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# The Role of Digital Platforms in Managing Institutional Logics: case from DHIS2 in Ethiopia

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**Abstract:** Digital platforms are vehicles to transform socio-economic activities leading to growth, innovation, interconnectedness and collaboration. Such platforms are keenly needed in low resource setting countries where developmental agenda is at the forefront of institutions. Often, such platforms originate in the global north and travel to south facing heterogeneous contexts and institutional logics which at times are conflicting. As a result, literature advises for context aware and homegrown solutions to fit into local realities. However, this paper documents how homegrown solutions also face conflicting institutional logics and their inability to adapt leads to failures. Emphasizing on global digital platforms, the paper investigates how they navigate conflicting institutional logics and realize their developmental potential. The paper argues digital platform's inherent constraint and affordance plays a central role in inscribing and accommodating multiple institutional logics. The paper is based on a case study of DHIS2 used as health management information system in Ethiopia.

**Keywords:** DHIS2, digital platforms, health information system, institutional logics, Ethiopia.

## 1. Introduction

Digital platforms are strongly regarded as vehicles to transform socio-economic activities leading to growth, innovation, interconnectedness and collaboration [1-3]. However, despite such a promising potential for the global south, focus has been more on the global north leading to a dearth of research on the global south [4]. Recognizing the shortage, research makes an explicit call for IS research that contributes to the developmental potential of digital platforms in the global south [5]. This paper attempts to respond to this call by exploring the link between platforms and institutional logics drawing from empirical material observed in global south health management information system (HMIS) digital platform implementation initiative.

Investigating digital platforms goes beyond the classic case of information system study in an organization. Digital platforms operate beyond the boundary of a single organization as they are inherently dynamic and transcend heterogeneous institutional logic. Various IS researchers showed how multiple stakeholders' institutional logics within a platform ecosystem compete, dominant or co-exist [6-7].

Masiero and Nicholson [4] identify market-centered and human-centered competing logics that underpin digital platforms. They further emphasize prioritizing human-centered logics to realize the developmental potential of digital platforms. However, despite a focus on human-centered logics, the reality that most of the platforms prominent in the ICT4D discourse originate from the North and continue to travel across many countries in the south brings a challenge of navigating multiple logics of these countries, including the platform creator ones. This paper aims to discuss how digital platforms play a role in managing competing logics through time.

There are two types of digital platforms – transactional platforms mostly focused on market-oriented exchange business logic and innovation platforms that provide boundary resources for others to innovate apps [5, 8]. In this paper we focus on innovation type digital platforms with developmental impact. These are platforms designed to facilitate locally situated value creation by third party actors. The innovation platform provides stable core functionalities and associated boundary resources such as APIs and technical documentations that local users,

governments, development partners and other institutions can consume to rapidly develop and deploy locally relevant context aware apps [9-10]. The advantage with innovation platforms is that they have done the heavy lifting by providing ready to consume boundary resources where local actors are relieved from dealing with complex technical materiality [11].

However, materializing the developmental impact of innovation digital platforms in the global south is met with locally situated institutional logics that need to be inscribed in the platform to ensure platform sustainability across time and space. Acknowledging the inherent nature of platforms to live through heterogeneous institutions, the paper aims to answer the following research question: how do innovation digital platforms navigate competing institutional logics and sustain through time? Answering this research question, arguably, provides a significant contribution to our understanding on the developmental role of digital platforms in the global south to navigate and inscribe multiple institutional logics in systems.

The empirical material informing this paper is a longitudinal study of a particular digital platform called DHIS2. DHIS2 is a web-based free and open-source health management information system developed by the University of Oslo (UiO), Norway. It is considered as a global public good digital platform currently in use by more than 70 countries in the global south including by the Government of Ethiopia. Before the empirical material, a discussion of foundational theoretical framework is presented. Following the theoretical framework, methodology, case description and analysis are presented. Finally, a concluding section, containing discussions of theoretical and practical contributions, is presented.

## **2. Theoretical Framework: Institutional Logic**

Institutional logic is a perspective that has received much attention in IS to analyze the interrelationships among institutions, individuals, and organizations in social systems [12]. Friedland and Alford [13] discuss the presence of multiple institutional orders in a society with a certain logic. Institutional logic refers to a set of material practices and symbolic constructions which constitutes its organizing principles, assumptions, identities, and domain dimensions which is available to organizations and individuals to elaborate on [6]. Field actors then use institutional logic as the organizing principles to select technologies, authorize actors and specify criteria for effectiveness and efficiency [14-15].

