IDENTITIES: THE MISSING LINK BETWEEN IT AFFORDANCES AND INSTITUTIONS FOR BETTER HEALTH CARE IN DEVELOPING COUNTRIES

Completed Research Paper

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Abstract

Using a case study of health information systems (HIS) in Kenya, we seek to better understand how HIS afford or constrain the action of local actors in provisioning health care in developing countries. We developed a theoretical perspective based on institutional theory that served as a lens to interpret the relationship between institutions and users' perceptions of IT constraints and affordances. We found how identities constitute sense-making devices through which users make sense of the cultural resources available in their institutional environment and use them to shape their perception of IT affordances. In addition, we found how contradictions between users’ perceived IT affordances constituted the source and means of identity work processes through which users either modified or reinforced their identities. The paper contributes toward an increased understanding of how IT affordances (or constraints) link to institutions, thereby influencing processes of institutional change and socio-economic development.

Keywords: IT-enabled change, Healthcare Information Systems, ICT in developing countries, Institutional Theory, IT affordances
Introduction

The change potential of Information and Communication Technologies (ICTs) has been put under scrutiny by various scholars studying Information Systems in developing countries (Heeks 2010; Thompson and Walsham 2010; Walsham 2010; Zheng 2009). A key question that these scholars raise is that the role of ICTs in improving the livelihood of the poor is not significantly understood.

We argue that one way of improving such understanding is to analyse the relationship between Information Technology (IT) affordances, i.e., what users can do with a technology, and human agency in bringing up organisational and social change. The organisational impact of ICT is a well-studied though contentious phenomenon in IS research (Avergou and McGrath 2007; Barley 1986; Boudreau and Robey 2005; Constantidines and Barrett 2006; Orlikowski 2000; Orlikowski 1992; Vaast and Walsham 2005). Many among these studies have been criticised for slipping into socio-deterministic explanations of IT-enabled change overlooking the role of IT artefacts in shaping how users use technologies (Jones and Karsten 2008; Leonardi and Barley 2008; Rose et al. 2005). Such criticism has spurred the research effort of providing a better theorisation of IT affordances in processes of organisational change (Leonardi 2011; Leonardi and Barley 2008). Yet, research in this area is in its infancy and focuses mainly on the relationship between IT affordances and micro-organisational structures such as routines (Leonardi 2011).

Drawing on the IT affordances literature, we will conceptualise IT artefacts as affording or constraining human action (e.g. Leonardi 2011). In principle, the affordances of a technology are given in its design. Yet, the way a technology either affords or constrains different possibilities for action depends on how users perceive its features. Thus, different users may perceive the same features of a technology as either constraining or affording their activities (Leonardi 2011).

Our argument is that users’ perceptions of how a technology affords or constrains their action are influenced by the institutional context in which they are embedded. Thus, the understanding of long-term outcomes of ICTs in terms of organisational and institutional change and, therefore, socio-economic development can be achieved by analysing how IT affordances and constraints link to institutions in influencing human agency.

We will elaborate on this argument by interpreting the case of health information systems (HIS) in a developing country, Kenya, where we seek to uncover the role of ICTs, and in this particular case, HIS, in providing solutions to complex social problems such as health inequalities in developing countries. Our research question, then, may be formally stated as: how do HIS afford or constrain the action of local actors in better provisioning of health care in developing countries?

In order to answer this question, we develop a theoretical perspective to analyse the relationship between institutions and users’ perceptions of the constraints and affordances of HIS. By knowing such a relationship it is possible to gather a better understanding of how users engage with HIS and the likely development outcomes that may arise from such engagement. This perspective will be used to interpret the historical case study of HIS in Kenya, which will be then followed by discussion of findings and conclusions.

Health Information Systems in Developing Countries

Health is one of the most strategic sectors targeted by neoliberal development policies (Hershey 2009). In particular, health information systems (HIS) constitute one of the key components of deep structural international managerialist reforms (Kimaro and Nhampossa 2005; Kimaro and Sahay 2007; Piotti and Macome 2007) requiring health workers to use HIS as vertical reporting tools to monitor health service performance outputs (e.g. no. of patients immunised) (Madon, Krishna and Michael 2010; Nyella and Mndeme 2010).

Yet, health workers do not often welcome the usage of HIS for data reporting and performance monitoring, which is seen as a secondary activity with respect to the care of patients (Chilundo and Aanestad 2004; Kimaro and Sahay 2007). The result is the lack of active usage of health information by HIS users (Sahay, et al. 2010; Smith, et al. 2008), who often misreport numbers to legitimise funding or inflate performance output figures in order to escape reprimand (Madon, Sahay and Sudan 2007; Noir...
andWalsham2007;Smith,etal.2008).Suchpracticesunderminearcacyofhealthinformation(e.g.
diseaseprevalence),which,instead,canaffectnegativelyhealthserviceplanningandmanagement
reducingthequalityofhealthcareprovision.

Thus,existingresearchtellsushowinstitutions—namelythetensionsbetweenthecoercive
institutionalistpressuresofmanagerialistreformsandtheinstitutionalisedpracticesoflocalISusers—
influenceHISusage.Yet,theroleofHISinproducinginstitutionaleffectsbynaffectingorconstraining
humanactionisundertheorised.

Inthenextsection,weexplainhowtheroleoftechnologyinprocessesofinstitutionalchangeorstability
canbebetterunderstoodbyfocusingonthelationshipbetweeninstitutions,ITaffordancesandhuman
agency.

**Institutions,ITaffordancesandconstraints**

Institutionaltheoryviewsinstitutionsassocially-constructedsystemsofrules,norms,andmeanings
underwhichsocialactorsgenerateregularitiesofbehaviour(BergerandLuckmann1991,2004).Ithas
beenwidelyusedinISresearchtoexplainhowthepowerofinstitutionscaninfluenceISadoptionsand
implementationscontributingtowardsorganisationalchangebothinindustrialisedcountries(Berente
andYoo2011;Currie2012;CurrieandGuah2007;DavidsonandChisman2007;Gosain2004;Hsu
etal.2012;LambandKling2003;RobeyandHolmstrom2001)andindevelopingcountries(Avgerou
2000;Bada2003;NoirandWalsham2007;RajaoandHayes2009).

