

# IT Enactment of new Public Management: the Case Study of Health Information Systems in Kenya

Roberta Bernardi

University of Warwick, Coventry, UK

[Roberta.Bernardi06@phd.wbs.ac.uk](mailto:Roberta.Bernardi06@phd.wbs.ac.uk)

**Abstract:** In the last twenty years most African Governments have embarked on health sector reforms sponsored by international partners. Conceived under New Public Management, the majority of these reforms leverage information technology to decentralise hierarchical structures into more information efficient organizations. The paper illustrates the case study of health management information systems in Kenya in order to better understand how the enactment of information technology has influenced the organisational outcome of New Public Management reforms within the health sector in Kenya. The case study provides a longitudinal account of how the adoption and usage of information technology within two health management information systems of Kenya Ministry of Health has affected the implementation of NPM reforms. Data collection and analysis have been framed within an institutionalist perspective viewing different agents acting under the pressure of competing logics (New Public Management and Old Public Administration) at three main levels of action: the macro or policy level (e.g., formal policies), the meso or organisational level (e.g., professional norms and management), and the user or agency level (e.g., IS users' routines). The case study has shown that NPM institutions were not supported by coherent actions unifying all actors involved in the restructuring of health information systems in Kenya so that IT enactment was not consistent across the health information system giving way to structural changes that were not aligned with what was envisaged in the reforms. Findings point to the rhetoric behind certain reform discourses by main actors involved, particularly, at the macro-policy level. The paper calls for a stronger source of political legitimacy to support discourses around public sector reforms so that through the right competences and systems of values at the meso level information technology can be used as a catalyst for a more consistent implementation of the reforms. New discourses around the potential of IT should be more aligned with certain institutions underpinning the practices of policy makers at the macro level inducing Government echelons to legitimize IT at the macro-policy level.

**Keywords:** information technology, health information systems, e-Government, new public management, institution theory, Africa, developing countries

## 1. Introduction

In the last twenty years most African Governments have embarked on health sector reforms sponsored by international partners (Lambo and Sambo 2003). Usually conceived under New Public Management, the majority of these reforms leverage information technology to decentralise and integrate health management and information systems structures to improve health care delivery (Kimaro and Nhampossa 2005).

Yet, available studies onto the restructuring of HMIS in Africa show that goals of decentralisation and integration are rarely achieved (e.g., Kimaro and Sahay 2007). On the contrary, in most cases the health sector scenario is still characterised by weak district health management systems (Odhiambo-Otieno 2005) storing information into vertical programmes' data bases that are not accessible by district managers (Chilundo and Aanestad 2004).

Main challenges to the achievement of expected results were identified in the resistance of recipient local actors to imported New Public Management reform models. Such resistance was stemming from a tension between the managerialist principle underpinning the restructuring of HIS for more efficient evidence-based management practices and health workers' and data managers' routines shaped by the local bureaucratic culture (Smith et al. 2008). Similar tensions have been identified in relation to the adoption of Western information technologies as well. Usually these technologies are software solutions designed in Western countries and adapted to the local contexts by international consultants with little participation of final users (Kimaro and Nhampossa 2005).

Hence, challenges to restructure management information systems to implement new public management reforms in the health sector are mainly linked to institutional complexity of African health sector contexts characterised by the divide between imported reforms and IT designs at the macro level and expectations and actions of implementers at the micro-level (Madon et al. 2007).

Based onto the case study of two health management information systems of the Ministry of Health in Kenya, this paper aims to shed light onto such divide by focusing onto *how new public management reforms are enacted in the restructuration of health management information systems in Kenya*.

In order to answer this research question, the case study will be analysed under an institution theory perspective, in particular, by taking an institutional logics approach. "Institutional logics" determine the way institutions shape individual identities, organisations, organisational fields and sectors of society (Friedland and Alford 1991). In particular, the tension between opposite logics is viewed as a source of cultural resources through which actors may either reinvent or resist meanings of imported logics (Thornton and Ocasio 2008, p. 101).

Under this perspective, the context of the health sector of an African country like Kenya has been conceptualised as being influenced by two main sets of logics: managerialist logics belonging to New Public Management (NPM) reforms imported by international donor partners and bureaucratic logics belonging to the traditional Old Public Administration (OPA) model inherited from the British colonial domination. The analysis of the case study will focus onto how and why different actors such as international donor partners, national decision makers, and main health information system users enact behaviours that reproduce (or re-invent) either NPM or OPA logics and what consequences do these different enactments bring to the restructuring of health management information systems in Kenya. More specifically, the case study analysis will focus onto how the enactment of competing logics influences the design of information channels, monitoring indicators, and information technology investments.

In addition, information technology designs are also viewed as embedding "technical norms" (Czarniawska 2008), which have also been institutionally shaped during their designs and, therefore, may shape users' practices and social structures in their context of usage. Whereas institutions or social structures influence the enactment of the material properties of IT, the design of the latter may promote new meanings and practices, thereby, reshaping the institutional order infused in public sector structures (Orlikowski 2000; Orlikowski and Barley 2001). Thus, the case study presented in this paper will also take into account how the IT-artefact influences the enactment of NPM and OPA logics across the spatial and temporal distance between its development and usage.

## **2. The New Public Management**

New Public Management is one of the major public sector reforms adopted by African and other developing countries under the pressure of multilateral financial institutions such as the World Bank. New Public Management supports increased efficiency and accountability for public administrations through the adoption of market-oriented management mechanisms used in the private sector (e.g., result-based management, outsourcing, etc). Initiated in the 1980s in the United States as an alternative to bureaucracies, NPM acquired soon a global dimension (Hood 2000). One of the lead arguments of NPM supporters was that bureaucracies failed to be those efficient and rational forms of organization as it was postulated by Weber (1946). In particular, NPM was thought to enable the Governments of developing countries to take advantage of the growth opportunities of the market economy (Larbi 2006; World Bank 2002).