Institutional logics are never homogeneous in an organization where multiple logics can be found in play simultaneously [13]. Institutionally pluralistic organizations are not passive agents but navigate and maintain contradictory logics. Thus, heterogeneous actors may draw on different logics and exercise their power to influence decision making processes [16]. Logics can complement and compete [17]. Cooperative logics support each other either through facilitative or additive [17] whereas competitive logics contribute to institutional contradictions which result in change or new account of activities in the organization field [12]. Institutional change is often associated with a change of the dominant institutional logic for the field [18-19]. Once institutional logic becomes dominant, its solutions and issues get the managers attention to influence organizational decisions [20].

Scholars put forward different mechanisms of consolidating divergent institutional logic to bring about institutional change thereby facilitating institutionalization of new logics. For example [12,21] point out structural overlap, event or temporal sequencing, institutional entrepreneurs and competing institutional logic as mechanisms of institutionalization. Scott [22] on the other hand, outlines three mechanisms– increasing returns, objectification and commitments. While increasing returns emphasizes reinforcement of existing institutions and benefits of economies of scale, increasing objectification accounts for the social construction of reality in objectifying and habituating shared beliefs. The main point in objectification is the interplay of actors. Actors interacting together form mental representations of each other's actions that are represented in the form of routines, documents, software tools and best practices. Mechanism of commitment distances itself from the economic gains, for example incentives, and investigates logics that provide commitments. This mechanism emphasizes the role of identity (who am I?) and appropriateness (what is the appropriate way to behave in this situation?)

Thus, the institutional logic concept enables us to understand aspects of complexity such as multiplicity, heterogeneity, coexistence of different logics [12, 14, 23]. Scott [19] identifies three major elements of institutions, where logics are drawn from- regulative, normative, cultural cognitive. Regulative institutions emphasize explicit regulatory processes (e.g. laws, rules and sanctions) that constrain or enable human behavior. Normative institutions refer to organizational or societal norms and values that are seen appropriate for a certain social order and they are invisible. The cultural-cognitive refers to the frames through which individuals perceive objects and activities and how those cultural-cognitive elements shape decisions that bring about institutional change. When applied to technological studies, there is a technological element [24] that creates institutional contradictions and breaks down persistent institutions incrementally or sustains the already existing institutions. Particularly, the inherent nature of digital platforms to live through heterogeneous institutions suits to apply the concept of institutional logic for the case.

However, most of the information systems literature rarely addresses the material dimensions of institutional logics by emphasizing on how various institutional logics influence human attitudes and engage human behavior [25-26]. Technology's inherent affordances and constraints can give the agentic behavior for technology [27]. In the

institutional logics perspective, material agency can be expressed through the inscription of institutional logics into technological artifacts serving as carriers for these logics. The role of technology in institutional logic studies is often passive, and scantily addresses the material agency of the technology [28]. More specifically, there is a lack of an explicit study that shows how digital platforms navigate competing institutional logics and sustain themselves through time. This paper is aimed at filling this knowledge gap by analyzing how the affordances and constraints of digital platforms accommodate multiple institutional logics underlying the DHIS2 implementation. It also shows the tradeoff that is made and technical debt this approach incurred.

### **3. Research Approach**

This paper is developed as part of the Health Information System Program (HISP) longitudinal action research on HMIS in developing countries [29]. It is an interpretive case study of ‘involved researchers’ [30] that explores the history of DHIS implementation in Ethiopia.

The authors have played a central role in the development, customization, and implementation since 2003 in various capacities. While two of the authors were active participants in the customization, implementation and research as full-time employees and master students in the period 2003-2007, one of the authors has been working as a core developer and researcher since 2007. Two of the authors participated in reintroducing DHIS2 to MOH in 2015. Since 2015, the core developer has been working in close collaboration with Ethiopia’s Federal Ministry of Health (FMoH) to incorporate their requirements technically and organizationally.

Data for this paper were chiefly generated as part of our action research engagement, which was complemented by few interviews and document reviews. Particularly, the period 2007-2015 was covered using data from interviews and document reviews. We used 6 interviews that were collected prior to this study, and we conducted one more with a key informant during the write up of this paper. Documents that were reviewed include strategy documents, assessment results, and PhD and Master theses.