Sinceninstitutionsrepresenttaken-for-grantednormsandrulestratingactor'sbehaviours,theyarenoteasy
tochange(SeoandCreed2002).Yet,recentstudieshavefoundthathighlyfragmentedfieldsin
characterisedbytheco-presencemultiple rationalities( orlogics)—i.e.,theculturalresourcesandrules
shapingthewayindividualsexperiencetheirsocialrealityandguidingactor'sbehavioursanddecisions
(FriedlandandAlford1991)—aremoreliketenableagency(Lounsbury2007;MarquisandLounsbury
2007;SchneibergandClemens2006;Scottetal.2000;ThorntonandOcasio1999).Inparticular,under
adialecticalperspectiveofinstitutionalchangethetensionbopposite logicscanconstituteasource
ofculturalresourcesthroughwhichindividualsgatherconsciousnessofhowinstitutionalcontradictions
mayaffecttheirinterestsandbecomemotivatedtoreconstituteanewinstitutionalorderortoresist
change(Benson1977;SeoandCreed2002;ThorntonandOcasio2008).

Byservingdifferentdominantinstitutionsacrosstime,ITartefactsmaybecontributetotheconflictual,
emergent, andcontestedorinstitutionalchangebyeitherreinforcingorchallenginginstitutions
(RajaoandHayes2009).Yet,thereislittleunderstandingoftheprocesssthroughwhichITartefacts,
throughhumanagency,linkwithinstitutionalcontradictionsandthetransformationorreinforcement
ofinstitutions(MigneratandRivard2009).AnalysingtheroleofITaffordancesandconstraintsinthis
respectcaninformusaboutthemissinglinkbetweentechnologyandinstitutions.

The notion of affordances and constraints has been used by IS researchers to understand how IT artefacts
relate with human agency in producing organisational outcomes. In particular, recent developments
of the theory of affordances(Hutchby2001;MarkusandSilver2008)stresstherelationalviewof
affordances,i.e.,affordancederivefromtheinteractionbetweenpeopleandtechnologicalartefacts,as
people perceivetheminrelationtotheirgoals(Leonardi2011).If,usersdonot perceiveatechnology
designasflexible,theymayrejectthetechnology(ConstatinidesandBarrett2006)orimplement
workarounds,i.e.makenuintendedusageofitsfeatures(BoudreauandRobey2005).Ontheotherhand,
usersmaychangeroutinesifthey perceivethe technologyasaffordingtheachievementofgoals
(Leonardi2011).

Users' perceptions of IT affordances should be understood in relation to the institutions in which IT users
areembedded.Theideais to understand"howregulativerprocesses,normativesystems,andcultural
frameworksshapethedesignanduseoftechnicalsystems"(OrlikowskiandBarley2001,p.153)bytaking
intoaccountthe“constraintsandaffordancesoftechnologies”(p.158).Inthesamewayasweperceivean
action as appropriate to achieve a specific goal in relation to commonly accepted assumptions and beliefs,
inotherwords,thetraditionsinformingourbehaviour(Greenwoodetal.2008;Lounsbury2007),wemayinterpretthefeaturesofatechnologyasaffordingorconstrainingtheachievementofourgoalsin
relationtotheinstitutionsinwhichweareembedded.
This argument leads us to focus on the relationship between IT affordances, constraints, and institutions in our interpretation of the case study of health information systems in Kenya in order to better understand how IT artefacts are involved in processes of institutional change and socio-economic development.

**Research Method**

**Interpretive Methodology**

The research is based on the case study of the Department of Health Information Systems (HIS) at the Ministry of Health in Kenya. HIS was created in 1980 to function as the centre of health information for the Ministry of Health. Yet, soon after its creation it faced strong competition from the information systems of other vertical health programmes, which were attracting most donor funding. Designed to function as the performance monitoring system of the Ministry of Health, the HIS was a carrier of managerialist institutions into a context characterised mainly, but not only, by bureaucratic institutions. It thus constituted an ideal case to understand how the HIS link with competing institutional rationalities influencing how users engage with the system, and, therefore, its impact on health service delivery.

The case study presented in this paper was analysed following an interpretive approach (Walsham 1993), within which meanings are seen to be the product of human and social action within a given cultural context (Orlikowski and Baroudi 1991). The researcher thus gains an understanding of reality by interpreting meanings that people assign to events, speeches, documents and artefacts (Walsham 1995). Since the objective of this study is to understand how HIS are related with processes of institutional change (or stability), and given that such processes usually unravel across a long period of time, we took a historical perspective. Technologies and institutions can change over time. Yet, the mechanisms through which they interact may remain the same.

More specifically, the case study that we discuss is part of a wider study on health information systems in Kenya. In total, thirty-eight semi-structured interviews were conducted together with three unstructured interviews held with three senior officials of the Government of Kenya during two fieldtrips in Kenya between 2007 and 2008. To this, we add six phone interviews with international donor agencies representatives undertaken in 2011. As shown in Table 1, out of a total of forty-seven interviews, the main data used for this paper are from the Health Records Information Officers (HRIOs) and IT officer interviews conducted in 2008. Data from the other interviews were useful to set the context.

<table>
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<th>Table 1. Summary of Interviews</th>
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<tr>
<td>Number of Informants</td>
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<tr>
<td>Two multilateral donor agencies</td>
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<tr>
<td>Three bilateral donor agencies</td>
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<tr>
<td>Senior Government Officers</td>
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<tr>
<td>Health Records Information Officers*</td>
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<td>IT officers*</td>
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<td>Medical officers</td>
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<tr>
<td>Total</td>
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*These are the main data used for this paper. The other data provided the context.