In particular, given the NPM focus onto the rationalisation and decentralisation of management structures and performance-based accountability, information technology assumes a strategic role in the implementation of the new reforms (Osborne and Gaebler 1992). However, some studies have linked the failure of IT initiatives within the Government administrations of developing countries to the use of pre-packaged NPM reforms (Ciborra and Navarra 2005). In particular, the disaggregation tendencies of the NPM (Dunleavy et al. 2006) matched with the inconsistencies of foreign development programmes (Therkildsen 2006) have contributed, in most cases, to the fragmentation of information systems (Kimaro and Nhampossa 2005) increasing, rather than reducing, complexity (Bellamy and Taylor 1992).

Such a failure has been related to the top-down approach of IT-led public sector reforms (Ciborra 2005), which do not account for the constraints posed by existing institutional settings. The main features of the local context, such as socio-economic conditions, weak organisational capacity (Marikanis 1994), informal systems of values (e.g., tribal norms) (Higgo 2003), incompatible legal frameworks, and poor political legitimacy have actually inhibited the success of New Public Management reforms. These same factors distorted the post-colonialist bureaucratic model by

supplanting transparency and inclusiveness procedures with patrimonial, clientelistic, and rent-seeking practices (Batley and Larbi 2006). Other institutional factors such as power relationships (Dada 2006), political change and budget processes, and different labour contexts and markets (Bozeman and Bretschneider 1986; Kraemer and Dedrick 1997) have influenced the impact of information technology within public organisations.

The challenges posed by institutional contexts to the effect of information technology in implementing public sector reforms support arguments onto the lack of a linear causal relationship between information technology and organisational structures (Kraemer and Dedrick 1997). On the contrary, there have been either cases where integrated information systems and network technology seems to have supplanted bureaucracies with centralised and networked structures (Dunleavy et al. 2006) or cases where IT use, information exchange in particular, has not been successful in converting traditional hierarchical structures of public administrations into networked forms of organisations (Bretschneider 2003).

Therefore, a deeper consideration of the institutional context and its influence on technology adoption and usage could represent the missing link between public sector reforms and the attainment of expected performance. Fountain (2001), for example, refers to “technology enactment” as the process by which organisational forms, both affecting and being affected by existing institutional arrangements, influences the adoption of IT. The “enacted technology” can send feedback that directly creates changes into the organization and indirectly into policy institutions. Thus, the effects of information technology in relation to public sector reforms can be better understood by situating IT-enabled organisational change in the actual institutional context of a public organisation.

This is particularly true in the case of health sector reforms in most African countries aiming to decentralise and integrate health care and health management information systems. These objectives are envisaged in a series of international and regional agreements. One of these is the Alma Ata Declaration on Primary Health Care of 1978 (WHO 1978) putting emphasis onto decentralised health management systems (Kimaro and Sahay 2007) for a more efficient and inclusive health care delivery. Another significant reform was started in 1996 by the United Nations Special Initiative on Africa which led the way to Health Sector-Wide Approaches (SWAs) to coordinate health interventions among international and national development actors (Lambo and Sambo 2003).

Yet, the implementation of such reforms through Government IT innovation involves multiple stakeholders (international organisations, foreign consultants, governments, public employees, etc.) all acting according to different sets of rules, norms, and interests. In addition, rules and norms embedded in exogenous reforms and information technology designs may enter into conflict with values and norms shaping the actions of local public sector employees.

### **3. Theoretical framework**

The case study presented in this paper has been analysed through an institutional logics perspective. “Institutional logics” are “sets of ‘material’ practices and symbolic constructions which constitute a field’s organising principles and which are available to organisations and individuals to elaborate” (Friedland and Alford 1991). They represent the content and meaning of institutions (Thornton and Ocasio 2008) defined as socially constructed systems of rules, norms, and meanings (Berger and Luckmann 2004), which shape human action into regularities of behaviour and interaction patterns (Barley and Tolbert 1997).

Institutional logics determine the way institutions shape individual identities, organisations, organisational fields and sectors of society (Friedland & Alford 1991). Yet, actors are embedded within institutional logics (Thornton and Ocasio 2008) and social structures do not prevail over action (DiMaggio and Powell 1983). On the contrary, institutional logics can either constrain and enable individuals in advancing their interests and increase their political, social, and economic advantages by granting them partial autonomy (Thornton and Ocasio 2008, p. 104).

Following an extensive literature review of public and health sector and management information systems reforms in Africa and in other developing countries (e.g., Kimaro and Sahay 2007), the health sector of African countries can be viewed as characterised by two main logics: the managerialist logic imported through “New Public Management” reforms (Hood 2000) and the bureaucratic logic of “Old Public Administration” (Lynn 2006), namely, the traditional post-colonial bureaucracies. These two

different logics are believed to produce variation into the main institutions (Thornton and Ocasio 2008 p. 113) characterising the different dimensions of organisational structures (e.g., Child 1972) (Table 1).

**Table 1:** Main institutions of an organization’s structural dimensions under New Public Management, Old Public Administration, and “hybrid” logics

Structural dimensions	NPM Institutions	OPA Institutions	Hybrids
Control systems	Accountability	Non-evidence based management	-
Decision making	Decentralisation	Centralisation	-
Integration	Disaggregation (agencification)	Functional/vertical integration	Horizontal integration

These different institutions characterise the institutionalisation of information processing practices or routines of an information system users sustaining a particular type of organisational structure dimensions. Variation of content and meanings of these different institutions is shaped by the institutional logic that users enact.

Under the logic of New Public Management, the *institution of accountability* underpins management practices meant to account for results through outcome-based and performance measurement mechanisms (Osborne and Gaebler 1992). The *institution of decentralisation* stands for the deconcentration of authority to front-line managers (Olowu 2006). Deconcentration, however, has also brought to fragmentation or agencification of the public service into independent implementing units (Therkildsen 2006) such as in the case of the verticalisation of health programmes underpinned by the *institution of disaggregation*.

In opposition to these stand institutions identified under the OPA logic. Firstly, the *institution of non-evidence based management* stemming from a patronage system resisting efforts to implement result- and performance-driven systems (Kiragu and Mutahaba 2006). Secondly, the *institution of centralisation* involving the concentration of decision-making at the highest ranks of the hierarchy. The latter is strongly connected with the *institution of functional or vertical integration*, whereby actions are controlled through uniform and rigid administrative procedures (Grindle 1997).