Data were analyzed deductively [31] by applying the institutional logic concept on the case description. To do that we first identified opposing logics throughout the history of DHIS2 in Ethiopia. We then discussed the implication to institutional change (institutionalization).

### **4. Case Description: DHIS2 navigating conflicting logics in Ethiopia**

DHIS2 is a free and open-source Health Management Information System (HMIS) platform first released in 2006 by UiO. However, its earlier versions of 1.3 and 1.4 were operational since 1994. These earlier versions - collectively referred as DHIS - were first introduced to Ethiopia in 2003. Following its Scandinavian tradition of participatory design, UiO established a local in-country team called HISP-Ethiopia. The primary task of the team was to support local customizations, implementations, training, and related capacity building activities. To conduct these activities, HISP-Ethiopia signed a memorandum of understanding (MoU) with five Regional Health Bureaus of Ethiopia and one administration city (i.e., Oromia, Amhara, Tigray, Benishangul-Gumuz, and Addis Ababa) from 2003 – 2004. These five regions became DHIS pilot sites from 2004-2007.

Ultimately, the HMIS software was implemented in all public health institutions of the Addis Ababa Health Bureau to capture and report routine health information to a higher level. The remaining four regions were at different stages of customization and implementation activities. However, the FMoH criticized fragmented regional efforts and launched a national harmonized HMIS activity following a principle called “One Plan, One Report and One Budget” [32]. The ministry invited development partners to realize the centralized national endeavor. Three major systems used at that time, Tigray e-HMIS, SNNPR (Southern Nations Nationalities and People Region) e-HMIS and DHIS were evaluated by the National Advisory Committee (NAC) of FMoH. Towards the end of 2007, the NAC announced the rejection of DHIS due to lack of local capacity, mismatch between functionalities and needs as well as technical failures.

After DHIS was abandoned in 2007, the FMoH mandated John Snow, Inc., (JSI) and Tulane University Technical Assistant Project in Ethiopia (TUTAPE) to review, design and implement a new HMIS system. In the end both JSI and TUTAPE developed and rolled out their own brand-new local systems. JSI took the SNNPR while TUTAPE took the rest of the country. These two systems were in use in their respective regions till the end of 2017.

For about a decade, both systems have had the chance to roll out their organizational structures, human resources, work practices and system functionalities. However, for several reasons these systems were far from perfect in the eyes of FMoH users. Some of the problems raised were the FMoH never achieved a harmonized HMIS that it requested back in 2007 when DHIS was abandoned. The FMoH also couldn’t achieve the local capacity to own the systems as they were reliant on JSI and TUTAPE staff. There were several complaints how the FMoH was sidelined when it comes to the technical matters – for example FMoH users asking for JSI and TUTAPE staff to provide them username and password to access the systems; Health Information Technology Directorate (HITD) staff not getting access to the source codes to make minor adjustments to mention a few. In addition, the standalone nature of the e-HMIS systems was not appreciated by FMoH. An informant pointed out these issues as:

*“One of the criteria was, web-based and the systems we had were desktop based. That was the biggest gap between the criteria and the implemented systems. ....based on the criteria the systems lost big scores as they were not web based. The health workers need to transfer files using flash. When the frequency of data exchange is often, for example for PHEM data, it means exchange of flash weekly. The situation was not forward looking we identified this as the biggest gap at that point”*

These and other problems pushed the FMOH to evaluate existing systems and look for solutions or alternatives. One solution tried was acquiring a third integrator system that can generate national level reports from the two systems. However, this also became problematic – first it was expensive and cumbersome to maintain the system, second it forced FMOH users to rely on others to generate reports out of the data they collected.

While both systems were in use, FMOH showed interest in DHIS2 and contacted HISP UiO. HISP UiO was happy to see the interest after a decade and quickly assigned two of its staff – both Ethiopians but based in Oslo – to follow the matter. These individuals traveled to Addis to meet FMOH officials and discuss the way forward including establishing a local team and MoU based collaborations like it was before pre-2007. The FMOH rejected the idea saying we want to evaluate DHIS2 and try it for ourselves first without any bias from external stakeholders. The Ministry used JSI and TUTAPE experience as a reference. One of our informants described the extent of the partner organization dominance as:

*“In previous e-HMIS let alone the source code, even the IT department does not have a password to change the username....” Former directorate, MOH.*

The other informants echoed the partner organization dominance as follows

*“...We asked the partner organizations to hand over the source code...one delivered after the deadline...the other didn't ...”*

These excerpts revealed how much managers were frustrated with the dominance of partner organizations in previous e-HMIS implementations.