Interview data from HRI and IT officers were particularly relevant for the purpose of this paper. This is because they were among those mostly involved in the creation and development of the HIS over the years. In this regard, given the importance of constructing the narrative based on first-hand experiences to the extent possible, interview participants were selected based on the date of deployment within the HIS. Interview lengths varied, but a typical interview lasted from 60 to 90 minutes. Interviews were tape-recorded and all audio recordings were transcribed in an electronic format.
Primary data from interviews were integrated with a sample of approximately 6,000 pages of documents taken from the archives of HMIS, KEPI, NASCOP and the Ministry of Health’s library. These included Government policy documents, minutes of meetings, letters and reports from the information systems covering a period from 1977 to 2008. Relevant international agencies’ policy and project documents available from the Internet were also collected. With respect to the interviews, documents were a valuable historical source of information for tracing past events and practices that the memory of informants could not recall. In addition, based on documentary evidence, it was possible to reconstruct meanings that actors attributed to events, practices, and the health information system and identify how these meanings were changed or reinforced over time. For example, the case analysis demonstrated how in the early 1980s users viewed the health information system as a tool to serve patients’ interests. Later on, toward the beginning of the 1990s, there was a shift towards a managerialist view of the health information system. Significant documentary extracts were converted to an electronic format and then imported in NVIVO together with interview transcripts and notes.

The data analysis was informed by some of the principles of conducting interpretive research as postulated by Klein and Meyers (1999). First, we applied the principle of “contextualisation” in order to understand both the context in which information systems are situated and the processes through which information systems influence and are influenced by context (Walsham 1993, pp.4-5; Walsham and Sahay 2006). Thus, we familiarised ourselves with the data and constructed, a narrative focusing on major events and processes characterising the health sector reforms and health information systems in Kenya in the past 30 years.

Second, we searched for data that could provide further detail and explanation of the events and processes identified in the narrative. We were guided by the principle of the “hermeneutic circle”, acknowledging that “all human understanding is achieved through the interdependent meaning of parts and the whole that they form” (Klein and Myers 1999). We first undertook open coding to get to know data intimately (Glaser and Strauss 1967). The constant comparative process implicit in such coding is consistent with the principle of the hermeneutic circle. This coding process led to the identification of the main categories characterising the institutional context such as institutional rationalities and main patterns of meaning and practices held by different actors. Whenever the transcripts of data raised questions regarding the label of concepts and categories, the sequence of events or causal tendencies among categories, and relationships among categories or between concepts and categories, relevant data was deliberately identified through “theoretical sampling” (Miles and Huberman 1994, p.62) and re-analysed until there were no apparent anomalies remaining.

Based on the categories identified at this stage of coding, it was possible to identify two main scenarios. Each of these scenarios was characterized by major events: the strengthening of the health information systems including its decentralization and the set-up of the HIS Department from 1980 to 1990; and the increased use of health information for managerial purposes following health sector reforms such as cost-sharing from 1990 to 2000. These events corresponded with major role and identity changes arising from the interplay between institutional pressures and IT affordances – we explain these issues in greater detail in the interpretation section. Consistent with the notion of “theoretical saturation” (Glaser and Strauss 1967), the period between 2000 and 2008 was not included in this work, since, despite being empirically different, it did not add any significantly new theoretical patterns that were not unearthed in the previous two periods (1980-1990 and 1990-2000).

Third, we drew upon our theoretical sensitivity, specifically the literature on IT affordances and dialectical institutional theory, to weave together an integrative framework, that represented the empirical patterns discerned in our data at a theoretical level, consistent with the principle of “abstraction and generalisation” (Klein and Myers 1999).

Finally, throughout our analysis we applied the interpretative principle of “suspicion” (Klein and Meyers 1999) by triangulating data, specifically, by comparing participants’ narratives and documentary accounts to check the reliability of our data underlying the interpretations. In this respect, we found consistency between retrospective accounts from interview participants validating historical data from documentary sources. For example, as shown in Table 2, a medical records officer’s view of health information as a key component of the medical records profession found in a 1984 letter was confirmed by health records information officers interviewed in 2008.
Table 2. Example of triangulation between documentary data and interview data

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<td>“I don’t find any way in which we can separate the medical records personnel and the health information personnel... the medical records maintained and analysed by the medical records personnel are the source of health information... the two are complementary and health information is a by-product of the medical record thus first created”</td>
<td>“When we started operating in the facilities that is when we had nothing to do with information, we were only processing patients’ documentation. But then, with time, information has become part of the health records and information personnel [to such an extent that] one cannot do without the other...”</td>
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Case Study

The Creation of the HIS Department and the Integration of Medical Records Officers in the Health Information System (1980-1990)

The World Health Organisation (WHO) was one of the major players that contributed to the creation of health information systems in Kenya in the 1970s. The main function of the health information systems was to produce health statistics to monitor diseases (HMIS 2000). In 1980 the Department of HIS was created as the “Central Statistical Unit within the Ministry of Health” and put in charge of the health information system (HIS 1980). Soon after its establishment in 1980, the HIS Department deployed Medical Records Officers (MROs) in HIS offices both at national and district levels (HIS 1985; HIS 1986a). This move enlarged the responsibilities of MROs, who, before being integrated in the health information system, were mainly in charge of administrative tasks such as booking patients’ appointments and filing patients’ records in the hospitals across the country (Kenyatta National Hospital 1985). Soon after their integration in the HIS, the MROs engaged in a series of activities meant to strengthen the health information system, which included its decentralization:

“It is my feeling that we can decentralize the HIS in contradiction to those who are of the view that we can’t be able to decentralize until we recruit a certain category of specified personnel as supervisors (MOH 1984)”

Yet, MROs were not satisfied with the level of recognition of their profession in the health information system, particularly, in hospitals, where records officers were still mainly utilised for administering patients’ records. Thus, in order to increase the legitimacy of their cadre, they advanced a series of requests including filling vacant posts and the creation of new ones, better promotion and training courses at Diploma and Degree level, and, above all, to be recognised as paramedics within the health service (Kenyatta National Hospital 1985):

“Internationally MROs are treated and accepted as paramedic. A classical textbook Medical Records Management by Haufman, p. 139... recognised Records Officers as Paramedics” (Kenyatta National Hospital 1985).