An additional institution identified in the literature review is the *institution of horizontal integration* referred from now on simply as *institution of integration*. This institution falls neither under the NPM logic nor under the OPA logic. It represents international partners’ intention to integrate data management practices across all levels of the health system in order to reverse the trend of donor-driven fragmentation and verticalisation of HIV/AIDS programmes and their information systems. Hence, the institution of integration can be considered as being characterised by a hybrid logic between the NPM and OPA logics.

Thus, objective of the case study is to identify between those institutions that are actually enacted as taken-for-granted and institutionalised information processing practices and those that, in contrast, occur only in the form of policy accounts. The latter, therefore, are not reflected into IS users’ institutionalised behaviours.

More specifically, the acceptance of NPM reforms are expected to give way to the adoption and institutionalisation of information processing practices that encode institutions underpinned by the managerialist logic of new public management. In contrast, the resistance to NPM would maintain old institutionalised practices or institutions informed by the bureaucratic logic of Old Public Administration. A third outcome is that the NPM is only partially accepted and adapted to the local bureaucratic context, in which case the adaptation of new public management practices to the local context would give way to the creation and institutionalisation of “hybrid” information processing practices.

By analysing which institutions or taken-for-granted information processing practices are either re-invented or replicated, the analysis of the case study will take a multilevel perspective which views the context of health sector reforms and health management information systems in Kenya as characterised by three main levels of action: the macro or policy level (e.g., formal policies), the meso or organisational level (e.g., management structures) and the user or agentic level (e.g., IS users’ routines). The multilevel perspective helps identify the main motivations or factors that drove main

actors (e.g., international donor partners, national decision-makers, public employees, etc.) involved in health sector reforms and the re-structuring of health management information systems to enact specific institutions.

In addition, the enactment of institutions at different levels is associated with the technical features of technology. Depending on how institutionally-embedded actors enact institutional norms embedded in software designs, the technical properties of a technology can also influence the way actors enact institutions characterised by competing logics.

#### 4. Methods

The paper adopts a case study methodology to analyse a multiplicity of context-embedded processes that are not linked by linear causal relationships (Yin 2003, p. 13). Thanks to its holistic focus, the case study is one of the research methods most widely used and discussed in qualitative IS research particularly in relation to the analysis of the situated interaction between organisations, information technology, and people (e.g., Dubé and Paré 2003).

The case of the Ministry of Health in Kenya was primarily selected for its typicality (Yin 2003, p. 41). Like other African countries, Kenya's health sector reforms aim to decentralise and integrate its health management information systems (Figure 1, 2).

As the purpose of the research is mainly to explain the variation underpinning different enactments of IT-enabled New Public Management reforms, the selected case incorporates more than one unit of analysis to provide enhanced analytical insights into the processes under study (Yin 2003, p. 46).

The units of analysis were chosen based on the criteria of "theoretical replication" whereby specific differences between them were known to generate contrasting but significant results bringing an enriched theoretical understanding of the complex interrelationships the research seeks to unravel (Yin 2003, p. 47). This led to the choice of the following units of analysis: the central Division of Health Management Information Systems HMIS), the Kenya Expanded Programme of Immunisation (KEPI), and the Division of HIV/AIDS.

