into the genesis and life of national ICT projects and processes from an organic nonlinear



perspective. Nineteen in-depth interviews, each lasting 1 to 3 hours, were carried out with persons listed in Appendix A. Audio recordings and notes were transcribed into Microsoft Word files, giving about 440 pages of interview transcripts in addition to field notes.

Documented events provided a time line on which interview data was pegged to complete the picture of the emergent ICT process. ICT policy making in action was observed at a discussion forum for the recently published ICT bill attended by top-level media executives and owners, and addressed by the Permanent Secretary, Ministry of Information and Communications.

All interview transcripts, observations, and interview notes were entered into an NVIVO qualitative data analysis software database. Ongoing reflections were also entered into the database and a project log was maintained to track the chain of reasoning and inference.

Data Analysis

Two levels of analysis were done with corresponding outputs: a descriptive level for data summarization, collation, and organization that resulted in factual case study descriptions and a chronological account of events, and an analytical level for theoretical reflection and interpretations to develop analytical histories of emergence.

Secondary Data Analysis: A skeletal chronological account (early 1960s to 2006) of the evolution of institutions, e-government systems, and the ICT policy process was developed, based on reports and published documents. This

anchored interview narratives and subsequent analysis in documented historical time, and was expanded with interview and observation data in the analytical account.

Primary Data Analysis: NVIVO software was used to track and collate themes, issues, and ideas from transcript data, notes, and on-going reflections, and to identify key events and developments in the unfolding ICT processes.

Analysis started with open coding to generate concepts obtained inductively from the raw data in the form of 80 free nodes. These were grouped into emergent categories at a more abstract level in subsequent analyses. Concepts and ideas were explored using NVIVO data organization and modeling capabilities. Tree nodes were introduced to represent hierarchical relationships; node sets, deeper thematic nodes, and relationship nodes were derived from the free nodes.

Analysis was iterative and recursive between data and emergent themes to structure raw data with themes from critical realism and morphogenesis as a foundation for a robust analytical narrative. Four dynamic models of social entity relationships and theorized mechanisms were developed. As more transcripts and documents were included, accounts became richer but with diminishing extension of thematic reach until no new themes emerged.

Development of the Analytical History of Emergence

ICT4D systems were considered to be socio-technical systems whose change process involved technology and social components, with agent interaction conditioned by technical and

socio-systemic constraints and enablements. Analysis was primarily concerned with implicit and explicit change in ICT systems in government and in national ICT policy. These were analyzed concurrently because they interpenetrated to generate situations that agents encountered during interaction. Development of the analytical narrative proceeded iteratively with constant comparisons between interviewees, documented evidence, and MA constructs. We used a practical four-step methodology to develop analytical narratives.

1. Tentative adoption of a set of periods characterized by periods of stability and times of change. Starting with the end of a period, identify first-order emergent properties (FEPs) for structure, culture, and people, conditioned from previous interaction.
2. Identify potentialities arising from FEPs in Step 1 in the form of contradictions and complementarities.
3. Describe and analyze the actions of agents in the form of interactions with the *conditioning effects* of extant structure and culture. From these, obtain a new configuration of emergent structures as second-order emergent properties.
4. Analyze the new configuration of emergent structures arising from agent interaction and social action in Step 3. This completes the analytical cycle and sets the stage for iteration back to Step 1 for the next analytical cycle.

Four periods or *morphogenetic cycles* were identified inductively from the data as derivative nodes with the aid of NVIVO from the chronological account. In the account that follows we use the term *phase* (I, II, III and IV) to refer to the corresponding (first, second, third, and fourth) *morphogenetic cycles* during which there was appreciable change in the social system. Each phase was analyzed and written out as an analytical history of emergence or narrative, forming the basis for inferences about significant causal mechanisms.

The Contextual Setting

Institutional Structure

Historically, public sector ICT activities in Kenya centered on the Ministry of Finance. By June 2008, the institutional framework (Figure 3) comprised the Ministry of Information and Communication for overall leadership for the ICT sector (including regulation and promotion), and the Ministry of Finance hosting Government Information Technology Services (GITS, the government's technical ICT wing). The Directorate of E-Government (Dir-eGov), responsible for

e-government promotion and rollout, was established in late 2004 under the Office of the President (OoP) as an outgrowth of GITS with most personnel drawn from it.

Most public ICT work was under GITS, in close cooperation with Dir-eGov. At the time of this study, there were two relatively new cross-cutting e-government applications under GITS, the integrated payroll and personnel database (IPPD) and the integrated financial management information system (IFMIS, at pilot stage). Development agencies, especially the World Bank, were interested in the IFMIS for monitoring purposes, as a means of improving transparency and accountability of government spending. For many years, small internally financed and developed *ad hoc* systems had sustained a crisis-management mode as user needs outstripped systems production capacity. IFMIS relied on bilateral and multilateral financing and experienced serious implementation bottlenecks. IPPD, developed and financed internally, was considered a "good system" by users, although not state of the art.

ICT4D Systems and Processes

Figure 4 is the chronology of significant events over the years for public sector ICT systems and policy. The institutional setup and principal organizations involved are shown in Table 2 (some changed or were renamed later).

Our analysis showed the *structural system* broadly corresponded to institutional structures for ICT governance and systems that involved material resources more heavily, while the *cultural system* corresponded to the ideas and values behind the ICT policy making process. The ICT policy process and ICT systems development were closely intertwined through the agents and were analyzed concurrently to present as complete a picture as possible.

Case Narrative

Our account covers changes over 40 years in the national ICT policy environment and ICT systems, covering four *morphogenetic cycles* or phases. Most events involved the national ICT policy making process and changes within the Ministry of Finance (which housed government IT services). The four phases were

- Phase 1: The mainframe era with great stability in all systems (\approx 1963 – 1990).
- Phase 2: Influx of PCs that changed mainframe culture and structures, and the emergence of strong regulatory liberalization pressure (\approx 1990 – 2000).