A letter dated 1984 shows how medical records officers viewed the health information system as a “comprehensible system adapted to the requirements of patients/clients, doctors, nurses, managers, evaluators...”. In addition, the uninterrupted flow of information should be ensured by “instilling into everyone a consciousness that they are part of an interlocking system of communication that helps the patient” (Ministry of Health 1984).

The view of the health information system as meeting the information requirements of health workers and medical practitioners may have been influenced by the medical environment in which they were used to work since their creation in the 1970s. As suggested by documentary evidence, the medical records and the medical practice used to go hand in hand:

“The history of medical records runs in parallel with the history of medicine. Records are as necessary
for the practice of medicine as medication is for effective treatment” (HIS 1992a).

Yet, such a view of the health information system was quite different from that of central planning and monitoring tool proposed by its creators. The main function of the HIS was actually to provide the Ministry of Health with statistical information in order to support planning, implementation and evaluation of health interventions (The Population Council 1978; Ejiohu 1980). The HIS project targeted the definition of “realistic and achievable goals, objectives and targets”. The evaluation of health programmes had to be based on the “measurement of results” through the establishment of a “reporting system” to maintain “a continuing line of accountability for performance” (Charles Drew Postgraduate Medical School 1981, p. 7). Yet, initially, health information was rarely used for managerial purposes as pointed out by the Department of HIS in those years:

“The medical officers of health and their District Health Management Teams are either not interested in or do not understand the importance of health data” (HIS 1987).

In this respect, an interviewee recalled that the role of MROs at the health facilities in the 1980s was to make medical practitioners aware of the uses of health information to improve health care management:

“Doctors in charge of the hospitals never used to care about information. We used to tell them that without health service data, it was hard for them to understand what patients in that area were suffering from... or the leading cause of morbidity in their hospital. We would show them how the data could be used to see the finances and man hours used to treat the first 10 causes of morbidity. Those doctors who were able to use those data could manage the service very effectively”.

Thus, information became an integral part of the MROs profession as explained in a letter from 1984, where an MRO stressed the strong tie between health information and medical records (Ministry of Health 1984):

“I don't find any way in which we can separate the medical records personnel and the health information personnel... the medical records maintained and analysed by the medical records personnel are the source of health information... the two are complementary and health information is a by-product of the medical record thus first created”.

This same feeling was echoed by a participant who was trained and employed as MRO from 1985 to 1988:

“When we started operating in the hospitals we had nothing to do with information, we were only processing patients’ documentation. But then, with time, information has become part of the health records and information personnel [to such an extent that] one cannot do without the other”.

Following the pressure of MROs, the new qualification of Health Records Information Officer (HRIO) was officially introduced in 1990 (HIS 1993).

The Role of the HIS Department as Centre of Health Information (1990-2000)

In 1989 the Ministry of Health adopted the cost-sharing programme. Started under the initiative of the World Bank (Ministry of Health 1992), “cost-sharing” was related to the introduction of user fees that patients had to pay in order to access certain health services. As part of the activities of strengthening District Health Management Teams’ capacity to implement cost-sharing (USAID 1991), USAID collaborated with other donor agencies to the set up District Health Management Information Systems (DHMIS) (Ministry of Health 1991).

The new system was meant to improve the decision-making and planning capacity of health managers at the districts for a “more efficient use and more equitable distribution of resources” (Ministry of Health 1986b). This is because the introduction of cost-sharing increased the demand for information at the districts and facilities. As a consequence, the district started to re-allocate existing HIS officers and to request new ones “to fill the functional vacancies created by the cost-sharing program” (HIS 1990). As a matter of fact, in a document dated 1993 the head of the HIS states how medical officers were starting to take health information officers more seriously:

“It is only now that district teams are beginning to recognise the important role played by the HIS officers. It will certainly take some time to correct the inequity that existed before” (HIS 1993a).
In this regard, an interview with a health information officer confirmed that the introduction of cost-sharing revived the interest in health management information, particularly, among district medical officers (DMOs):

“From 1988 up to 1995 there was not that demand for information... it increased afterwards and that is why [DMOs] felt the need to be given more computers [together with other] resources... For example I was given a motorbike to go around health facilities and collect [health data] reports that [had not been handed] in time. The reason why DMOs started appreciating more information was that, [after] the introduction of the cost-sharing, they had to monitor what they were doing in order to know where the resources they were collecting from the cost-sharing were going”.

Yet, despite some improvement in the utilisation of health information, the HIS Department was still complaining that records officers were usually excluded from the decision-making activity of DHMTs (HIS 1992b). At the national level, HIS officers also felt to be given little consideration. For example, they complained that most Ministries’ offices were derailing the routine data processing activities of their computer section by requesting typing and data entry services (HIS 1992b). Further constraints came from the incapacity of the HIS Department to supply health workers on the ground with the reporting forms needed to collect health data. In addition, decision makers in the Ministry of Health were not using the information produced by the health information system:

“Mr. K. reminded the members to start utilising the information generated at MIS (Management Information System). WHO, UNICEF... have been utilising our information more than ourselves” (KEPI 1996).

A health records information officer recalled the frustration she faced as soon as she started working as a MRO at the health facilities:

“Out of the [Medical Training Centre] [in 1993] as we went to hospitals, information was never taken seriously... people [at the hospital] knew a doctor, a nurse, the laboratory technician, the physiotherapist, a cleaner... for them [health information] was paperwork... We [as Medical Records Officers] understood the power of information... the importance of information... the uses of information... we understood how it [could be used] to make decisions”.