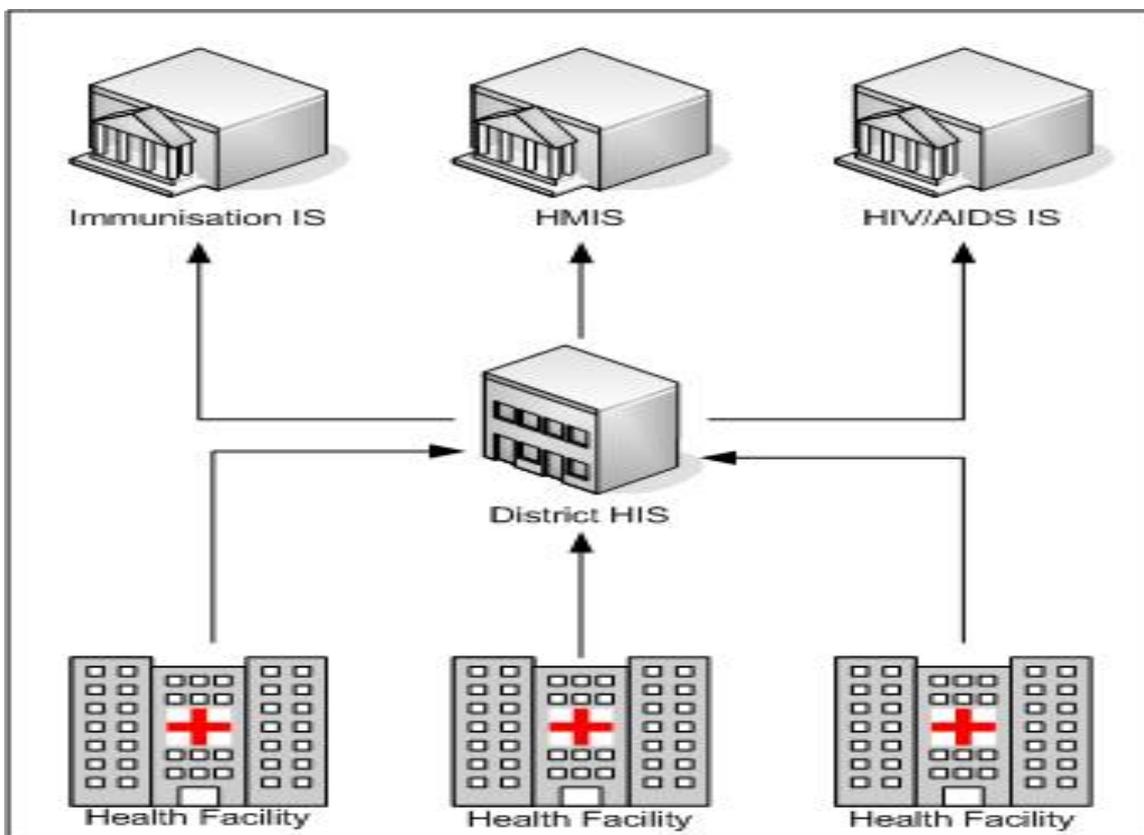
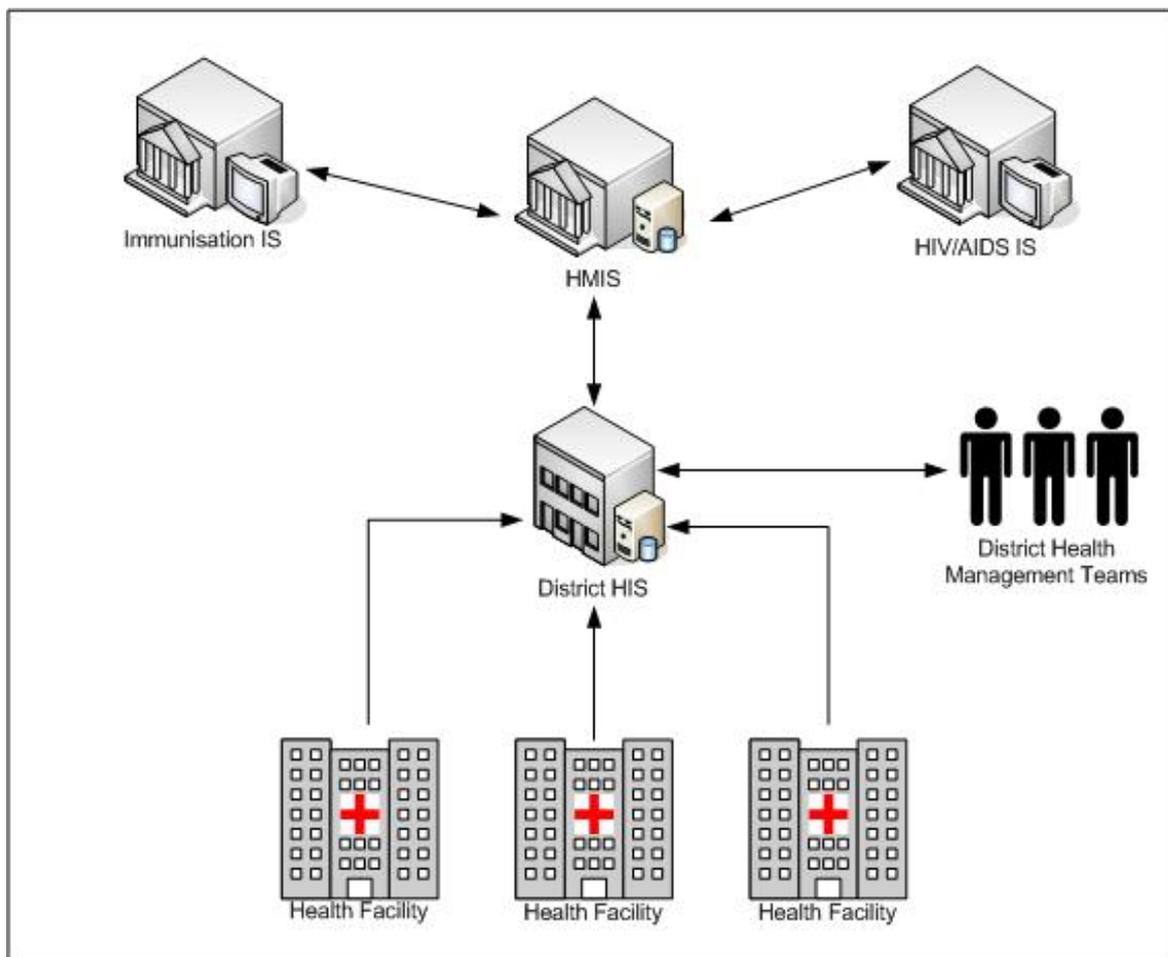


Figure 1: Vertical and centralised health information systems in Kenya

This paper illustrates the case of the first two units of analysis, the central Division of Health Management Information Systems and the Kenya Expanded Programme of Immunisation. Each unit has a vertical information system in place. The two units have been chosen based on the ratio between donor and government funding, the status of their information system and their technological maturity. Thus, the first unit is the least donor funded and the one with the oldest and least efficient and technologically innovative information system in place. The second unit has seen a gradual phase out of donor funding against an increase in government funding. It also has a mature information system and is the one with the best achievements in the Ministry in terms of technological innovation and information system performance.



**Figure 2:** Planned decentralised and integrated health management information system

Given the longitudinal perspective of the case study, when possible, informants with the earliest dates of employment have been selected. They represent not only health records information officers (HRIOs), the direct users of the information system, but also medical management and technicians (Table 2). This sample allows to have a diversified and comprehensive view of the evolution of the information system, and of how institutional reforms and technological changes have affected roles, working practices, and management structures within the information system.

**Table 2:** Matrix of sample of informants grouped according to unit of analysis, profession, date, and length of deployment in the unit

Deployment date	No. of years per unit	HMIS				KEPI			
		HRIO	Medical Doctor	IT	Other medical profession	HRIO	Medical Doctor	IT	Other medical profession
Before 1980	30 to 35	1							
1980-1985	25 to 30	3							
1985-1990	20 to 25	1							1
1990-1995	15 to 20	2	1	1		2			1

Deployment date	No. of years per unit	HMIS				KEPI			
		HRIO	Medical Doctor	IT	Other medical profession	HRIO	Medical Doctor	IT	Other medical profession
1995-2000	0 to 5								1
1995-2000	5 to 10					1			
2000-2008	0 to 5	1	2			2	1		
2000-2008	5 to 10		1			1	1		
Totals		8	4	1	0	6	2	0	3

The documents selected comprise: main donor project and policy documents, Government policies, the units' official documents including minutes of meetings and reports of the information system. The documents cover a period from 1980s to 2008 and have been sampled randomly per time period.

Interviews and relevant documentary extracts were transcribed and coded in NVIVO 8. Starting from a pre-defined set of institutions classified under NPM and OPA logics respectively (see Table 1), new codes were created along the process of data analysis (Miles and Huberman 1984, p. 58) and organized within time-series.

