HUMANITARIAN HEALTH INFORMATION SYSTEMS: DIFFERENT CHALLENGES AND RESPONSES

Research paper

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Abstract

The role of humanitarian organizations is becoming increasingly vital in a world characterized by conflicts, natural and man made disasters, and disease epidemics. For these organizations to become more effective, they need robust supporting information systems. These systems are complex to design and use for two reasons. One, the context is unstable, unpredictable and extremely dynamic. Two, the methods for design of these systems typically follow structured methods assuming routine information systems. There is thus a mismatch resulting in emerging contradictions, which in the short-run have adverse consequences, but in the longer run provide the potential for positive change. Theoretically, we draw upon some concepts from institutional theory, such as institutions, logics and contradictions to understand what are the emerging contradictions, why do they occur, and what can we do about them. Empirically, we study a large humanitarian organization (MSF), and analyze some of their processes around the design and development of their "humanitarian health management information system." We identify contradictions arising from various technical, institutional and contextual conditions, and analyze how the potential for change carried in them can be positively leveraged upon.

Keywords: humanitarian organizations, HIS, institutional logics, contradictions, change

1 Introduction

The importance of reliable information in humanitarian interventions is heightened as the number of people affected by humanitarian crises has almost doubled over the past decade and is expected to keep rising (MSF Spain, 2014). Reliable information, that which is complete, timely, and without errors, tends to be at a premium given the context of uncertainty coupled with the need for swift reporting and response. This heightens the need for effective access to reliable information to address challenges arising through the unstable and changing environment of humanitarian interventions, which requires rapid decision-making and response. The absence of this could potentially result in wrong decisions, slow reactions that could adversely impact upon the well-being and lives of people. A recent study of the humanitarian system´s performance published by the Active Learning Network for Accountability and Performance in Humanitarian Action (ALNAP) pictures a humanitarian system that has expanded its operational modalities, but not its operational capacity, including its information systems (ALNAP, 2015). Despite increased investments in technologies, commensurate improvements are not reflected in results, especially related to coverage and capacity of the supporting information system (MSF Spain, 2016).

Humanitarian organizations operate in both short and long-term interventions. Short term or "emergency interventions" typically require a response in less than 72 hours to natural disasters, man-made emergencies such as armed conflicts, industrial accidents, or disease outbreaks. There are also protracted social conflicts (Azar, Jureidini, & McLaurin, 1978) involving complex contexts contributed to by a

combination of natural and man-made elements and different causes of vulnerability emerging not from one unexpected isolated event. Such long-term activities evolve into "regular interventions". Response to emergencies inevitably involves the coordination of multiple actors requiring effective interagency information management (Altay, 2014). In the quest for inter-agency coordination, the need for examining the effectiveness of an agency's internal information system tends to be marginalized (Miskovich (2013). Strengthening this focus is a primary aim of this paper.

Challenges to information management in humanitarian organizations come from the unpredictability of needs, multiplicity of interests, unique structure of the organizations, inadequate funding, limited technological infrastructure, and organizational secrecy and exclusivity requirements (Tafere, 2014). While activities of a global humanitarian organization in a country are defined by particular needs in the field, interventions need to be approved and followed up by the headquarters level of that organization. This raises the need for the Health Management Information System (which we refer to as HHMIS – humanitarian health management information system) to adhere to needs for a certain degree of integration and standardization, to ensure completeness and quality in data collection and use. Therefore, this HMIS needs to have a structural stability and routine processes of what data to collect, when and by whom. However, this need contradicts with the reality of the humanitarian setting where the context is uncertain and by definition cannot be well structured, and at best is semi-structured, and very often unstructured. This mismatch creases technical and institutional contradictions, which is currently under-researched in terms of both the challenges they raise and the potential opportunities they provide to strengthen the HHMIS. This paper thus explores the following research question:

> *What are the inherent contradictions between routine HHMIS and the information needs of a humanitarian organization, and what challenges and opportunities come with them?*

Empirically, we address this question in the context of Doctors Without Borders / Médecins sans Frontières (MSF), a global humanitarian organization which have been engaged in strengthening their supporting HHMIS, with a view to improve support for the effectiveness of their interventions. We adopt an institutional theory perspective to understand the nature of the contradictions and what we can do with them. This paper makes important contributions to theory and practice. Firstly, it seeks to bring to the forefront the problem of information systems in humanitarian organizations, which has to date been largely ignored in IS research. By helping to strengthen the HHMIS through a theoretically informed approach, we expect to contribute to improving the efficacy humanitarian interventions and potentially improve the lives of affected people. This helps to engage with Walsham's (2012) question of "Are ICTs making the world a better place for us to live?"

The rest of the paper is organized as follows. In the next section, we discuss our institutional theory informed analytical framework. Sections 3 and 4 describe research methods and the case study respectively. In section 5, we present our case analysis and discussions, followed by a brief concluding section.