Faced with such constraints, HRIOS officers stressed the HIS department role as the “centre for information in the Ministry of Health” (1992c) and started to put pressure on Ministry’s senior officials to recognize the importance of the role of the HIS in providing the Ministry of Health with “the most needed information for planning purposes” and as a “data bank” for all types of data (HIS 1992a). Particularly significant is the account of a HRIO regarding the period when the HIS was part of the Department of Planning, between 1989 and 2000 (Information System and Planning Departments 1989; Ministry of Health 2000a). On that occasion, confronted with the lack of awareness of the value of information by senior Government and Ministry officials, HRIOS tried to show how data can be used for planning purposes:

“I remember one time, the senior officers from the planning section [of the Ministry of Health] went to Treasury [to] defend the [Ministry’s] budget. [When] asked [about] their criteria for the requests that they were placing, they said they had no criteria. There was a HIS officer with a team, [who said]: ‘I can place the information they [need to justify] the budget’. So they came back and collected the data to justify their request. That is why I am saying nobody needed information, although it was available”.

In order to prove the value of health information, a major activity HRIOS were investing most resources on was the production of the annual health information systems report, a compilation of health management statistics collected by health workers in each district:

“The HIS report is intended to assist health policy and health programme decision makers by forming the basis for future decision-making regarding how resources for health care delivery should be allocated” (Information System and Planning Departments 1989).

In particular, HIS officers were often sent to the health facilities in order to collect delayed data reports (HIS 1986b). In this regard, a health records information officer said:

“Between 1995 up to 1997 I was given a motorcycle to visit health facilities that had failed to return their reports on time. This is because the [HIS Department] was sending letters and circulars to remind us to
send late reports”.

Yet, during one donor coordination meeting it was noted how this activity was unnecessary since the information collected was too outdated to be used for health planning and management (DHMIS Task Force 1992):

“When it was learned that a district is endeavouring to compile reports for each of the four quarters of 1991, HIS was informed that reports are to be prepared for only the most recent quarter for which data is available – not for multiple back quarters” (DHMIS Task Force 1992).

**Interpretation**

The interpretation of interview and documentary data produced a series of dominant themes. The first set of themes is that of institutional rationalities. In particular, there were three key rationalities that were relevant in our story: the techno-managerial rationality, the medical rationality, and the bureaucratic rationality.

The techno-managerial rationality (Avgerou 2008, 2010) emphasised the use of clear plans and targets, accountability and performance monitoring as cost-effective solutions to improve health care. The medical rationality provided a more holistic approach to health interventions by putting patients’ care first. Therefore, health information was viewed as a useful resource to treat patients. The bureaucratic rationality did not entail a specific value to health information as such. Under this rationality, information was seen as useful for performing administrative tasks such as ministerial communication.

These three types of rationalities were connected to another set of themes found in the data analysis: that of IS interpretations. The themes related to the perceived nature of IS, and these capture how different rationalities informed the functionalities and expected usage of health information systems. In particular, we identified two types of perceptions regarding IS by the stakeholders: IS viewed as a medical tool and IS viewed as a managerialist tool.

The first interpretation of IS as a medical tool was mainly expressed by the Medical Records Officers (MROs) and was informed by the medical rationality characterizing the view of health information systems, principally, as serving patients’ interests. The second interpretation of IS as a managerialist tool was informed by the techno-managerial rationality, whereby the function of health information systems should be to ensure “performance accountability” by measuring and correcting performance against desired outputs (Batley and Larbi 2006; Brinkerhoff 2004; Hood 1991). Therefore, the HIS should serve health managers’ interests. The actual design of the health information system in Kenya incorporates such a managerialist function in the form of health data monitoring facility, which pertains to the third category of themes, namely, IT design.

The next set of themes identified are related to identities. The first theme of identities that emerges from the data analysis is that of paramedics. Such an identity was enacted by the role of MROs. In response to a number of institutional contradictions, IS interpretations and identities were modified over time enriching our sets of themes. The view of IS as a medical tool was incompatible with the techno-managerial rationality enacted in the health data monitoring facility of the health information system. As they were assimilated in the health information system, MROs internalised new symbolic practices attached to the managerial usage of health information. These new practices were part of their new role as health records information officers (HRIOs). In this new role, health information became an integral part of their identity. In other words, the new identity of HRIOs came to be custodians of health information rather than paramedics.

However, this identity could not be performed because of the prevalent use of computer systems and information to perform administrative tasks at the Ministry of Health. HRIOs formulated a new interpretation of IS as an empowerment tool. In other words, HRIOs viewed the health information system as a tool to perform their identity, and thus gain legitimacy and improve their social status in the Ministry of Health. Such a view of the health information system motivated HRIOs to engage with the health information system for the production of annual reports leading to the instantiation of an institutionally-dysfunctional role. This new role was institutionally-dysfunctional because it stemmed from the usage of the health information system; yet, it did not reflect the techno-managerial rationality.
informing its design. The main themes that emerged from the data analysis are summarised in Table 3.

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<th>Themes</th>
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<td>Rationalities</td>
<td>• Techno-managerial rationality</td>
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<td>• Medical rationality</td>
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<td>• Bureaucratic rationality</td>
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<td>IS interpretations</td>
<td>• IS as a medical tool: it serves patients’ interests</td>
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<td>• IS as a managerialist tool: it serves managers’ interests</td>
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<td>IT design</td>
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<td>Identities</td>
<td>• MROs’ identity as “paramedics”</td>
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<td>• HRIOs’ identity as “custodians of health information”</td>
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<tr>
<td>Roles</td>
<td>• Medical Records Officers</td>
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<td></td>
<td>• Health Records Information Officers</td>
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<td>• Institutionally-dysfunctional role</td>
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In the next sections, we describe in greater detail how these themes linked together by drawing on our theoretical sensitivity.