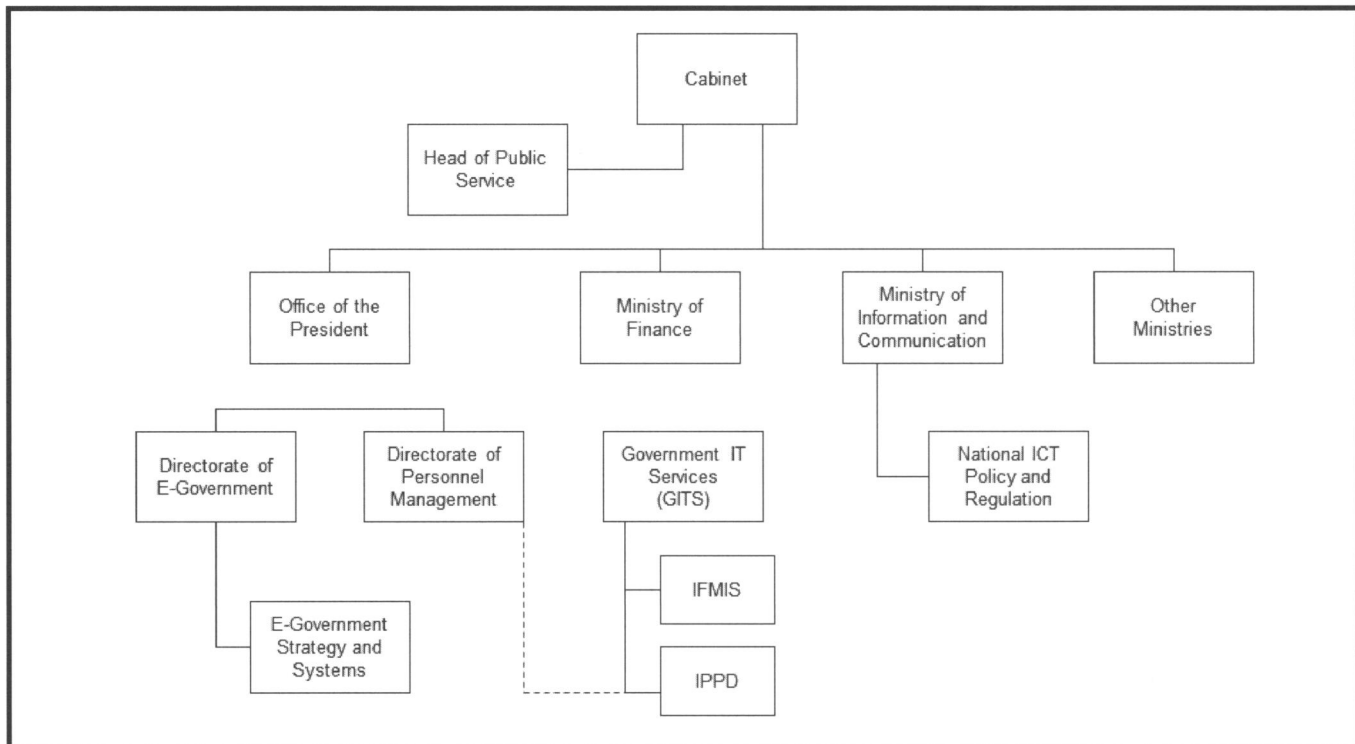


Figure 3. Institutional Structure and Systems at the End of the Study Period

Table 2. Institutions, ICT4D Systems, and Processes

Social System Components for ICT4D	Characteristics/Description	Institutions Directly Concerned	Interested Parties
Cultural System	Ideas and values enshrined in or influencing national ICT policy process and e-government	Directorate of E-Government, Ministry of Information and Communication	World Bank, development agencies, and the private sector championing liberal values; civil society seeking to increase individual liberties
Socio-Cultural and Social Interactions	Agent interactions between ideas about ICT and policy, and on outcomes in relation to interests	Research agencies, (alongside academics and consultants)	None at first; later, networks like KICTANET and professional and industry associations emerged
Structural System	Public sector ICT4D systems (e-government – finance, human resources, legal and regulatory framework for ICT)	Ministry of Finance, Government IT Services.	World Bank as lender in e-government projects, development agencies as donors and granters to projects, public as consumers of government services

Phase 3: Telecommunication deregulation and emergence of internet-related businesses, and new modes of interaction. The leadership was noninclusive, leading to fissures in the social system and radical change (≈ 2000 – 2004).

Phase 4: Fully liberalized networked environment with inclusive leadership allowing rapid exploitation of emergent opportunities in a supportive environment (≈ 2004 – 2006).

The analytical history of emergence is presented in the following section.

Analytical History of Emergence

This section presents an analytical history of emergence through the four phases, developed through retroduction to reveal underlying causal mechanisms using MA. Space only allows for a summarized account, but one that reveals causal