2 Institutional Theory as a Theoretical framework

North (1990) describes **institutions** as "the rules of the game" (North, 1990) and organizations as the players. An **organizational field comprises** those organizations that, in the aggregate, constitute a recognized area of institutional life (DiMaggio, 1983). Such a conceptualization entails organizational and societal levels in the study of social and community change (DiMaggio, 1986). **Organizations** are not passive entities controlled by the environment but are active players capable of responding to environmental pressure (Orlikowski & Barley, 2001) emerging from the organizational field.

Avgerou (2002) argues that technology, on its own, can be considered an institution that can influence adequately the process of transformation of organised activities in society. Piotti et al (2006) extend the idea of the organizational field also to include the role of ICT and the formal and informal practices that surround their use in organizations. We understand the IS as the institution, and its users as independent actors, shaping organizational behaviour, emphasizing the role of human agency to influence the

institution. Drawing from the concept of organizational field as an interactive network, we introduce **institutional logics** as the organizing principles that supply guidelines to actors, guiding both, the means and ends of individual behaviour (Friedland & Alford, 1991). Institutional logics are not necessarily homogeneous; they are multiple, and could be simultaneously in play and not in synch, often contributing to **institutional contradictions** (Friedland & Alford, 1991).

Our case study is of the deployment of a HHMIS in a medical humanitarian organization, where in **the field**, operations are managed at two levels, the projects, where the intervention takes place physically, and the coordination office, usually at the capital of the country, where the intervention is managed. From **headquarters,** field interventions are followed up and supported, drawing upon varying levels of real-time access to information. While the operations department works more transversally to support every intervention as a whole, the medical department, with specialised health professionals, focusses to guarantee standards and quality of medical activities. We position the HHMIS as the institution, representing a common working tool that all actors use for performing their activities, while being engaged with the different influences from the organizational field. The HHMIS imposes on and is also influenced by different institutional logics, which sometimes is in synch and at other times creates contradictions. We outline the concepts used in our theoretical framework in Figure 1.

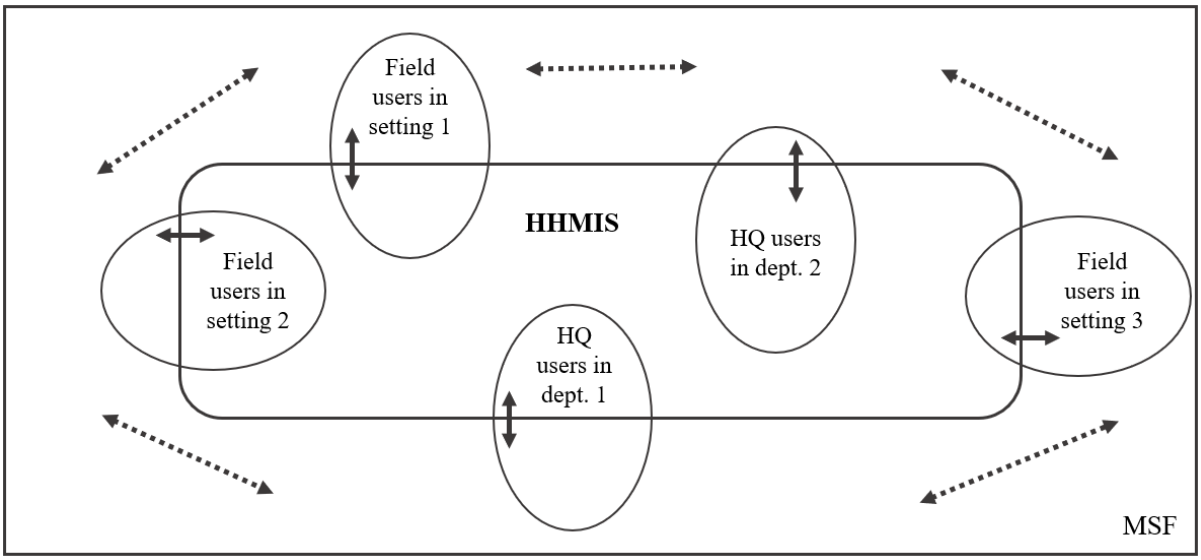

Figure 1 – The Organizational Field

The main rectangle encompassing all elements represents the organizational field. In our case study, it represents MSF performing humanitarian interventions globally. The ellipses represent different groups of users from the field settings and headquarters. Health data needs act as independent agents with capacity to individually respond to and influence the institution. The HHMIS, the institution, is represented by the rounded rectangle in the middle, touching the whole organization, with various overlapping influences. Different grades of overlap represent the level of response of the functionalities of the HHMIS to each particular use-case. Where the system and particular information needs collide represent the competing logics and the institutional contradictions (depicted by the homogeneous short arrows). When contradictions occur, users try to adapt the system to their needs and as independent agents, influence the evolution of the system, and through this interfere with other user logics (represented with the discontinuous arrows). The organizational field provides the space where the interplay of competing logics evolves to the benefit or detriment for the other actors.