However, the problem with this was, the FMOH has no local capacity to do the assessment on DHIS2. Though not an ideal scenario, HISP UiO accepted the FMOH's request and even hired one more local staff to assist on the configuration, testing, training and piloting activities needed for the evaluation. The UiO-hired staff became part of the FMOH team. The team then made the assessment across a number of categories and presented a thorough report to the NAC. The final assessment report ranked DHIS2 with a weighted score of 96.4, JSI's system 72.7 and TUTAPE's 62.3 out of 100.

Once the assessment report was reviewed by the NAC and high-level decision makers of the FMOH, a decision was made for TUTAPE's and JSI's systems to be replaced by DHIS2 throughout the entire country. To facilitate the transition to DHIS2, the FMOH management established three committees – Steering Committee (SC), Core Customization Team (CCT) and Technical Working Group (TWG). The SC was chaired by the state minister which showed the emphasis and urgency given to the task.

Though DHIS2 was given a high score during the evaluation, there was some resistance from users especially on features that they found useful in the old systems but not available in DHIS2. From a usability perspective, features available in DHIS2 were ranked higher. However, because of the tendency to resist changes and the level of learning effort needed on the new system users brought strong resistance. For example, one of the requests was:

*“... we used to see target data sets separately during data entry. Now both target and routine data sets come in the same app. These shouldn't be mixed as they are used by different users and departments”*

The CCT and TWG tried to clarify by saying,

*“... yes they appear on the same app because both are about data entry. You can also select whether to enter for targets or routines. It is also possible to control which user can see and enter which of the data sets”.*

This, however, was not a satisfactory answer to users. Another request asked by users was “in the old system we used to generate reports in the same format as data entry”. The CCT and TWG tried to clarify by saying “data in should not be the same as data out. Once data is captured, you can use DHIS2's pivot table to generate reports in the format you want”. This too was not convincing to the users. Several such demands put a strong pressure on the CCT and TWG teams that they needed to find a solution before the SC was swayed back to the old systems.

These demands required a considerable amount of extension to DHIS2 through system design and development. For fear of lack of capacity, the local team again requested the FMOH to contact UiO for official support and get into some form of MoU but again rejected. The team even got an ultimatum that they need to support the ministry as Ethiopian and technical individuals, not as a UiO staff. The team understood FMOH's position that given the amount of influence of the old systems for so many years, it won't be easy for FMOH to be seen siding with UiO.

However, despite the rejection the local team convinced UiO to hire additional staff arguing there is a good potential for DHIS2 to be adopted as a national system. UiO agreed and hired the fourth team member to work on the technical tasks. One of the HISP Ethiopia members, also part of DHIS2's global core team, got heavily involved in the required design and development tasks. This helped the team to develop all features requested by users – for example creating three data entry apps dedicated for target setting, routine reporting and disaggregated disease reporting; creating a report app based on data entry template; extending DHIS2 for Ethiopian calendar; and supporting on-the-fly data validation to mention a few. These extensions were made possible because of DHIS2's core platform, web API and pluggable web app design logic.

The team was also able to extend DHIS2 for practices that are in complete opposite to established practices of UiO and HISP – especially on the need to collect minimum vs maximum data sets. For example, one of the monthly excel templates has about 800 rows to be filled. At the time of converting the template to DHIS2 form, HISP UiO experts advised for revising the form and focus only on minimum actionable data points. But the FMOH rejected the advice and ordered for all the data points to be included and made mandatory so that the form won't be considered complete and acceptable if a single data point is left blank. The technical team went outside their established logic and redesigned DHIS2 as per the FMOH needs. However, soon after users started data entry, the mandatory logic created a problem - because users have no data on many of the rows, but the form asks them to put something. Instead of reducing the form to only available dataset, the Ministry asked for a solution of bulk inserting zero values for those data points users have no information. With no way out of the disagreement, the team implemented the solution as per the request but tried to argue using some statistics where more than 70% of the collected data has zero values. But the ministry insisted on collecting maximum data despite being zero.