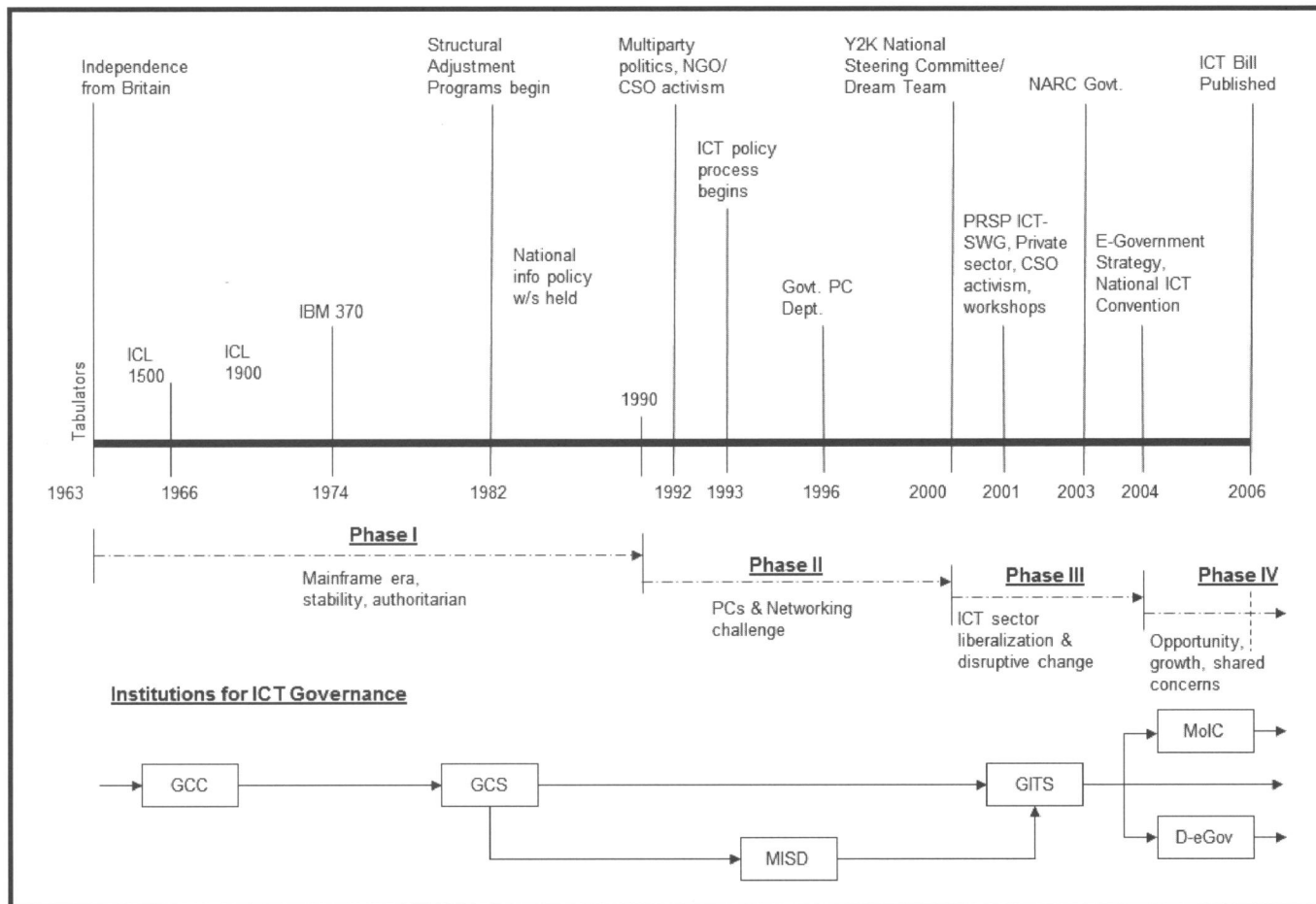


Figure 4. Kenya Public ICT: Chronology of Key Events

Table 3. Situational Logics and Outcomes for Different Phases After Analysis

Aspect	Phase 1	Phase 2	Phase 3	Phase 4
SEPs Conjunction (situational logic)	Necessary complementarity (Protection)	Necessary contradiction (Correction)	Contingent contradiction (Elimination)	Contingent complementarity (Opportunism)
SS	Integration	Compromise	Competition	Differentiation
S-I	Solidarity	Containment	Polarization	Diversification
CEPs Conjunction (situational logic)	Necessary complementarity (Protection)	Necessary contradiction (Correction)	Contingent contradiction (Elimination)	Contingent complementarity (Opportunism)
CS	Systematization	Syncretism	Pluralism	Specialization
S-C	Reproduction	Unification	Cleavage	Sectionalism
Overall outcome	Structural and cultural morphostasis	Structural morphostasis; cultural elaboration	Structural and cultural elaboration (destructive)	Structural and cultural elaboration (constructive)

CS – Cultural System; S-C – Socio-Cultural Interaction; SS – Structural System; S-I – Social Interaction

mechanisms of significance to developing country ICT4D contexts. Table 3 summarizes the *situational logics* in each period for different aspects of social reality.

Phase 1: Dominance by the Political and Bureaucratic Classes

Phase I corresponded to a conjunction in *structural* and *cultural morphostasis*. The ruling clique was the dominant structural agent; the dominant cultural agent was an elite combining African traditionalism and Western values. Structural and cultural *conditioning* and social and *socio-cultural interactions* resulted in a *morphostatic cycle* and overall social system stability.

Following independence in 1963, Kenya installed a single-party political system, giving the new rulers power and patronage. An “Africanization” program gradually transformed the colonial civil service, leading to a politicized elite favoring capitalist bourgeois values over socialism. Until the early 1990s, central government computing was wholly mainframe-based and used for large number-crunching tasks (payrolls, financial accounts, national examinations, school equipment, and national statistics). ICT systems during this period were stable with little innovation except for periodic upgrades for mainframe systems.

The civil service was the center of power and distribution of national resources. The Government Computer Center (GCC, later renamed Government Computer Services, GCS) was established to manage the computing function. There was a heavy reliance on, and conformity with, rules and procedures. User requirements were subordinated to computer department dictates. Politically sensitive applications (e.g., payrolls for the civil service and the military) were priority. ICT policy was little more than a statement of roles set out in periodic circulars issued by the Treasury. Emphasis was on adherence to rules of the game. Under the *conditioning effects* of a powerful, politicized civil service, loyalty was valued above professional competence; career advancement depended on fulfilling social roles.

Apparent external stability accompanied gradual professional decay. Programmers and developers became specialized for the mainframe environment (later challenged by the need to adapt to a PC environment; see Phase II). Top government IT managers became generic administrators, ultimately losing their capacity for visionary technical leadership and were unprepared for developments in PCs and networking (see Phases II and III).

There was a high degree of integration between the ideational and material realms arising from existing *necessary complementarities* for the *structural* and *cultural* systems; both displayed the same situational logic of *protection*. The bargaining power and negotiating strength of the ruling clique bordered on coercion. A monolithic government with well-laid-out archaic and colonial procedures blended with a stable traditional system of social values and kinship links, leaving little room for alternative interactions. High integration of the *structural* system comprising the predictable bureaucratic computing environment was reinforced by solidarity at the level of *social interactions*, thus assuring stability.

Structural stability was buttressed by the absence of ideational alternatives in the socio-political sphere and the standardized requirements of mainframe computing. *Socio-cultural interactions* were reproduced by limiting the entry of new ideas leading to a systematization of the *cultural system*. The dominant socio-cultural norms and the old school civil service mind set concerned with compliance to regulations guaranteed efficient delivery of politically critical outputs and kept *socio-cultural interactions* within accepted social and cultural boundaries as signaled by the ruling elite. Ideational innovation was neither encouraged nor called for.

Under the rigidity of *structural* and *cultural morphostasis*, *primary agents* had to find their space within a social system they had no power to change. Sanctions for deviance, and the absence of ideational alternatives, meant that all persons had to find their means of self-cultivation within the system, maintaining the *morphostasis of agency*. No new viable groups and associations were deemed necessary or allowed. The rigid mainframe systems’ culture of predictability ensured all kept to their place and kept new ideas to themselves. Overall *structural* and *cultural* system stability resulted from the complementary relationship between high social and system integration. In Phase II, new forces emerged that unsettled the apparent stability of the social system.

Phase II: Unsettling the Status Quo—Global Capital and New Ideas

Some *structural morphogenesis* appeared in this phase. The introduction of PCs resulted in a reorganization and expansion of the central computing department concurrently with the strong entrance of global capital led by the World Bank and the International Monetary Fund (IMF). The World Bank/IMF Structural Adjustment Programs (SAP, requiring commitments for reforms in return for financing) differentiated structural *corporate agents*, weakening the ruling clique’s

power and control over state resources. The most important changes occurred in the cultural realm as *cultural elaboration* evidenced in the *morphogenesis of agency*.

Perturbations in the ICT Landscape

Introduction of PCs: PCs, valuable business tools in the private sector since the 1980s, were formally introduced to the central computing unit in the 1990s, with the establishment of the Micro-Computer Services Department (MISD). MISD was led by external consultants working with younger IT personnel and supported by the U.S. Agency for International Development through the Harvard Institute for International Development.

Social interactions in response to PCs and networking challenges were limited to what the structural elite, following a containment strategy, could accept. They used an outside consultant to ensure control of the potentially disruptive technology innovation, even if they did not fully understand it. With its PC skills and political connections through the consultants, MISD acquired some bargaining power, strengthened in negotiation. This advantage faded as network servers became more powerful, blurring the line between mainframe and PC environments. Concurrently, GCS lost some of its bargaining power: with a rigid mainframe systems culture, it could not meet new needs for VAT administration and greater financial scrutiny and reporting required by the World Bank/IMF SAP. In a compromise to accommodate diverse requirements within the prevailing bureaucratic management system, GCS was merged with MISD to form GITS, with GCS retaining technical leadership.