## 5. Case study analysis

### 5.1 Division of Health Management Information Systems (HMIS)

#### 5.1.1 The 80s and 90s: misalignments between policy discourses and enactments

The Division of Health Management and Information Systems (HMIS) was established in the first half of the 70s under the aegis of the World Health Organisation. Since its establishment HMIS has been the target of sporadic capacity-building interventions within the scope of donor-driven projects. In particular, the lack of a systemic and countrywide approach to the strengthening of the health information system was rooted into the World Bank-sponsored principle of Selective Primary Health Care preferred by most donor partners to the system approach to primary health care advocated by WHO in the Conference of Alma-Ata (Brown et al. 2006).

The selective principle in international aid undermined the legitimacy of policy discourses of integrated planning and management of health care in favour of ad-hoc and small scale projects. This strengthened the verticalisation of information systems, which supported evidence-based planning and management practices encoding the *institution of accountability* only within the limited scope of donor-funded projects instead of the whole health system. Hence, such activities contributed to reinforce the *institution of disaggregation* encoded into non-integrated processing of separate data sets by stand-alone systems both at national and district level.

Donor partners' legitimacy of a "selective" approach to health care was most likely linked to the limitations of different governance and funding mechanisms across donor agencies to take long term commitments and pool financial resources into a common basket. Secondly, donor partners were not motivated to support wide-sector approaches due to the Government's lack of engagement into the reforms. Major supporters for decentralisation were, in fact, donor partners, who, faced with the financial mismanagement of the central government, were more willing to fund local projects rather than channel their money through the central administration (Kenya 1997, p. 29).

The Government's resistance towards the implementation of these reforms was due to the strong centralised orientation of its bureaucratic structures. In particular, decentralising more administrative autonomy to local authorities was not seen positively as it would have meant a loss of power by the national leadership in favour of local political leaders belonging to opposite ethnic factions (Ogot 1995).

Other reforms such as the pre-electoral split of districts were meant to sustain an *institution of centralisation* to fasten political control rather than bringing to the legitimacy of new health management practices supporting the institutionalisation of *decentralisation* for better public service delivery. These were in fact face-lifting reforms limited to change the administrative boundaries of districts without empowering health facilities.

Overall, the Government's resistance to reforms was underpinned by *institutions of centralisation and non-evidence based management*, whereby decisions and budget allocations were still made centrally without relying onto data. The persistence of old institutions created resistance to the creation and institutionalisation of new practices of *decentralisation and accountability* in health management. Hence, the poor Government's support to HMIS, which, in contrast, was at the centre of reforms of integration and decentralisation of health information and management systems.

Under these circumstances, local managers saw information as only addressing the monitoring and planning needs of donor projects, rather than those of the health system overall. This contributed to lack of local ownership of information reinforcing the *institution of non-evidence based management* encoded into mere data management practices that were not in function of either local planning or management.

### *5.1.2 The years 2000: a new boost to health sector reforms*

The issue of the Second National Health Sector Strategic Plan in 2005 marked a shift of engagement in the strengthening of HMIS. The new strategic plan, in fact, put more emphasis onto Monitoring and Evaluation systems in order to assess progress towards the Millennium Development Goals (UN 2000). Donor partners were the major source of funding for the Division.

One donor partner in particular, the Danish International Development Agency (DANIDA), was keen on scaling up its support to HMIS across the country in compliance with the discourses of integration and improved aid coordination entailed in the Paris Declaration on Aid Effectiveness of 2005. In addition, DANIDA's endorsement of a sector-wide approach was also due to increased trust commitment to reforms after the elections of the new President Mwai Kibaki in 2002.

Increase in aid brought about by the reforms and the new political environment constituted a source of new legitimacy of health information. As part of the reforms, the Ministry of Health also planned to integrate and decentralise its health information systems.

Yet, the Government did not show much commitment to the strengthening of the health information indicating that the central Government action was still underpinned by *institutions of centralisation and non-evidence based management*. This contributed to the uneven development of the health information system across districts.

In addition, support received from donor partners was not successful in instilling a culture of evidence-based culture underpinning the usage of information for decision making encoded into the *institution of accountability*. The analysis has in fact highlighted the persistence of separate sources of funding and hence accountability shaping data management practices across different information systems.

### *5.1.3 Poor legitimacy of health records information officers (HRIOs) and management*

Lack of legitimacy of the health information system by the Government and donor partners' incapacity of providing a sector-wide support characterised the poor institutional support to health records information officers. Their performance was thus undermined further exacerbating the negative perception of the usefulness of health information particularly at district level where it was needed for neither planning nor management. The more HMIS did not work efficiently, the more the Department and medical records officers were regarded responsible for it.

In order to elevate their status health records information officers tried to advocate for the utility of health information with the executives of the Ministry of Health: "we have worked for many years to enable the gurus... in this ministry... to understand what we are... to show them... how we can use that data we have collected and worked on to show incidences, prevalence of the diseases".

Despite lack of support from both donor partners and the Government, health information officers and their managers engaged into discourses of decentralised and integrated computerisation of the health information system since the 90s. Hence, health records information officers' intentions were supportive of *institutions of accountability, decentralisation, and integration* and constituted the main source of endogenous legitimacy of the health information system, on which, their survival and growth depended.

It is only after 2005 and the new health sector reforms of the Second Strategic Plan that HMIS starts receiving funds to decentralise and integrate the information system. Yet, management lacked the capacity and vision to negotiate a more integrated, rationalised and gradual approach to the process of computerisation sponsored by donor partners. In addition, the lack of a national ICT strategy at the macro level left HMIS management without any guidance onto the technical standards to implement during the process of computerisation besides posing serious threats to the harmonisation of computerised systems across the whole Ministry and other Government departments.

The result was a non-homogenous strengthening of the information system country-wide whereby some districts were still using hard copies for data reporting. The persistence of manual systems in certain districts, lack of storage capacity of Excel that other districts were using, and the usage of a strongly centralised computer system such as Clarion at the national level contributed to maintain strongly centralised patterns of information processing practices encoding the *institutions of centralisation and disaggregation*.