These developments were big achievements that convinced users that DHIS2 is a good system for them. Users also took this opportunity to ask the local team to develop additional features that were not part of TUTAPE's and JSI's systems. The team developed as requested. Some of them – for example aggregation type and data set report – were even found to be useful for other countries and adopted into the global DHIS2 nu HISP UiO.

Equally important to the development task was metadata configuration and training that were again spearheaded by the local team. The training and hands-on metadata configuration enabled FMOH users to make configurations as they see fit, decide what to collect and generate reports as per their needs. Finally, DHIS2 was adopted as a national HMIS by the end of 2017. It got rolled out across the country both as an online (where there is internet connectivity) and offline (where there is no connectivity) system. Since then, more than 6000 users were trained, close to 300 million records of data were collected by more than 35,000 organizations throughout the country. It was a big success to see such figures. For FMOH, it gave an opportunity to give official recognition and legitimacy to UiO, HISP Ethiopia team and the DHIS2 platform. For UiO, seeing DHIS2 as a national system was a big success and motivation to support the FMOH more. In 2019, two FMOH staff were invited to Oslo to attend the annual DHIS2 conference where users are allowed to gather and establish a network, share experience, present their achievements and challenges as well as vote on features that need to be included in the upcoming DHIS2 milestones and releases.

The 2020 COVID crisis was also another opportunity for the FMOH to give more recognition to the HISP Ethiopia team and UiO. When the crisis hit, few at the Ministry had the idea of how to manage data collection, notification, tracking and reporting challenges needed to contain the outbreak. Many DHIS2 using countries were able to respond quickly by using the DHIS2 tracker module and COVID-19 surveillance packages developed by HISP UiO. The HISP Ethiopia team adopted the packages by making the necessary localizations. The team even developed four additional apps that assist on bulk importing, SMS notification, certificate generation and validation. FMOH wouldn't have been able to achieve these without the support of UiO and its HISP team in Ethiopia. This convinced FMOH to get into official recognition by signing the long-resisted MoU. The MoU was signed by the state minister on March 09, 2021. Currently the FMOH and UiO are in conversation to develop a joint project by outlining a scope of work that needs to be conducted for the FMOH to upgrade its DHIS2 to the latest versions. The following table summarizes the major events and key stakeholders involved in the HMIS digitization of Ethiopia.

**Table 1.** Major events and stakeholders in digitizing the HMIS of Ethiopia

Period	2003 – 2007	2008 - 2014	2015 -
Stakeholder	HISP / UiO, JSI	TUTAPE, JSI	HISP / UiO, JSI
Major events	Customization and implementation of DHIS 1.3 & 1.4 in five regions.  DHIS2 presented as a national solution	e-HMIS was developed locally and implemented at a national level  JSI had own system in one region	DHIS2 customized and implemented nationally in collaboration with JSI

## 5. Analysis and Discussion

Institutional logics are rarely homogeneous; within an organization, multiple logics may be simultaneously in play, contributing to institutional contradictions that bring change in the field [13]. Similarly, the story of DHIS2 in Ethiopia shows several conflicts that the local team, FMOH decision makers, HISP UiO management and DHIS2's material affordance were able to collectively navigate for a successful outcome. It shows the importance of overcoming "design-reality gap" and skillfully accommodating what is required in specific local situations even if what is needed is outside one's established logic.

Throughout the history of DHIS2 implementation, heterogeneous institutional logics were found to compete and at times collaborate [17]. Of these, the policy plan logic based on the one plan, one report and one budget principle was the dominant one.

From the early story of DHIS2 – versions 1.3 and 1.4 – it was evident how its materiality and flexibility were relatively weaker to accommodate the needs of the FMOH. There was a gap along the technical, managerial and policy level, especially with regards to the one plan, one report and one budget institutional logic. Being a system developed in the North and taken to the South, one would also expect a mismatch and conflict of institutional logics [33]. Failure to accommodate the dominant institutional logic led to outright rejection.

JSI and TUTAPE systems, though developed in-house from scratch, were also rejected for their failure to accommodate emerging logics. This shows, the issue is not really whether a system goes from North to South, rather flexibility and material affordance to accommodate emerging logics. These logics are not just technical, but also organizational. For example, not granting FMOH user's full access to the national HMIS system is not technical but managerial that gave TUTAPE more control. System administrators from TUTAPE, not FMOH, had full control on who could use and operate the system. There were also other situations, for example FMOH users not able to generate their own reports but rely on others and HITD technical staff not getting access to the source code to make some adjustments as seen fit by the FMOH. These instances show the temporal nature of institutional logic and that once dominant logic could be secondary or unimportant at other times.