Restructuring of Postal and Telecommunication Monopoly: Under World Bank/IMF pressure to break up the state postal, telecom, and regulatory monopoly, the legal and regulatory framework was amended by 1998 to create two new monopolies for postal and telecom services, and a regulatory body. A National Communications Secretariat (NCS) was created in the Ministry of Information, Transport and Communications (MoITC) as legal advisor on ICT to the government. These changes were *compromises* to accommodate, without fundamentally altering ICT governance, demands for reforms from World Bank/IMF and antigovernment activists and Western powers pushing for broader political reforms toward greater democracy.

Y2K bug: Government efforts to deal with the Millennium Bug (Y2K) necessitated the involvement of stakeholders from the private sector, academia, and CSOs. These nongovernmental participants were initially wary of enforced collabora-

tion, but synergistic outcomes facilitated a mental and emotional shift toward effecting change through multistakeholder collaboration. Y2K collaborative efforts were short-lived attempts at unifying disparate ideas as a way to meet the immediate crisis without addressing fundamental questions or underlying systemic contradictions.

Structural Tensions and Cultural Elaboration

Socio-cultural interaction was enriched by new ideas on governance emerging from global pressures for greater freedoms, and the collaboration during the Y2K crisis. The presence of global capital weakened the cultural hegemony of conservatism, allowing alternative ideas to enter. Young civil servants in MISD and people in private sector and civil society who participated in short collaborations with government emerged as a group of change-minded *primary agents* interested in rational exploitation of ICTs. Although not yet organized as *corporate agents* to affect structural and cultural modeling, they and their ideas on governance, including ICT, were to become significant in Phase III.

In Phase II, the underlying structural configuration was contradictory, pitting the ruling clique against global capital and the growing body of reform-minded primary agents from the government, private sector, and civil society. *Social and socio-cultural interactions* were conditioned by structural influences from World Bank/IMF SAP related requirements and technology change as the bargaining power of GCS with its rigid mainframe culture declined. The *situational logic* called for correction from *necessary contradictions* in the *structural system*: while large-scale change was neither possible nor necessary, some change was required to meet new demands. No real cultural shift took place in government except for a form of *compromise*, temporizing in the face of mounting ideational pressure from different interest groups that could no longer be wholly ignored. *Cultural elaboration* was the most significant outcome when people acquired new ideas and modes of interaction that were to have far-reaching impacts on real change in the next Phases.

Phase III: Radical Change and Beginnings of Real Collaboration and Transformation

Phase III was particularly eventful, encompassing the end of one government regime and the beginning of another. Telecommunications liberalization fueled a mobile phone revolution, stimulating a public appetite for further reforms. Things opened to negotiation under *situational logics of elimination* in government and *opportunism* in the private sector and civil

society. CSOs and development research agencies came together as ideational interest groups, organized to provide new legitimating frameworks for private sector and government material interest groups, resulting in *structural* and *cultural elaboration* and emergence of new *corporate agents*.

Fissures in the Structural Realm

Examples below illustrate how the structural tensions and *conditioning effects* of Phase II, established *corporate agents* (World Bank, development agencies, and the Kenyan civil service), and national elections weave into the narrative of change.

The Dream Team: In 1999, the World Bank appointed an opposition party leader, an internationally respected scientist, as Head of Public Service and Secretary to the Cabinet. Charged with public sector reform, he recruited a “dream team” of Kenyan technocrats from the private sector, academia, and development agencies to senior posts in MoF and MoITC. The World Bank financed their salaries through a UNDP project as technical assistance, using their Kenyan nationality to claim the arrangement was “home-grown and locally implemented,” and not another Washington “diktat.” Between 1999 and 2001, fundamental public sector reforms began, requiring interaction between government, business, and civil society based on the *comprehensive development framework* (CDF).

A significant example (it ended in the demise of the dream team and MoITC) was the development of the World Bank *poverty reduction strategy paper* (PRSP).² This was an explicitly consultative process with Ministerial Sector Working Groups (SWG) including private sector and civil society interest groups. Participation in the ICT-SWG was enthusiastic: despite initial mutual antipathy, all welcomed the prospect of sitting with government and being heard. Meetings and stakeholder workshops on ICT policy were held over two years, but there were too many competing interests to make meaningful progress.

Nationally, *social interaction* was polarized along intractable lines of vested interests supported by different power bases. The conservative ruling clique and civil service looked to state machinery, while nascent private sector and some civil society movements looked to global capital and donors to exert pressure via the dream team. The PRSP initiative was curtailed in March 2001. On the day the ICT-SWG was to officially present its report to the MoITC Permanent Secretary

²See the World Bank’s Kenya page at <http://www.worldbank.org/en/country/kenya>.

(part of the dream team), he and his team were sacked and the ministry split into two.

The promise of aid as reward for reform was the backdrop for the *situational logic* of *compromise* that prevailed when the ruling clique attempted to accommodate the formation of the dream team without allowing it to disrupt the state machinery significantly. By 2002, the IFIs were still not forthcoming with aid. The ruling clique tired of their endless aid assessment missions and the posturing ended. Government and global capital were at a standoff. Members of parliament rebelled against the secretive nature of IMF/World Bank government negotiations in the face of rising discontent (*Sunday Nation Newspaper* 2002). They stopped talking and concentrated instead on the national elections of December 2002.

Internal Competition and the ICT Policy Process: The new government was a coalition of former opposition parties elected on pledges to eradicate corruption and revive the economy, and included civil society activists sympathetic to liberal ideas of governance and to participatory processes.

The period between dismantling MoITC and the elections was characterized by confusion. The political elite, attending to more populist issues for election, lost interest in the ICT policy, while elite civil servants were divided between the persisting old guard and those who had bought into the dream team. Post-election, the *situational logic* of *elimination* prevailed as GITS was weakened internally by competing factions, and government departments vied for ownership of the ICT policy process.

IFMIS, a major component of IFI-funded state reform programs, was disrupted by delays and limited user involvement. Internal corruption networks profited from inefficiencies in the archaic manual financial systems (e.g., pension payments to nonexistent persons). Under a public sector reform initiative, the Directorate of Personnel Management (DoPM) attempted to usurp GITS’s authority as the official government ICT unit by contracting a major IT consultancy to create a high-level ICT framework, strategy, and operational plan. The initiative died quietly leaving a report that few heard of or read.

With GITS distracted by internal and external battles, the Economic Secretary (a former member of the dream team, later designated Adviser to Cabinet on E-Government), launched a project to develop the e-government strategy independently of the ICT policy. The project was funded by the treasury and backed by the International Development Research Centre (IDRC) and UNDP for capacity building. External critics cited it as evidence of continued government high-handedness.

In the institutional competition to seize advantage in a rapidly reconstituting ICT environment, none of the corporate agents had sufficient bargaining power or negotiating strength to press forward with a viable large-scale change program. Their efforts accentuated the mismatch between an intransigent leadership and reformist forces inside and outside government and paved the way for later, more significant *structural elaboration*.