**Scenario 1. The creation of the MROs identity of “custodians of health information” (1980-1990)**

This section illustrates the first scenario characterizing the early years of the health information system in Kenya. This scenario is depicted in Figure 1.

![Figure 1. Scenario 1 (1980-1990)](image)

After 1980, the creation of the Department of HIS and the rollover of the health information system...
across the country was mainly informed by the techno-managerial rationality (Arrow a) for the centralised planning and monitoring of national health services (Avergou 2008; 2010). Medical records officers (MROs) started to be trained and employed to work for the health information system. Yet, their new role as HIS officers was not always legitimised, particularly, in hospitals, where MROs were mainly utilised to perform secretarial and administrative duties such as booking patients’ appointments and filing patients’ records. Such a view of MROs can be attributed to a bureaucratic rationality and clashed with the self-representation of “paramedics” by the MROs. The identity of “paramedics” may be interpreted as representing the medical rationality (Arrow b) characterising the medical (or hospital) environment in which MROs used to work.

The notion of identity and the roles that are implicated characterise the set of meanings that we use to frame our ideas of the world and, therefore, our actions in relation to specific situations (Weber and Glynn 2006; Weick 1995). Thus, faced with the contradictions between the medical rationality informing their identity and the bureaucratic rationality challenging their identity as paramedics (Arrow c), the identity of MROs played a key role in their reasoned analysis of the limitations and opportunities available in their environment (Arrow d). This motivated their action to change by engaging in a series of activities meant to institutionalise their new identity and role in the national civil service and to strengthen the health information system. In particular, through their identity of “paramedics”, MROs drew on the cultural resources of the medical rationality (Seo and Creed 2002) to frame a bottom-up view of the health information system that is not exclusively for health planners and managers but is also a valuable resource for the patient and health personnel (Arrow e).

Thus, the interpretation of what IS can do is linked to the goal that users aim to achieve, in this case, to serve patients’ interests. Under the relational view of affordances, defining IT affordances as what people perceive in relation to their goals (Markus and Silver 2008; Leonardi 2011), what we labeled as “IS interpretation” is actually a type of affordance. In this case, identities constitute a sense-making device through which users make sense of the cultural resources available in their institutional environment and use them to shape their perception of IT affordances, i.e., what an IS can do in relation to their goals. Yet, the perception of the health information system as serving patients’ interests was constrained by its design (Arrow f), which, by contrast, afforded a managerialist usage of the health information system health service planning, monitoring and management (Arrow g).

With the passing of time, as part of the process of assimilation of the medical records personnel in the health information system, MROs internalized the symbolic practices attached to the managerial usage of the health information system. This is demonstrated by the way they tried to make medical practitioners aware of the importance of health data for health service planning and management. Thus, MROs took on the new role of health records information officers, which encompasses two main roles/functions: the role of records officers administering patients’ data and the role of information officers managing health data (Arrow h). Thus, by enabling the creation of HRIOs roles, the health information system triggered a process whereby IS users reviewed their identity by internalising the meanings associated to the managerialist usage of health information afforded in its design. The result was the formation of a new identity, which we label as “custodians of health information” (Creed et al. 2010) (Arrow i).

The process through which individuals review their identity is usually defined as “identity work” (Creed et al. 2010). Actors can engage in identity work and change their identities when faced with institutional contradictions (Creed et al. 2010). In this case, the source and means of identity work were the contradictions between affordances, namely, the affordance of “IS serving patients’ interests” perceived by MROs through their “paramedics” identity and the affordance of “IS serving managers’ interests” afforded by the actual design of the HIS. The IT enactment afforded by the HIS design was a source of the cultural resources that users drew on when faced with contradictions challenging their identity. This process led to the assimilation of the meanings, practices, and roles afforded by the HIS design.

**Scenario 2. IS as empowerment tool and the creation of an institutionally-dysfunctional role (1990-2000)**

The second scenario illustrated in this section focuses on the effort of health records information officers (HRIOs) in promoting their role in the Ministry of Health in Kenya. This scenario is depicted in Figure 2.
After the introduction of new managerialist reforms, such as cost-sharing in 1989, the health information system played a key role in strengthening the health planning and management capacity within the Ministry of Health. For example, the health information systems at the district level was strengthened through the creation of the District Health Management Information System (DHMIS). Meant to support District Health Management Teams in tracking health service resources, the design of DHMIS illustrates how the design and use of health information system was informed by the techno-managerial rationality (Arrow a). Cost-sharing increased the demand for health information for managerial purposes and required, as a consequence, a major involvement of HRIOs in the health planning and management structures of the Ministry of Health. Thus, as discussed in the previous scenario, the perception of the HIS as a managerialist tool enabling “planning, managing and evaluating” health interventions in Kenya (Arrow b) was a major cultural resource through which HRIOs could perform their identity as “custodians of health information” (Arrow c).

Yet, major contradictions emerged from the tensions between the perception of the HIS as a managerialist tool and the bureaucratic rationality legitimising information systems and computer services for processing red-tape in most Departments of the Ministry of Health (Moon and Bretschneider 2002). The use of the HIS computer systems for administrative tasks was quite limiting for the HIS Department. It overloaded the computer centre with administrative tasks unrelated to its core function. The view of health information as red-tape (“paper work”) was also a limiting and demoralizing factor for HRIOs working at the health facilities. Consequently, the HIS was not used for the purpose that it had been created for, that is, to produce health information for the decision makers and planners of the Ministry of Health. Thus, the bureaucratic rationality was a source of constraints to the performance of the HRIOs’ identity, by denying HRIOs and their Department an institutionally-accepted role in the Ministry of Health (Arrow d).