#### 5.1.4 Computerisation

Since the late 80s computerisation has been mainly undertaken to address donor projects needs with very poor vision of the capacity and information requirements of HMIS. The result was inefficient computer systems and the lack of programmers and other IT professionals that could have advised on how to use few development resources available for the set up of a more functional computing environment.

The IT system used in the division was a Clarion data base. Clarion is a warranty-free programming tool for the development of Data Base Management Systems supplied by a donor partner project in the early 90s in order to computerise all HIS subsystems and data reports generation. Yet, the Clarion experience showed that IT potential was not fully achieved due to the co-participation of three factors: i) the technical complexity of the system; ii) human capacity; iii) and institutional dynamics.

First of all, the technical complexity of Clarion framed users' perception of the inadequacy of the system in meeting certain information requirements. However, being Clarion a development tool, its design was more flexible rather than rigid. However, its flexibility needed enablers to emerge, such as, programming skills which were not available in the Division. Most of interviewed users referred to Clarion as an unfriendly and inefficient system: "it is very cumbersome, it is based on Dos... before you access it there is always a problem... we entered the data and we could not do anything with that, we called a programmer and he is not based here".

Technical complexity has most likely influenced negatively the diffusion of Clarion across the health information system. In fact there was no trace of Clarion being used at the districts, whereas, until the introduction of Excel in the years 2000, Dbase III was a core part of the Ministry's computer training. It can thus be assumed that computerised districts were mainly using Dbase. This situation encouraged the co-presence of manual and stand-alone computer systems and lack of common standards (Grafton and Permaloff 1991), which, in turn, gave way to fragmented and inconsistent information processing behaviours encoding the *institution of disaggregation*.

One institutional factor that by interacting with technical complexity contributed to bog down HIS computerisation was the low institutionalisation of information technology as evidenced by the language used to refer to computer-related issues both before and after the reforms in the years 2000: "The Ministry as a minimum should endeavour to make as many cadres as possible "computer literate", a term used to express knowledge of what computers are and what they can do". Poor institutionalisation of IT brought to poor planning and management of the IT component including lack of IT expertise within the Ministry of health, which, by the way, amplified users' perception of technical complexity.

## 5.2 Kenya Expanded Programme of Immunisation (KEPI)

### 5.2.1 The 80s and 90s: the verticalisation of immunisation and disease surveillance information systems

The Kenya Expanded Programme of Immunisation (KEPI) in 1980 as part of a ten-year project funded by the Danish International Development Agency (DANIDA). The Programme's mission constituted

the national effort towards the achievement of the global immunisation goals set by the World Health Assembly in Geneva in 1974 (WHO 1974).

Under the pressure of DANIDA, the project put emphasis onto the set up of a sound monitoring system for the planning and management of KEPI activities. Facing the inefficiency of the central Health Management Information Systems Division in feeding the Programme with data, DANIDA recommended the set up of a vertical immunisation and disease surveillance information system.

The phase out of DANIDA project in 1990 marked the end of a substantial and consistent flow of funding to the Programme. On top of this, this was the time when international donors started downsizing their support to immunisation systems all over Africa leading to a decline in immunisation coverages. One of the major causes of this reverse trend was the rise of other health priorities attracting donor interest such as HIV/AIDS (WHO 1994).

The evidence of a donor-driven pilot District Health Management Information System between 1988 and 1990 assumes a small scale and piecemeal effort towards the decentralisation and strengthening of the health information system initiated in 1985. The inadequacy of such an approach was recognised by the Ministry authority as well: "the PS is meeting with donors on September 16th [1991] to seek long term funding for HMIS activities in the Ministry including our district work".

Therefore, In contrast with policy discourses of "integration", donor partners preferred the creation of vertical information systems rather than integrating with HMIS. Vertical systems such as the one created for the Programme represented the enactment of the NPM *institution of disaggregation* which is at the core of the fragmentation of the health information systems in the country. This is because the *institution of accountability* was not encoded in the whole health information system, but applied only for the scope of activities of donor-funded projects, given that data management practices were meant to account for resources invested in immunisation activities and not for the whole health system.

In addition, the Government was putting very little effort to the implementation of decentralisation reforms, whereas its contribution to the Programme was very little compared to foreign aid. As reported by official records of the Programme, in 1999 the Programme was in fact receiving only 15% of its funding from the Government budget and 85% from donor partners. In one instance in particular the Government decided to delegate the procurement of stationary (e.g., data reporting tools) and office equipment to the district offices without granting the districts the necessary financial autonomy: "Medical stationary in the District is in acute shortage. This is as a result of Government's action of decentralising printing of medical stationary". Not only were budgets still approved centrally, funds were also allocated by the Treasury: "Government funds are controlled initially by the Division of Primary Health Care... and secondly at the district treasury [...] Availability of finances at the facility and district levels is subject to availability of cash at the district Treasury, which depends on reimbursement by the national treasury". Thus, districts lacked the means to enact the new policy of decentralisation. This confirms the reluctance of the central government to hand over power to the local administrations, which, by resisting decentralisation, contributed to the persistence of centralised information processing practices encoding the *institution of centralisation*.

Thus, districts were only dependent onto the piecemeal approach of donor partners, which contributed to an uneven development of the health information system on the ground characterised by good- and bad-performing districts. This exacerbated the de-motivation of health workers and district medical officers in charge with the collection and reporting of data. Thus, data management practices on the ground were supportive of the *institution of non-evidence based management* given that local managers were not the direct consumers of information.

### *5.2.2 The Global Alliance of Vaccines and Immunisation (GAVI)*

The end of the 90s saw the stepping in of a new contributor to immunisation in the country, i.e., the Global Alliance for Vaccines and Immunisation (GAVI). GAVI was meant to support the Programme not only through the introduction of new vaccines (e.g., HiB in 2001) but also by contributing to the strengthening of the monitoring and evaluation system through its "performance-based grant programme" (GAVI 2007). Funds were in fact released against periodical performance measurement through a Data Quality Audit (DQA) (GAVI 2004). GAVI's emphasis on reliable quality data to justify

funding increased the Programme management's support to the strengthening of the information system.