Disruption and Invigoration in the Cultural Realm

In the cultural sphere, new ideas were introduced by development agencies and CSOs sponsoring capacity building projects and workshops to catalyze ICT development and (less effectively) through external pressure.

External Pressure: External pressure to relax government control and liberalize ICT policy to allow free competition came from local businesses, Internet service providers (ISPs), and internationally. The government's responsiveness was modulated by dispositional changes of key ministers and bureaucrats. For example, nudged by global normative pressure, NCS restarted the ICT policy process after the 2003 WSIS conference in Geneva, but little came of it under an incumbent Minister who belonged to the old guard. The process excluded private sector and CSOs, producing a confidential draft National ICT Policy in 2003. In a consultative meeting (June 2004) to discuss the draft ICT policy, its confidential status precluded the discussants from seeing it. This lack of open engagement was condemned locally and internationally. Progress came slowly, and only after a reform-minded Minister and Permanent Secretary promoted an open and inclusive process (see below).

Participation, Communication, and Changes in the Ideational Landscape: With government split between openness and authoritarianism, CSOs and development agencies actively promoted new initiatives with consultative workshops to engage with government. Change-minded nascent *primary agents* in government (some enthused by the dream team) tapped into these efforts to catalyze ICT change and continued the struggle from within. The private sector sought them out to see where they could be assisted.

Under an IDRC sponsored study on the status of ICT policy and its potential for development, a series of ICT workshops was held in 2003 to build awareness of ICT across the private sector and civil society. Academics and consultants acted as researchers and workshop facilitators, bringing new ideas to the attention of structural and cultural *corporate agents*.

Through quick, efficient sharing of relevant information, the workshops united different constituencies and promoted the emergence of new *corporate agents*. Much of the sensitization to new ideas within government happened by default when government officials came to open these events. In June 2003, in a watershed multistakeholder conference held to discuss economic revival, ICT was recognized as a cross-cutting issue for the first time. E-government was identified as a specific strategic undertaking to improve governance and to monitor and evaluate economic indicators and millennium development goals (MDGs). The Minister for Planning and Development encouraged the private sector to speak with one voice for easier engagement. They formed the Kenya Private Sector Alliance (KEPSA) as an apex body of private sector associations, and the Kenya ICT Federation (KIF) for all ICT associations. ISPs also welcomed the forum: having acquired financial muscle from the Internet boom, they emerged as a powerful private sector interest group that wanted a say in ICT policy formulation and the regulatory framework.

A newsletter and an e-mail discussion list (KIPNews and KIPList, September 2003–March 2004) were created for the growing ICT constituency. The KIF Integration Workshop (end of 2003) aimed to bring government to the same level of enthusiasm as the other players. The first National ICT Convention (in March 2004) laid the basis for cooperation with government and was a major turning point in the change process; afterward, there was broad agreement among *corporate agents* on the way forward in national ICT development.

Socio-Cultural Interaction and the Morphogenesis of Agency

Socio-cultural interaction over most of Phase III was governed by cleavage of intractable ideational differences. Discord between emerging and extant *primary agents* within government was paralleled by conflict between the government and change-minded *corporate agents* outside it. The private sector played both sides of the political game for economic gain by cultivating the government while supporting change efforts. This diversity supported the generation and uptake of ideas in the 2003/2004 series of workshops and participatory forums. Their penetration into the *cultural system* moved the process toward a cultural renaissance, leveraging the new technologies of e-mail lists and the Internet discussion forums to sustain networks of groups that pushed for change in ICT policy.

The most significant transformation was the *morphogenesis of agency*, as people and organizations were exposed to and absorbed new ideas, and aligned themselves with collaboration. The increasingly open ideational space resulted in the

emergence of *primary agents* as individuals came together with like-minded fellows, and as discussion forums progressed, they found a common voice as *corporate agents* encouraged by ministerial support. By the end of this phase, the number of change-supporting *corporate agents* from the private sector and civil society had increased significantly.

Cultural and Structural Elaboration

A turning point for the policy process came with *cultural elaboration* when all key players converged *ideologically* after the workshops in 2003/2004. This happened in parallel with competition among structural agents. *Structural elaboration* followed more slowly as institutional reconfiguration in the face of external pressures and internal competition as the old guard attempted to retain control. Conservatism within government decreased as active interaction with outside groups overcame embedded institutional authoritarianism and insularity, and newly elected change-minded ministers gained public visibility. Private sector agents emerged to support an alternative structural arrangement with networks of formal associations and increased financial muscle from the telecommunications industry boom. This paved the way for change-minded individuals in public ICT institutions to more effectively shape policy and programs in Phase IV.

At the end of Phase III, *morphogenesis* in culture and structure were out of synchrony and could not yet yield positive benefits from reciprocity, but the conditions were set for real change to happen in Phase IV.

Phase IV: Deepening Change and Exploiting New Opportunities

Phase IV was less turbulent. Ideational battles were already largely won by liberal agents favoring change. *Corporate agents* reconstituted around new ideas on governance, technology, and the profit motive in relation to public interest. Government, private sector, and CSO interests were congruent. New ideas linked to ICT proposals were interpreted and clarified through discussion forums and the web. A *situational logic of opportunism* prevailed from contingent complementarities in both the *structural* and *cultural system*.

From Agency to Action

By the end of Phase III, *corporate agents* were structurally differentiated with aspirations to realize interests through reconstructing weak and contradictory ICT institutional governance. Private sector players intended to profit through

investment opportunities (e.g., public-private partnerships) arising from long-term under-investment in telecommunications. The consensual scenario from Phase III of ideational convergence between government, private sector and civil society was prevalent with constructive ideational dialogue. Liberal- and critical-minded *corporate agents* in and out of government acted to reinforce this cultural shift for an overall outcome of *structural* and *cultural elaboration*.

Civil Society and the Private Sector: Civil society acted as a check on potential private sector avarice and a possible return to the old style conservatism espoused by some elements in the new government. KICTANET (Kenya ICT Network, a civil society led consultative forum on the ICT policy process), as a united forum, had greater bargaining power and negotiating strength and constrained the government to listen:

Yes, we are a force so that they do not target one particular sector, so if they say it is money we will draft statements for the private sector which also includes human rights perspectives, the development perspective so the government cannot come back and say that's all they are interested in, and civil society the same. (Coordinator, APC-KICTANET)

The Government: The new government moved quickly to implement forward-looking initiatives in its economic development policy document. Widespread public goodwill and the acknowledged caliber of ministers and top civil servants were important *conditioning* factors. Although some issues remained such as the intransigent NCS and corruption and patronage networks (Munene 2005), there was broad agreement within the ICT community on what ought to be done. A few enlightened public servants in key positions were crucial in realizing these aspirations: drawing on prior experience from different contexts, they radically changed the way government perceived its role vis-a-vis the private sector and civil society.

Donor Agencies and IFIs: Reconstituting Relationships: Failure of IFIs to restart credit and aid under the new government at the end of 2002 resulted in a national self-examination and a realization that Kenya had to survive with or without donors. Perceiving IFI good governance conditionalities as moving targets, the government revamped the Kenya Revenue Authority to fill financing gaps via improved tax collection.