It is through their identity of being part of the “centre for information” of the Ministry of Health and, therefore, “custodians of health information”, that HRIOs made sense of the main contradictions undermining their social status in the health information systems in Kenya (Arrow e). In particular, they realized that they could gain more legitimacy as a profession by valuing the “power of information” among decision-makers and health managers within the Ministry of Health, which, eventually, could increase the demand for information produced by the HIS. Thus, under their identity as “custodians of health
information”, HRIOs framed a new affordance of the HIS as empowerment tool meant to improve their social status within the Ministry of Health (Arrow f).

In order to achieve this objective, HRIOs used the health information system to create a symbolic role through which their own identity could function (Weber and Glynn 2006) (Arrow g). This symbolic role entailed the production of annual health information systems reports. Such a role was framed by drawing on the IT enactment afforded by the HIS design as a cultural resource of the techno-managerial rationality (Thornton and Ocasio 2008), given that it was often justified as supporting decision making and planning in the Ministry of Health. In this way, the enactment of this role was afforded by the health information system which was used by HIS staff to perform a set of routines such as the compilation of old district quarterly data reports from the previous years in order to produce annual reports (Arrow h). Yet, under the techno-managerial rationality legitimising the usage of information for short-term planning, decision-making, and immediate action, the activity of the HIS was “irrational” as demonstrated in a donor meeting where the production of quarterly reports based on data that were more than one year old was reprimanded given that such outdated information could not be used for planning or monitoring purposes.

Thus, institutional contradictions triggered the sense-making activity of HRIOs, who, through their identity drew on the cultural resources represented by the IT enactments afforded by the HIS design and engaged in an identity work process to reinforce their identity (Creed et al. 2010). Yet, this time the identity work process involved the creation of a new IT affordance (“IS as an empowerment tool”) involving the production of health information as a “meaningful activity” through which the HRIOs reproduced their identity and legitimised their existence in the Ministry of Health in order to be given access to resources and improve their social status (Arrow i).

The construction and enactment of particular identities can influence institutions (Clark and Geppert 2011; Creed et al. 2010). In this case, it was evident how the IT affordance underpinning the identity work process influenced the institutional effects produced. In particular, the symbolic role created by the HRIOs for the HIS Department was “institutionally-dysfunctional” since its enactment by the health information system did not support managerial practices. Thus, it did not reinforce the techno-managerial rationality informing the design of the health information system. On the contrary, it reproduced the bureaucratic institutions in which HRIOs and their Department were embedded (Arrow j) by producing outdated health information that could not be used by health planners and managers to improve health services.

Discussion

Theoretical Implications

In this paper, we have discussed the case study of the Health Information Systems in Kenya. The historical perspective adopted in this research allowed us to increase the understanding of how IT affordances (or constraints) link to institutions, thereby, influencing processes of institutional change and socio-economic development. Such processes usually span long periods of time. Therefore, a historical perspective was necessary.

Although the period of analysis was between 1980 and 2000, the theoretical significance of the case study is not diminished as time has passed. On the contrary, the historical perspective adopted strengthens the validity of the main findings emerging from the case analysis and the theoretical implications that we highlight in this section. The case study has demonstrated that technologies and institutions can change over time. Yet, the processes through which such changes occur and their implications for the understanding of the relationship between theoretical concepts, such as IT affordances and institutions, remain much the same. This is clear from the two scenarios that we pictured in our data analysis. Even though these two scenarios belonged to two different decades, the theoretical themes and processes emerging from their analysis were recurrent and similar. Therefore, in their abstraction the themes and patterns of relationships that we are going to discuss in this section (e.g. identities) are still valuable for today’s health information systems. Yet, their instances could be different depending on the cultural and historical context in which they are instantiated (e.g. “identity of custodians of health information”).
More specifically, a key finding of this research concerns the role of the mutual shaping relationship between identities and IT affordances (or constraints) in producing institutional effects. The concept of identity is not new to IS research. Recent studies have found that technological change may affect organisational members’ interests by challenging their roles and identities and the power that such roles and identities represent. In order to defend their power, and, therefore, their interests, users either maintain or review their identities through workarounds, i.e. unplanned usage of the information system features (Alvarez 2008; Jensen et al. 2009). Eventually identity reinforcement and modification may influence the way IT is assimilated into users’ practices (Mishra et al. 2012). Yet, how users’ perception of IT affordances (or constraints) in relation to their interests links with identities and IT designs producing institutional effects has not been systematically explored.

Previous studies demonstrated how IT affordances (or constraints) are involved in influencing micro-organisational structures such as routines (Leonardi 2011). Others demonstrated how users reinvent their role to take advantage of the new capabilities of Information Technology (Barley 1990). It is however not clear how IT affordances are involved in processes of institutional change.

Our study addresses this gap by demonstrating how IT affordances and constraints are involved in processes of identity work whereby users either reinforce or modify their identities influencing institutional change or stability. Consistent with the principle of theoretical abstraction suggested by Klein and Meyers (1999), we have theorised this process through the framework represented in Figure 3. The framework has been developed based on the themes and processes that emerged from our case interpretation and represent a more general form of Figures 1 and 2.

![Figure 3. Theoretical Framework on Identities and IT Affordances](image)

The starting point of our framework is that of institutional rationalities shaping users’ identities (Creed et al. 2010). Yet, the performance of users’ identities may also be challenged by contradictory institutional rationalities (Arrow a). Constraints to identity performance can undermine one’s interests and social status within an organisation (Clark and Geppert 2011). Thus, users start a reasoned analysis of the limitations and opportunities of their environment (Arrow b) to cope with such contradictions in order to defend their interests. Identities constitute a sense-making device through which users frame their perception of IT affordances (Arrow c), i.e., what an IS can do in relation to their goals (Markus and Silver 2008) and interests, by drawing on the cultural resources available in their institutional environment (Arrow d). In this way, IT affordances (or constraints) become part of the opportunities (or limitations) available in users’ environment as they constitute the means through which users can or cannot perform
their identity. Perceived affordances motivate the design and enactment of IT systems (Arrow e). Yet, when users cannot modify existing IT designs (Leonardi 2011), users can produce new enactments of an IT system only if an IT design does not constrain users’ perceived affordances (Arrow f). IT enactments may either enable or constrain the creation or performance of specific roles (Arrow g) and, therefore, participate to identity work processes through which users either reinforce or modify their identities (Arrow h). Identities and their modification may produce a reconfiguration of interests giving rise to new ways in which IT affordances are perceived, and, therefore, new ways in which users engage with an IT system. Finally, the reconfiguration of identities may affect institutions (Arrow i). Yet, changes in identities may not immediately lead to changes in institutions. This is why in Figure 3 the feedback to institutions is represented by a dashed arrow.