To overcome dominance of partner organizations experienced in the locally developed e-HMIS solutions, the policy plan logic emphasized on "use in-house IT capacity" to DHIS2 customization. This "use in-house IT capacity" for design aimed to put FMOH on the driver's seat. On the other hand, the decision didn't allow for having formal relations with HISP through establishing the HISP-Ethiopia team. This has limited the number of HISP staff required to support the implementation. From the HISP perspective, this was not about dominating but following the Scandinavian tradition of participatory design. Here the policy plan logic clashes with DHIS2 logic which often uses global-local DHIS2 experts' collaboration to satisfy the countries' local requirement.

Institutional logic contradiction is not always resolved but sometimes it needs to be acknowledged [34]. HISP didn't argue but quickly recognized the position of FMOH and accommodated the ministry's logic and went ahead without establishing local HISP Ethiopia team and MoU. As a result, the technical team with limited local HISP staff had been soon challenged by the lack of DHIS2 competence mainly regarding code level customization that directed to include few more HISP members informally that enabled them to address the ministry's unique. With these informal relations with HISP enabled to address the current need of DHIS2 competence to implement DHIS2 and alleviated the MOH dominance concern. On the same vein, HISP has got an opportunity to implement DHIS2 in Ethiopia and gained recognition from the sector.

Another important aspect of DHIS2's materiality was its affordance to inscribe conflicting logics. DHIS2 is designed along the assumption of minimum dataset and single flexible app per functionality. However, for the system to be acceptable by FMOH users and be useful in their work practice, the local team had to go outside the DHIS2 logic and redesign DHIS2 based on the maximum dataset and multiple distinct apps for a single functionality as seen for target setting, routine reporting and disaggregated disease registration. Here, HISP accommodated the policy plan logic, maximum data set, and inscribed in DHIS2 to satisfy users that contradicted with DHIS2 logic assumption.

Following the widely use of the routine DHIS2 which was configured according to the logic of policy and plan, health experts had begun complaining for the inadequacy of DHIS2 to address their specific and detailed information needs. Health experts required, health program specific detailed and/or case-based information to monitor, plan and evaluate the performance of the health service for their respective health programs. Thus, they forwarded their information need to CCT as well as to the HISP staff to be inscribed in DHIS2. Given to DHIS2's flexibility and affordance feature, the CCT team, who were convinced with the importance of health expert information needs, enacted the health expert logic. The health experts' information needs such as PHEM and covid19 were addressed in DHIS2.

Furthermore, DHIS2 has given users absolute control of what to collect and report in the format they needed without relying on other actors. Health experts appreciated the fact that they could generate their own reports and perform analysis in DHIS2 without needing assistance from external stakeholders. Thus, DHIS2 became the collaboration logic to bring both the health experts and the policy experts into one to produce standardized program specific DHIS2.

In addition to this, partner organizations, who often worked in specific health programs expressed their interest to develop data quality apps. Accordingly, various data quality apps such as score card, bottle neck analysis had been developed and deployed with DHIS2 platform. Exploiting the affordability of DHIS2 and the commitment of HISP staff, several apps were developed and deployed in the sector. Ultimately, addressing the major actors' logics underpinned in DHIS2 implementation due to the affordability and flexible feature of DHIS2 and HISP staff commitment. This has convinced MOH to establish formal relations with HISP UiO to be able to address the emergent health sector needs.

In general, the study revealed how DHIS2's material and organizational affordance has facilitated institutions to navigate and enact multiple logics through time. This was observed during the (re)design, customization and implementation of DHIS2 as well as its sustainability in the country. The case analysis shows how different mechanisms were used to bring about the sought institutional change in the e-HMIS landscape of the country. Particularly, mechanisms of commitment [22] and managing competing institutional logics through time [12, 21] were heavily drawn upon to reintroduce and sustain DHIS2 in Ethiopia. However, these mechanisms would not be sufficient without a flexible platform.

Institutional change is often associated with a change of the dominant institutional logic in the organizational field [35-36]. On the contrary, our analysis shows how institutional change happened, while the dominant logic remains stable, experiencing minor adjustments to accommodate health experts and DHIS2 logics.