Success in financing, independent of donors, led to a new assertiveness that filtered into ICT processes to reshape attitudes to, and relations with, development agencies, Western governments, and IFIs. Internally financed e-government

initiatives such as IPPD progressed while donor funded ones like IFMIS were less successful because of associated complexities such as uncertainty in funding and differing national versus donor interests.

Logistical problems with donor “basket funding” for ICT projects reinforced the drive toward self-reliance and willingness to pursue a self-directed course in the private sector and civil society. For example, when promised donor funding for workshops failed to materialize, local organizations covered the deficit. ISPs, mobile telephone firms, and relevant state corporations could now underwrite change initiatives. This led to greater certainty and local engagement. CSOs and the ICT policy process became more independent of donor funding. The draft ICT policy was revised in open workshops and conferences spearheaded by KICTANET, published in February 2006, and gazetted in March 2006 with broad acceptance.

With increasing financial self reliance, local actors’ relationships with donor agencies and global capital were reconstituted towards mutual respect and reciprocity. The “post-Washington consensus” crystallized as the CDF approach to development meant that stakeholder participation was now obligatory and ideas of good governance and transparency were no longer associated with coercion.

Structural and Cultural Morphogenesis

Table 4 summarizes key relationships associated with the system states for the four phases.

In Phase IV, corporate agents and actors took an ambivalent, opportunistic, or pragmatic stance. Complementary but contingent cultural relationships existed among the major *corporate agent* groups—government, private sector, and CSOs—with CSOs continuing to lead in cultural innovation. The *cultural system* became more specialized through interaction and communication among cultural interest groups by email, meetings and workshops.

Change in Kenya’s ICT policy and systems processes contributed to, and benefitted from, the emergence of autonomous local agency, evidenced in agent interactions by the end of Phase IV. This led to rapid *structural and cultural morphogenesis*, observed in many new initiatives and the exchange of ideas.

Real change occurred after local agents and partners began to see the value and implications of ICT4D differently. With the national ICT policy in place, attention shifted to long-term

projects (e.g., establishing an international fibre optic cable infrastructure, deepening Internet and mobile penetration, enhancing e-government infrastructure and applications) and innovations in applications to meet more immediate popular needs (e.g., mobile money transfer).

Constitution of the Broader ICT4D Context

The explanatory critiques emerging from this study identify several important constituents of the broader context. From outside are global normative pressures for change in governance and technological innovation. From within are national demographics, culture and polity, and economic and human resources that constrain the transformational potential of new technologies. New technology emerged as a disruptive force amplifying existing socio-systemic fissures and creating windows of opportunity for certain groups. Interaction of these components was a source of large scale social tensions in the systemic level structural and cultural constitution. Networks were emergent structures of agent alliances (see the next section), prominent in the final analysis and the transformation of agency into action.

Global Normative Pressures

The global institutional and ideological framework within which ICT4D is undertaken comprises a diffuse web of global normative pressure³ influencing bureaucrats. Our study shows that this pressure is interpreted or filtered by local political leaders, bureaucrats, development agencies, and CSOs. Private sector and civil society advocates for liberal economic governance favored a liberal national ICT policy (albeit for different reasons) and their interests and actions were largely in harmony with global normative pressures for rapid reforms through e-government.

Socio-Economic Base

Surveys report an association between a country’s socio-economic condition and the rate of ICT uptake (Banerjee and Chau 2004; UNPAN 2005), with a positive association between GDP per capita and ICT investment (Hosman et al. 2008). Developing country studies show that a pursuit of technology innovations for growth can create social tensions

³We take Wong and Welch’s (2004) definition of global normative pressures as “a new set of complex and interactive stimuli, demands, and opportunities in the external environment of national public bureaucracies, whose origin is not traceable to any particular nation” (p. 277).

System/Phase	I	II	III	IV
Situational logic	Protection	Correction	Elimination	Opportunism
Structural	Morphostasis	Morphostasis	Morphogenesis (-ve)	Morphogenesis
Cultural	Morphostasis	Morphogenesis (slow)	Morphogenesis (+ve)	Morphogenesis
Agency	Morphostasis	Morphogenesis (Slow)	Morphogenesis (Rapid)	Morphogenesis
Structure/Culture	In phase: Stable	In phase: Unstable	Out of phase: Destructive Change	In phase: Constructive Change
Outcomes	No need for change or existence of any real alternatives	Need for change downplayed by government	Competition, learning and reformulation	Liberal victory over conservatism. Regeneration
Description	Stability	Small adjustments	Reconstitution of social system	Rapid change to exploit opportunities

by neglecting the masses of rural poor (Krishna and Walsham 2005). Kenyan leaders, sensitive to the needs of this constituency, gave ICTs low priority in parliament in comparison to popular decisions like free primary education. The importance of wealth was seen in Phase IV when increased availability of local funding for ICT-related activities in government and civil society fostered greater ICT innovation.

Environmental and resource factors, infrastructure, and e-leadership were major constituents of the broader socio-economic base, consistent with Banerjee and Chau's (2004) evaluation framework for e-government convergence potential of developing countries.

Technology Innovations

New ICT was important in explaining change. PCs, the Internet, and mobile telephony emerged as disruptive technologies that changed the balance of power among corporate agents in fundamental ways at different times. The impact of PCs was contained by conservative forces, but the Internet and mobile telephony generated wealth for new groups, changed modes of interaction, and stimulated change in the legal and regulatory policy framework. Our study shows that new technologies can be an important source of socio-systemic tensions, creating opportunities for transformative change in ICT4D contexts consistent with conventional views on the transformational power of ICTs (Castells 2000): MA reveals the dynamics of IS/IT-related change as arising from tensions created in the existing social system in material and ideational terms, reflected in agent interactions and repositioning to a new balance of power.

National Polity

Our findings concur with Wilson's (2004) contention that elite strategic behaviors are an important factor in understanding ICT change in developing countries. The change of government in Kenya in 2002 was crucial in overcoming conservative protectionist attitudes toward ICT reforms, and a few well-placed individuals served as actors to affect the course of change. For example, ICTs never became a national priority over the study period, being perceived as an elite affair for NGOs and private sector players, but e-government was launched at the behest of one senior bureaucrat, and ministerial support for the emergence of change-minded *corporate agents* outside government was important in facilitating development of the ICT policy document.

According to Hajer (2003), the global rise of civil society and NGOs fills the institutional void left by weakened state institutions as the challenges they confront cannot be met within accepted norms of policy making or conduct of politics. In our study, the role of CSOs and NGOs in policy making is integral to the narrative for the entire period, contributing to *social* and *socio-cultural interactions* between the diverse stakeholders through political change.