Thus, we submit that our study helps us understand that: a) institutional contradictions and their effects on users’ identity influence how users would review their perception of IT affordances and their engagement with an IT system; b) whether and how new IT enactments produce institutional effects by modifying or reinforcing identities depends on whether and how users’ perceived affordances are enabled or constrained by an IT design.

Without the use of institutional theory, the understanding of these processes would not have been possible. The concept of institutional rationality was important to understand the design of the health information system, users’ perceived IT affordances, and users’ identities. As we showed through our scenarios, institutional rationalities were not only the source (e.g. institutional contradictions) but also the means (e.g. the cultural resources) of the mutual shaping relationship between identities and IT affordances characterising the role of IT artefacts in processes of institutional change and stability.

In terms of generalisability, on the one hand, the themes and patterns of relationships represented in Figure 3 appear transferable to other contexts. On the other hand, following the principle of “particularization” (Stake 2000), the bounding context of developing countries can provide significant differences in the way these generalisable themes and patterns work together. First, the specificity of the context influences the type of role-options framed under one identity (Weber and Glynn 2006; Weick 1995). For example, as soon as MROs became more and more involved in the health information system they started performing roles that went beyond managing patients’ records and report health information. They were involved in advocacy activities, trying to increase the awareness of the value of information among HIS users, in particular, policy-makers. The advocacy role played by MROs was related to their perception of IT as an empowerment tool. A common situation documented by studies on the public and health sector context of developed countries is that users may view a new IT system as a threat to their power which needs to be resisted or, at least diminished (Alvarez 2008; Jensen et al. 2009). In contrast, our study suggests that in a developing context, new IT systems can be often viewed as a source of power by marginalized categories of actors due to lack of resources and the constraining force of institutional contradictions.

In this respect, it is worth noting that institutional contradictions may be more severe in the health sector of a developing country due to the disruptive as well as discontinuous nature of donor-driven managerialist reforms. This was demonstrated, for example, by the case of the health information system in Kenya that was created as a managerial tool and that could not work properly in the bureaucratic structures of the Ministry of Health. Under these circumstances, HRIOs’ engagement with the health information system as a managerialist tool reproduced the bureaucratic institutions within which the HIS and its users were embedded.

Practical Implications

In this section, we illustrate a series of implications and lessons, which can be mainly useful for HIS practitioners in Kenya, the setting of our case study, and can also be extended to other similar developing contexts. Similar to other studies, this research points to the low ownership of health information by local health workers due to the bureaucratic reporting of health information for monitoring and evaluation (Bernardi and De Chiara 2011; Madon et al. 2010). This is one of the major causes of low commitment to the HIS by local health workers leading to misreporting and bad quality data. Thus, monitoring and evaluation tools should be integrated with other systems that are more patient-related, such as Electronic Medical Records Systems, to increase the perceived usefulness of HIS by local health workers in charge of
collecting data.

Interestingly, in the case study, not all actors were resistant to the managerialist usage of health information systems. Local actors such as health records information officers shared the cultural meanings and interests embedded in the health information system design. This is because they saw the health information system and the managerialist practices that it supported as an opportunity to improve their status within the Ministry of Health. Although local champions endorsing a new IT system can increase the chances of its success, the case study in Kenya showed that local actors’ engagement with the HIS did not have desired development effects, as demonstrated by the downsides of symbolic and institutionally-dysfunctional roles.

One lesson from these findings is that of the need for institutional alignment between the health information system and the various structures supporting it. For example, our case study showed how the HIS was a managerialist tool that could not function in the bureaucratic institutions in which it was embedded. Another lesson is to look at the reasons and motives of local actors for engaging with the health information system for a better understanding of the development and change implications of their actions. In the case study in Kenya, for example, HIS users were committed to managerialist reforms as a means to improve their social status.

In this respect, institutional theory offers another implication related to the importance of identifying local actors, particularly those who are not strongly embedded in existing institutions (Battilana et al. 2009), and, therefore, can work as institutional entrepreneurs by re-adapting and institutionalise new IT systems. The case study in Kenya showed how, for years, medical records officers had to struggle to gain a proper role and recognition in the health information system and the Ministry of Health. Eventually, these actors became health records information officers and, even though the results were not always desirable, supported the functioning of the health information system under considerable resource constraints. The lesson, particularly for donor agencies and IT consultants, is to identify and empower local institutional entrepreneurs that can challenge local institutions resistant to health information systems in order to make HIS more responsive to the health care and development needs of the local population.

**Conclusion**

In this study, we hope to have contributed to a better understanding of how IT artefacts link with institutions participating to processes of institutional change and stability. A key finding of the paper relates to the mutual shaping relationship between identities and IT affordances (or constraints) in producing institutional effects. We sought to offer an understanding of how ICT and, in particular, HIS can enable the provision of better health care in developing countries. In this respect, we found that HIS users do not always resist a technology, as may be expected; on the contrary, they can actively engage with it. Yet, their engagement with the HIS is not always beneficial. The effects of engagement can depend on the interests that motivate them and the constraints that they face in their environment. In this respect, changes in roles following the introduction of a HIS are important as they contribute to the change in identities of local actors. A major issue is to understand how, given certain constraints, new prerogatives emerging from new roles and identities can encourage a productive and effective usage of the HIS.

**References**