Yet, as the Global Alliance's funding was limited to the financing of vaccines, the majority of the remaining expenses on immunisation were covered by the Government, which, increased its contributions to immunisation from 49% in 2000 to 53% in 2001 (WHO 2001). In 2001 GAVI's share of contributions to immunisation was instead 34%, whereas other multilateral and bilateral donor partners were contributing a 13% (WHO 2001). Moreover, the trend of funding from 2003 to 2005 shows an exponential increase of Government contributions to immunisation starting from a 44% share in the financial year (FY) 2003/2004 and reaching a 91% share in FY 2004/2005 (Health 2008, p. 45).

It is therefore possible that GAVI performance-based grant was not the only reason behind the stronger legitimacy of the information system within the Programme. Increased funding from the Government may also have constituted a strong source of legitimacy of the information system, which was now important to be accountable to the Government and not only to donor partners as it used to be ten years before. Under this perspective, the management perceived longer term benefits from the enactment of the *institution of accountability* through the strengthening of the information system. Through a sounder base of data on its activities, the Programme aimed to gain a more advantageous position in the competition for a share of the national public health funding with other health departments.

Hence, both the start of GAVI and the increase in Government contributions increased the management's awareness of the utility of decentralised health information systems to account for funding. As a consequence, the management started to give more credit to health records information officers' discourses of decentralisation by mobilising donor funding for the set up of a "decentralised [...] multiuser window based programme which can be used in a networking environment". The original design of the proposed system was meant to fully delegate data processing to the lower levels, starting from the provinces all the way down to the facilities. Still, it took almost four years before the implementation of the new system started. Until then, although "the year (2002-2003) witnessed a continued improvement in data processing" at least in a few provinces, there are reports of misalignment between type of technologies and information processing practices on the ground and inconsistent data processing across the different levels of the information system causing duplications and delays.

### 5.2.3 Computerisation

Following the decision to create a stand-alone vertical information system for routine immunisation and disease surveillance, around 1990 an IBM computer equipped with a Computerised Epidemiological Information System (CEIS) was procured with donor money. CEIS was a dos-based and centralised IT system designed for the management and statistical analysis of epidemiological data. Due to its stand-alone architecture, it only provided a single-user environment and hence a centralised processing of information.

The acknowledgement of the limitations of a centralised computerised information system was one of the trigger of discourses for the installation of a decentralised computerised information system in the late 90s. Despite this, CEIS continued to be used for a long time. Data kept being entered centrally into the system reiterating the *institution of centralisation* which clashed with accounts of decentralisation.

Between 2003 and 2004 CEIS broke down forcing the programme to rely exclusively on Excel, which, although being an efficient data analysis tool, had low data storage capacity posing no little constraint to the maintenance of an updated immunisation and disease data base. The need for a new computerised system became thus more compelling to such an extent that in 2004 the new system EPI-Info was implemented with the support of the U.S. Centres for Disease Control (CDC) in conjunction with WHO. Epi-Info is a public domain (free-of-charge) statistical software for epidemiology developed by CDC. It has been in existence for 20 years. Its first Windows version, Epi-Info 2000, was released in 1999. Until then, it could be run as a DOS programme in a Windows environment (Harbage and Dean 1999). Its simple programming language allows non-programmers to easily build and customise data based management systems (Ma et al. 2008).

Epi-Info was rolled out to the provinces but not to the districts as originally planned. Data entry was thus decentralised only to the provinces whereas data analysis was still performed by the central data management unit. Districts would send data to the provinces, which would share data with the central data management unit either by entering them into Epi-Info or by sending data sheets by e-mail.

Therefore, the decentralisation of the information system produced the partial decentralisation of data entry practices. Hence, the new system did not have a substantial impact onto the decentralisation of planning and management structures at the lower levels, given that both districts and provinces were not empowered in decision making as data analysis was still performed at the central level reiterating the *institution of non-evidence based management*.

It is arguable that the slow pace through which the whole process of computerisation was carried out was due to misalignments between the legitimacy of the new IT system driving the supportive action of health records officers and management at the meso level and the legitimacy of a well functioning monitoring and evaluation system by donor partners and decision makers at the macro level. First of all, although donors recognised the importance for a more efficient information system at all levels, they might not have been ready to commit considerable funding for its automation. Secondly, the central government support to automation was still very poor due to little awareness among decision makers of IT as a powerful control and monitoring tool. In addition, the Government was still privileging a central mode of governance so that policy-makers' actions were still encoding *institutions of centralisation and non-evidence based management* in contrast with new practices of *decentralisation and accountability* envisaged in the reforms and in the new computerised system.

## 6. Discussion of findings

The case study of the central Division of Health Management Information Systems and the Programme of Immunisation of the Ministry of Health shows different outcomes in the implementation of health sector reforms. This has been mainly due either to the partial enactment of NPM logics, such as in the case of sector-specific accountability underpinning donor projects or the resistance of OPA institutions such as centralisation enacted by the Government (Table 3).

**Table 3:** Across-unit comparison of NPM and OPA institutions per levels of action

Levels of action	HMIS	KEPI
Macro level: Donor partners	Decentralisation Sector-specific accountability Disaggregation	
	Poor financial support to computerisation	Higher financial support to computerisation, but not enough for large scale IT support
Macro level: National policy-makers	Centralisation Non-evidence based management Poor legitimacy of information technology	
	Poor financial support	Higher financial support after 2000
Meso-level: HRIOs	Decentralisation	
	Integration Sector –wide accountability	Sector-specific accountability
Meso-level: management	Decentralisation Sector –wide accountability Integration Poor IT vision	Support decentralised IT system only after GAVI and increase of Government funding

Levels of action	HMIS	KEPI
Information Technology	Centralisation Technical complexity (disaggregation)	Decentralisation User-friendliness
Micro-level users	Centralisation	Partial decentralisation
	Non-evidence based management	

First of all, the case study has shown how donor support to the decentralisation and integration of the health information system was not strong enough. Given the sector-specific focus of donor initiatives, the accounts of *accountability* underpinning donors' call for an efficient monitoring and evaluation system on the ground applied only for the scope of activities of donor-funded projects. In other words, donors did not legitimise the decentralisation and integration of the health information system for a better performance of the whole health system, thereby the verticalisation of the health information systems reinforcing fragmented information processing practices encoding the NPM *institution of disaggregation*.