Discussion

Morphogenetic analysis makes it incumbent on the researcher to look for deep systemic generative causal mechanisms (i.e., to get inside Walsham et al.'s black box) *and* to account for the import and impact of the broader context, something

Mutch et al. (2006) fear is ignored by many studies focusing on process and practice. In this section, we discuss how MA was useful, and what insights it gave.

The device of temporal separation, the language, and conceptual constructs of MA are profoundly concerned with flow and change: they oblige the researcher to attend to dynamism. This was particularly relevant in our case as the Kenyan context over the period of our study was turbulent, with relatively abrupt changes in donor policy and attitudes, political power base, organization of governing institutions and government departments, and the intrusion of disruptive technologies.

Separation of the Whole from the Parts

Our analytical narrative is taken from a detailed longitudinal study (Njihia 2008), used here to illustrate the messiness of the situation. Our purpose was to illustrate how Archer's analytic apparatus enabled separation of the parts from the whole, allowing us to untangle relations between the flows of emergence for ideational and structural systems and agency that make up the social system, and to articulate them in a retroductive account of the mechanisms that would give rise to embodied and observable macro-level properties. This approach furnished the "missing middle," addressing the *why* and *how* related to the *whats* identified in positivist and interpretive studies of ICT4D.

Our analysis exposed dual deep impacts of donor interventions and national politics, and the subtleties of emergent dynamics, providing an explanatory mechanism (in terms of the interplay between *conditioning effects* and *situational logics*) for how intended and unintended consequences of agential actions came about, and played out to deliver macro-level outcomes. This treatment yielded insights relevant to informing ICT4D studies generally (discussed later). At a more fundamental level, we present two observations that give rise to tentative propositions: the first is related to the gestation of agency and its transformation (from *primary* to *corporate agent* and then to *actor*), and the second to the role of networks. Both are closely linked to the way in which temporal separation is used in MA (see below).

Time and Temporality

It is clear from Archer's (1995) emphasis on historicity that the longitudinal perspective, *and* the window of time deployed for examining the case, impinge on what can be understood from its analysis. The analytical apparatus of temporal separation sensitizes the researcher to the impor-

tance of attending to the *relative* timing of actions and changes in components of the social system.

Our narrative illustrates that the possibility of transformation occurs in the interstices when the relations between *cultural* and *structural systems* open up possibilities for agential action. This underlines the importance of attending to time and timing in the analysis of ICT4D projects in complex contexts. Timing of the appearance of such windows of opportunity relative to the ability of agents to act decisively has important consequences for the trajectory of systemic change.

Action is continuous while structural change is discontinuous (Archer 1995). Our study highlights the importance of the *relative* pace of change in different components of analysis. At higher levels, there were turbulent exchanges between the IFIs and the government, political instability and restructuring of government agencies and departments, with palpable and abrupt structural modifications. IFI interventions precipitated piecemeal changes and sporadic restructuring of departments (consistent with the *situational logic of compromise*) without significant transformation of systemic properties for the *structural* and *cultural systems* at the time. We note that vestiges of these interventions (e.g., ideas and people from the dream team, telecommunications liberalization) became resources for later cycles of systemic transformation.

This contrasted with the emergence of agency in the private sector and civil society, where during the gestation of agency (the first 30+ years of the study), transformation was slower but less discontinuous than that observed at higher levels. Tempo changed in the later part of Phase III and in Phase IV when the window of opportunity for action opened up and *primary agents* transformed into *corporate agents* and *actors*. The agents appeared and acted in concert within a relatively short period of time, and we suggest that this temporal shift can be understood in terms of the dynamics of the networks that emerged over the period of our study.

Consideration of time and timing is thus critical in attempting to understand *why* a given intervention may achieve its aim in one ICT4D context and not another. It may lead to reframing question in terms of *when* an intervention stands a chance of having the desired impact.

The Role of Networks

Network structure and dynamics have been used to explain transformational change in the IS literature (Merali et al. 2012). We suggest the networks that emerged over the phases

of our analytical narrative were important in the gestation of agency and critical for the change in tempo during the transformation of agent to *actor*. Specifically, we propose that the emergence of networks during the *gestation* of agency over the longer period lead to greater agential resilience (in the face of contextual turbulence).

The history of interagent relations contains a description of an evolving network of relations, providing insights about the mundane mechanics of organization and mobilization of agency implicated in the morphogenesis of Phase IV. In particular, it shows how agents were able to act quickly and in concert to exploit the emerging window of opportunity.

The evolution of the network carries a trace of the *social interactions* over time. In the early phases, before the emergence of new *primary* and *corporate agents*, we can discern a sparse network between change-minded individuals in government and business. Later, during the gestation period when *corporate agents* were emerging but not able to transform into *actors* to influence national ICT4D policy, networks were characterized by diversity (including private sector, CSO, and donor agents) and wide reach. They constituted a space in which agents were connected, but not committed to particular courses of action.

The networks were a locus of resources for the ideational and material systems, and were used by civil society and business to maintain stability without stasis, and by donor agencies to exert influence in a sustained and distributed manner across diverse constituencies. The diversity of agents in the network and multiple linkages within and across agential boundaries contributed to the resilience of agents in the face of attack from political and government *actors*: the *necessary and internal relations* associated with network membership meant that agents closed ranks before the common enemy. Potential issues of trust between individual players were superseded by solidarity at the network level. Acting through the network also served to keep open the option space for opportunistic agential action, as illustrated by private sector agents lobbying both political parties before the election.

Structurally, ICTs constituted a physical medium of communication (e-mail and web forums), and their deployment increased the rate and volume of information exchange in the ideational realm. Access to real-time information sensitized groups to contextual developments, enabling them to act in a coordinated way to exploit windows of opportunity as they arose. When conditions emerged for transformation from agent to *actor*, the existence of the interagent network enabled a collective change in tempo for agential interaction. Existing network relations enabled alliances between *corporate agents*

in business and civil society to form rapidly, based on *contingent complementarities* and the logic of *opportunism*, and supported by ICTs.

Individually, the *corporate agents* could not become *actors* in shaping the ICT policy process (they lacked the requisite negotiating strength), but “the network” with its heterogeneous membership was an effective force at the critical turning point in the narrative.

Implications for ICT4D Research

Mutch et al. (2006) make the case for attending to the broader context and the reflexivity of the relationship between context and organizational action. Our study shows this is of profound importance in the case of ICT4D. Many of our earlier observations have general relevance for ICT4D research: we advocate using a relational approach that has the requisite analytical apparatus to take account of the relationship with the broader context and deal explicitly with temporality. This enables identification of the dynamics and mechanisms connecting emergence of macro-level phenomena to micro-level actions. Our next comments refer to MA, but other relational approaches also offer viable alternatives (Mutch et al. 2006).

As shown earlier, in the complex ICT4D context, change happens in the interstices and is not simply attributable to factor changes (e.g., influx of material or ideational resources) manifest in the *empirical* and *actual* domains of reality: the analytical apparatus provided by MA enables the generation of explanations that are connected with context and being in the *real* world.