## 6. Conclusions

There has been sufficient IS research that uses institutional logic as a concept to explore the embedded exogenic forces that influence the implementation and use of IT based innovations. However, there has been little focus on the role the platform plays to navigate through heterogeneous institutional logics. This paper shows how the flexibility of a platform helps converge divergent logics through time and commitment. It contributes to the little discussed fourth institutional element – IT as an institution.

The paper challenges the taken-for-granted assumption that institutional logic clashes are particularly pertinent when technological innovations are translated from North to South. It shows how a home-grown software that is coded from scratch, in the hope of addressing contextual needs, failed for an innovation platform that is robust enough to accommodate embedded and emerging logics. If innovation platforms are to achieve their developmental goals, they need to acknowledge the presence of heterogeneous institutional logics in the platform ecosystem and platforms need to be designed enabling navigation through these logics.

While our study provided empirical and theoretical understanding on the role of the platform in managing heterogeneous institutional logics, we noticed accommodating institutional logic comes with an opportunity cost of accumulated digital debt. Further research might be required to understand the link between institutional logic and digital debt.

This study is limited to identifying the institutional logics of HIS implementation in Ethiopia at macro level. Thus, the findings may not adequately reflect each case's micro level institutional logics contradictions. A more detailed longitudinal study of both cases would be relevant to unravel implementations' challenges at various stages of implementations due to the dynamic and complex nature of the health sector.

## 7. Reference

- [1] Heeks, R. (2020). ICT4D 3.0? Part 1—The components of an emerging “digital-for-development” paradigm. *Electronic Journal of Information Systems in Developing Countries*, 86(3), 1–15
- [2] van Biljon, J., Marais, M., & Platz, M. (2017). Digital platforms for research collaboration: using design science in developing a South African open knowledge repository. *Information Technology for Development*, 23(3), 463–485.
- [3] Walsham, G. (2020). South-South and triangular cooperation in ICT4D. *Electronic Journal of Information Systems in Developing Countries*, 86(4), 2–7.
- [4] Masiero, S., & Nicholson, B. (2020). Competing logics: Towards a theory of digital platforms for socio-economic development. In *International Conference on Social Implications of Computers in Developing Countries* (pp. 3–13). Springer, Cham.
- [5] Bonina, C., Koskinen, K., Eaton, B., & Gawer, A. (2021). Digital platforms for development: Foundations and research agenda. *Information Systems Journal*, 31(6), 869-902.
- [6] Berente, N., & Yoo, Y. (2012). Institutional Contradictions and Loose Coupling: Post Implementation of NASA's Enterprise Information System. *Information System Research*, 23(2), 376–396.
- [7] Boonstra, A., Eseryel, U., & Offenbeek, M. (2017). Stakeholders' enactment of competing logics in IT governance: polarization, compromise or synthesis? *European Journal of Information Systems*.
- [8] Koskinen, K., Bonina, C., & Eaton, B. (2019, May). Digital platforms in the global south: foundations and research agenda. In *International conference on social implications of computers in developing countries* (pp. 319-330). Springer, Cham.