On the other hand, the central government was reluctant to hand over power to the local administrations so that its governance practices are strongly rooted into the OPA *institution of centralisation*. The gap between the institutional discourses and enactments of decentralisation by the central government has contributed to the persistence of centralised information systems structures and data management practices supporting the *institution of centralisation*.

Thus, health workers' motivation to collect data was very low as they could not see the benefits of the system. Since the main consumers of data were donors and national programme managers, health workers' information behaviour was informed by the *institution of non-evidence based management* underpinning the lack of local ownership of information and the poor perception of the importance of data evidence for health planning and management.

The lack of legitimacy of health information on the ground was a major concern for health information officers in both units of analysis. In fact, their power and legitimacy in the health system depended onto the strengthening of the health information system. Under these circumstances, health information officers were at the front line to increase the legitimacy of health information among its users. This is why they advocated the upgrading of centralised dos-based computer systems to networked and decentralised IT systems. Thus, in both units health records information officers played a key role to promote new information processing practices encoding the *institution of decentralisation* and *accountability* across the whole health system. In addition, the division of HMIS was also keen to integrate information processing structures and practices supporting the *institution of integration* to gain a leading role in maintaining the health management information system for the entire Ministry as it was envisaged in the reforms.

Yet, the management support to health information officers's discourses of computerisation came under different circumstances. Whereas the management of HMIS showed immediate interest in supporting computerisation, the management of KEPI showed its support only when it saw the opportunity to leverage increased capacity of the information system to attract funding from GAVI and to secure increasing Government funding. This can be explained by the fact that KEPI's mission was not completely shaped around the health information system as it was for HMIS.

Still, only the managers of KEPI have been successful in bringing technological and structural changes in their information system. This was because they could count onto higher donor support. In contrast, donor support to implement the necessary technological innovation for the restructuring of HMIS came much later, whereas its management lacked the capacity and the vision to negotiate the terms of computerisation with donor partners to better suit IS users' requirements.

Thus, despite the fact that computerisation in both units was slacking due to the piece-meal approach of donor partners and lack of legitimacy of IT by the Government, KEPI was the only successful in implementing a new decentralised IT system.

In contrast, HMIS was still relying onto a centralised dos-based system after more than fifteen yeas of discourses of restructuration of their information systems. Due to its centralised architecture and technical complexity, Clarion could not be easily and cost-effectively adopted by the lower levels of the health system posing limitations to the decentralization of the division's information processing structures. As a consequence, apart from a few districts sending their reports in Excel sheets, most data entry was still done at the central level enacting the OPA *institution of centralisation*.

On the contrary, a Windows and web-based IT system like Epi-Info was more friendly and easier to adopt by the lower levels. Due to institutional constraints such as inconsistent donor funding and lack of support from the central Government, Epi-Info was implemented in the provinces but not in the districts as planned leading to a *partial decentralisation* of the health information systems and data entry practices. Although this was not enough to instil and institutionalise *accountability* in the lower levels of the health information systems, the new computerised system represented the major achievement towards reducing the gap between institutional accounts of decentralisation and their enactment.

Hence, the case study has shown how processes of computerisation and technical complexity are influenced by institutional dynamics. At the same time, it can be argued that more user-friendly systems like Epi-Info can produce different outcomes from more complex systems like Clarion with the same institutional arrangements such as lack of legitimacy of IT. This means that different systems with different technical properties may require different institutional arrangements to be optimised. In addition, although professional norms and management's engagement are essential for IT innovation in the public administration, they need institutional enablers at the macro-policy level in order to fully exploit the innovation potential of computerisation.

## **7. Conclusions**

The case study has shown that NPM institutions were not supported by coherent actions unifying all actors involved in the restructuration of health information systems in Kenya. Its main sets of meanings were either eluded or reinterpreted so that IT enactment was not consistent across the health information system giving way to structural changes that were not aligned with what was envisaged in the reforms. In particular, the case study has highlighted three main misalignments of political discourses: the clash between NPM institutions such as *decentralisation* with the old public administration institution of *centralisation*; different interpretations and enactments of NPM institutions by different actors (e.g., sector-specific *accountability* in donor projects implementations vs. sector-wide *accountability* in health management by HRIOs and middle-management). This not only unleashed internal contradictions in NPM reforms but gave way to the abuse of the NPM institution of *disaggregation* by being more driven by donors' priorities related to project implementation and monitoring rather than the reforms of the health sector. The consequence was an incomplete implementation of reforms, including partial attempts of decentralisation across the health information system leaving unheard discourses of integration.

Moreover, the case study has shown that misalignments between policy discourses and their enactments can be particularly deleterious if they occur at the macro policy level. This highlights the importance of political legitimacy of reforms in the public sector to bring more results in shaping certain behaviours that are meant to be changed at the micro level. This was evidenced, for example, by the partial decentralisation of the immunisation information system brought about by piecemeal donor support and lack of IT legitimacy by the government. As a result, management was not successful to achieve most substantive change into health management and planning practices and structures.

Thus, the findings of the case study do not put under question the efficacy of NPM reforms. Rather, they point to the rhetoric behind certain reform discourses by the main actors involved, particularly, at the macro-policy level. A stronger source of political legitimacy need to support these discourses so that through the right competences and systems of values at the meso level IT can be used as a catalyst for a more consistent implementation of the reforms. This new source of legitimacy could stem from the codification of new sets of meanings constituting a valid intermediary between NPM and African OPA models. For example, the institutional discourse of "controlled decentralisation" or "decentralised bureaucracies" could replace more dissonant discourses of "decentralization" or "managerialism". Such new discourses could induce Government echelons to legitimize IT at the macro-policy level. Under this perspective IT could be seen as keeping the operational freedom given

to peripheral units under control. In the health sector, this would facilitate integration rather than disaggregation of health management practices.

Localised policy discourses could also help determine the role of IT in building an interface between informal and formal governance systems characterising most African Governments. Under this perspective, more research of the main value systems characterising these two different levels of governance in relation to IT usage is recommended.

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