This search for generative causal explanations in MA allows for sensitization to historicity and the unexpected consequences of programmed interventions. For example, interventions by the IMF and World Bank did not play out the way they were planned, but were implicated indirectly in the emergence of liberalization. Liberalization did not come about directly from the pressures exerted by the IFIs or the imposition of accountability and governance measures. It emerged after the breakdown of the relationship between IFIs and politicians. The ensuing hiatus allowed the “bottom up” push from business and CSO agents to gain momentum. The role of donors in introducing ideational resources was indirect and diffuse.

This has implications for how “failure” is attributed to initiatives: in the absence of a longitudinal study and sensitization to the insights from MA (e.g., successive morphogenetic cycles are connected, and seeds for future change

exist in past cycles; causal mechanisms and powers exist but may not be exercised until the “right” confluence of *conditioning effects* and *situational logics* arises), initiatives may be judged prematurely as having failed.

While global normative pressures, the influence of polity and governance on the pace and scope of change, and the role of donor agency evidenced in our study are all recognized as important factors in the ICT4D literature (Avgerou 2003; Brown and Grant 2010; Walsham and Sahey 2006), we are concerned that their impact at the deeper level of social reality may not be appreciated without recourse to a critical and realist method of analysis.

Framing of Future ICT4D Research

Our findings suggest two important aspects of extant ICT4D research in need of revision:

- the treatment of intended indigenous beneficiaries of ICT4D projects and programs
- the framing of ICT4D as addressing problems and the “lack of” things (technological, ideational, and material) in developing countries

Our first concern derives from Archer’s reminder that “everyone is ineluctably an agent” (Archer 1995, p. 258). Many studies evaluated in Walsham et al.’s (2007) review cite the lack of indigenous participation as a causal factor for failure of ICT4D projects. This suggests a project-centric and instrumental perspective and may not advance our understanding of how to deal with the situation. It may be more productive to look for the deeper mechanisms and conditions that would bring about the nonparticipation. From Archer’s systemic perspective it is clear that those affected *are* participating within the *conditioning effects* of the internal and external context, and *are* contributing to the reproduction or transformation of that context. The observed absence of agency at the *empirical* and *actual* level, in the period that the researchers are examining, does not equate with the absence of people and their effects in the “here and now” *real* world. Recognizing hidden *causal powers* and *generative mechanisms* may lead to more contextually sensitive interventions and evaluations that take into account the existence of indigenous ideational and structural resources and the potential for unintended consequences beyond the formal project boundary.

Our second concern is with the implicit assumption that ICT4D should be about overcoming the *absence* in devel-

oping countries of resources, expertise, and processes that are valued in the developed world. Thompson and Walsham (2010), in their review of ICTs and development, summarize the position succinctly when they say

In linking ICT to transformational development, we are participating in an inherently political act whose aim is to alter (“transform”) a current economic and political landscape to achieve a more equitable settlement of access and opportunity; once acknowledged, this aim may give sharper definition to our research activities (p. 121).

This framing of ICT4D runs counter to the emancipatory ethos of critical realism and overlooks opportunities for innovation and development driven by local expertise, needs, and adaptive capabilities. MA provides a powerful solution to this tendency: ontological commitment to the *real* drives the researcher to look at what *exists* (rather than what is lacking), and to develop explanations of possible *generative mechanisms* as a basis for reasonable speculation on what *could* be and *how* it might come about. This is particularly important for development and globalization. As exemplified by *MPESA* (Beck 2009) and other similar developments in mobile money transfer, it *is* possible for developing country innovations to be taken up in the developed world (Economist 2012).

Conclusion

Our use of MA to analyze the evolution of the broader context of public sector ICT4D implementations in Kenya in 1963–2006 generated a number of observations that are relevant to ICT4D research generally.

Our study highlighted the complexity of the web of relations between donors, politicians, civil servants, private sector, and civil society organizations that came into play as the context evolved over four decades. It illustrated the extent to which concerns of the different constituencies were inseparable from the broader context.

MA provided the requisite analytical apparatus to tease out the dynamics of emergence of the components and the relations over time without losing sight of the systemic “whole.” We suggest that understanding the interplay between *conditioning effects* of the broader context and the emergence and exercise of *causal powers* through agent interactions (in and with that context) would promote a more emancipatory outlook for future ICT4D research and lead to a reframing of perceptions of failure in ICT4D projects.

The temporal analytical separation central to MA enabled us to identify the importance of *relative* pace and timing in explaining outcomes of agential interactions, and the role of the multiagent network in enabling the transformation from agent to actor. We suggest that both of these observations have the potential to contribute significantly to future explanatory critiques of ICT4D.

Our study demonstrates that the analytical and explanatory capacity afforded by MA is well suited to addressing ICT4D environments characterized by dynamic political, socio-economic, and technological contingencies. Its philosophical base in critical realism and its explicit concern with historicity and emergence sit very well with the recent calls for methodological development in the ICT4D literature (Avgerou 2008; Walsham et al. 2007).

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Appendix A

List of Interviewees and Their NVIVO Codes

No.	Organization/ Interviewee title	Remarks	NVIVO Code
Directorate of E-Government			
1	Senior Public Relations Officer	Nontechnical, conscious of broad implications of e-government	EG1
2	Senior Economist	Involved in drafting e-government strategy	EG2
3	Principal ICT Officer (GITS/D-eGov)	Intimate long-term association with ICTs in government	EG3
Ministry of Finance			
4	Deputy Director GITS	One of two deputies, directorship was vacant	MF1
5	Systems Administrator GITS	Coordinates IT projects for interministry linkages	MF2
6	ICT Officer (Ministry of Planning and National Development)	Same building as Finance, previously one ministry, works closely with GITS	MF3
7	HRM Officer	IPPD user	MF4
8	Project Manager (IFMIS)	Works with donor technical assistance personnel	MF5
9	Accountant General	User and policy maker, IFMIS, No audio recording	MF6
Ministry of Health			
10	Chief ICT Officer	Long serving, very informative	MH1
11	HR Officer	User IPPD	MH2
12	Health Records & Information Officer (Ag. Head HMIS)	Head on training in Japan	MH3
13	Dentist & Head – Child Health Promotion Program	Knowledgeable on strategy & ICT	MH4
Private Sector			
14	Group Executive Director Large IT Firm and Chairman KIF (Kenya ICT Federation)	Leading spokesman for Kenyan private sector & ICT	PS1
15	Media Owners Association	Observed Forum to discuss ICT Bill on invitation	MOA
Civil Society			
16	Coordinator APC-KICTANET	Hub for professional and civil society network activities	CS1
Development Agency			
17	Program Officer IDRC	Donor perspectives	DA1
18	Ex-Program Officer IDRC	Led ICT policy research with MoPND	DA2
Academia/Consultants			
19	Computer Science Lecturer/ consultant	ICT Consultant evaluated most GoK systems including IFMIS, HMIS, IPPD	AC1
20	Professor of Information Systems/ consultant	Intimately involved in most major ICT policy initiatives at national level	AC2