- [9] Familia, B. (2020). Bolsa Familia CAIXA (Version 2.4.0) [Mobile application software]. Retrieved from <https://apps.apple.com/br/app/bolsa-fam%C3%ADlia-caixa/id1036174679>
- [10] Bright, J. (2022, April 15). Diving deep into Africa's blossoming tech scene. Retrieved from <https://social.techcrunch.com/2019/05/31/diving-deep-into-africas-blossoming-tech-scene/>
- [11] Ghazawneh, A., & Henfridsson, O. (2013). Balancing platform control and external contribution in third-party development: The boundary resources model. *Information Systems Journal*, 23(2), 173–192.
- [12] Thornton, P. H., & Ocasio, W. (2012). The institutional logics perspective: A new approach to culture, structure, and process. In & R. S. R. Greenwood, C. Oliver (Ed.), *The Sage Handbook of Organizational Institutionalism*. Oxford, UK: Oxford University Press.
- [13] Friedland, R., & Alford, R. (1991). Bringing Society Back In: Symbols, Practices, and Institutional Contradictions. In W. W. Powell & J. D. Paul (Eds.), *The New Institutionalism in Organizational Analysis* (pp. 232–263). Chicago: University of Chicago Press.
- [14] Greenwood, R., Raynard, M., Kodeih, F., Micelotta, E. R., & Lounsbury, M. (2011). Institutional complexity and organizational responses. *Academy of Management Annals*, 5(1), 317–371.
- [15] Lounsbury, M. (2002). Institutional transformation and status mobility: The professionalization of the field of finance. *Academy of Management Journal*, 45(1), 255–266.
- [16] Gregory, R. W., Keil, M., Muntermann, J., & Mähring, M. (2015). Paradoxes and the nature of ambidexterity in IT transformation programs. *Information Systems Research*, 26(1), 57–80.
- [17] Goodrick, E., & Reay, T. (2011). Constellations of Institutional Logics: Changes in the Professional Work of Pharmacists. *Work and Occupations*, 38(3), 372–416.
- [18] Greenwood, R., Suddaby, R., & Hinings, C. (2002). Theorizing change: The role of professional associations in the transformation of institutionalized fields. *Academy of Management Journal*, 45(1), 58–80.
- [19] Scott, R. (2001). Institutional change and healthcare organizations: From professional dominance to managed care. In *Institutions and organizations* (2nd ed.). SAGE PUBLICATION
- [20] Thornton, P. H. (2004). *Markets from Culture: Institutional Logics and Organizational Decisions in Higher Education Publishing*. Stanford: Stanford University Press.
- [21] Jepperson, R. L. (1991). “Institutions, Institutional Effects and Institutionalism.” Pp. 143–63 in *The New Institutionalism in Organizational Analysis*, edited by Powell, Walter W., DiMaggio, Paul. J.. Chicago: University of Chicago Press.
- [22] Scott, R. (2008). Approaching adulthood: The maturing of institutional theory. *Theory and Society*, 37(5), 427–442.
- [23] Grisot, M., & Vassilakopoulou, P. (2013). Infrastructures in healthcare: The interplay between generativity and standardization. *International Journal of Medical Informatics*, 82(5), e170–e179.
- [24] Fossum, S. (2016). An institutional perspective on health information systems’ standardization: multiple case studies. University of Oslo, Norway.
- [25] Raaijmakers, A., Vermeulen, P. A., and Meeus, M. T. (2018). Children Without Bruised Knees: Responding to Material and Ideational (Mis)Alignments. *Organization Studies*.
- [26] Reay, T., & Jones, C. (2015). Qualitatively capturing institutional logics. *Strategic Organization*, 1–14.
- [27] Leonardi, P. M. (2011). When Flexible Routines Meet Flexible Technologies: Affordance, Constraint, and the Imbrication of Human and Material Agencies. *MIS Quarterly*, 35(1), 147–167.
- [28] Avgerou, C. (2003). IT as an institutional actor in developing countries. *The digital challenge: Information technology in the development context*, 1, 46–63.
- [29] Braa, J., Monteiro, E., & Sahay, S. (2004). Networks of Action: Sustainable Health Information Systems Across Developing Countries. *MIS Quarterly*, 28(3), 337–362.
- [30] Sahay, S., & Walsham, G. (1995). Information technology in developing countries: A need for theory building. *Information Technology for Development*, 6(3–4), 111–124.
- [31] Burnard, P., Gill, P., Stewart, K., Treasure, E., & Chadwick, B. (2008). Analysing and presenting qualitative data. *British Dental Journal*, 204(8), 429–432.
- [32] FMOH. (2010). *Health Sector Development Program: 2010/11 -2014/15*. Federal Democratic Republic of Ethiopia Ministry of Health (Vol. IV). Addis Ababa, Ethiopia.
- [33] Masiero, S. (2016). The origins of failure: seeking the causes of design–reality gaps. *Information Technology for Development*, 22(3), 487–502.
- [34] Hanseth, O., & Bygstad, B. (2015). Flexible generification: ICT standardization strategies and service innovation in health care. *European Journal of Information Systems*, 24(6), 645–663.
- [35] Scott, R., Ruef, M., Mendel, P., & Caron, C. (2000). Institutional Change and Healthcare Organizations: From Professional Dominance to Managed Care. *Administrative Science Quarterly*, 427, 384–387.
- [36] Suddaby, R., & Greenwood, R. (2005). Rhetorical strategies of legitimacy. *Administrative Science Quarterly*, 50(1), 35–67.