We propose this framework of concepts as a foundation for understanding the underlying nature and reasons for emerging contradictions. As stated by Stratton et al. (2016) contradictions can result in processes of change. This assumption guides us to empirically identify examples of competing logics, the contradictions they create, and how this influences the resulting evolution, reflecting change or stability.

3 Research Setting and Methods

3.1 Researcher positioning and research setting

The research setting encompasses the project of design and implementation of a HHMIS in MSF, an international medical humanitarian organisation that delivers emergency aid to people affected by armed conflict, epidemics, and natural disasters. It offers assistance to people based on need, irrespective of race, religion, gender or political affiliation (MSF Association, 1995). MSF supports field operations worldwide across the five continents and has been active for more than 40 years. MSF operates interventions in many different countries. Every country has a coordination office, usually based in the capital, from where a number of projects (2 to 5 approximately) are coordinated. Projects have their own sub-coordination offices. At the moment of writing this paper, MSF is operating 26 long-term interventions in addition to three short-term emergency projects.

The first author was part of MSF headquarters from August 2013 to February 2017, during which she worked as an information systems specialist working on tasks of requirements gathering, design and deployment of the global HHMIS. In this role, she was visiting field sites, designing and building systems, and supporting their global rollout. This work was not initially part of a research project but has with time now become part of her PhD work, which she formally started in August 2017. MSF has provided support and access to the first author to conduct the research, positioning her as an "insider" researcher (Walsham, 1995). This paper is based on reflections from that exploratory period at MSF. The other author is the research supervisor of the first author. Over the last year, she left her formal role at MSF and enrolled as a PhD researcher allowing her to research activities she was previously engaged with, from the "outside". The second author has supported processes of reflection and theorization of concepts and linking them with the empirical experiences. Being on the "outside", he has helped provide a degree of "objectivity" and "neutrality" to the interpretive process. Developing this paper is our first combined attempt to link theory, experience and practice.

Research design: The study is interpretive in that the focus is to understand the limitations in the adoption of a health information system in an organization from the perspective of the subjective interpretations of users, based on a retrospective case study. Case study is appropriate since the problem under investigation is practice-based, where the experiences of the actors within situated contexts are important. The case study strategy helps observe the adoption of the system in different settings (countries) and allows to compare and contrast the challenges shaped by the context in shaping the implementation of the information system. The cases involve varying contexts in terms of volume of intervention, local context, individual capacities, and technological settings. The study is multilevel in that action happened at all levels of the organization ranging from the headquarters to project setting, during the period 2013 – 2016.

3.2 Data Collection and analysis

Data collection was not formal, but an engagement of the first author with everyday work, while actively participating in the project at multiple levels. System design happened during the early phases of the project, during which semi-structured interviews were conducted, and observation notes made of activities. Additionally, while studying the headquarters practices, participant observation in meetings of the Medical and Operations department was also conducted. This included coordination meetings, system design workshops, internal project team meetings, and capacity building activities. In addition to the work in the headquarters, during the deployment phase the researcher performed field visits to four countries with twelve projects, actively participating in organizing and performing all deployment related activities.

Field and headquarters users in humanitarian organizations are difficult to access, due to limited resources and existing ones being overworked. Day to day work is dynamic and unpredictable, characterized by multiple travels and high turnover. The spirit of collecting feedback whenever possible was very

strong and was collected at different phases of the project. This feedback helped provide different perspectives of the users to different issues, allowing comparison across people and use cases.

Secondary data analysis was based on study of documents from different sources, including project reports. The researcher created a process documentation of projects which described on-going project challenges and potential risks. This has been very useful to reconstruct the processes and methodologies followed in the project. Field visit reports, used to collect relevant information in each country during the roll out, were also a rich source of information for identifying the particularities and challenges of each setting. Meeting notes were used to support the chronological reconstruction of events.

Data analysis followed an interpretive process in which we tried to holistically make overall sense of the empirical experiences, including the challenges experienced during design, configuration and deployment of the HHMIS, and relating them to theoretical concepts. Gradually, by moving iteratively from discussions to documentation and theory, concepts evolved giving more coherence and naturally grouping into themes which represented the main challenges faced in the project. Interesting events were discussed and developed by the authors to identify examples that clearly illustrate the themes. These examples were developed as vignettes to illustrate key practices or events relevant to the analysis (Kotlarsky, Scarbrough, & Oshri, 2014). A vignette "has a narrative, story-like structure that preserves chronological flow and that is normally limited to a brief time span, to one or a few key actors, to a bounded space, or to all three" (Miles, Huberman, & Saldana, 2013).

Having an insider and an outsider researcher doing a retrospective study resulted in many conversations between the authors, including story-telling where the "inner" researcher had to reflect on her thoughts and develop rich examples to underpin her statements. The representation of the conflicting logics through encapsulated vivid examples evolved naturally into vignettes, which became the primary vehicle for the analysis, highlighting challenges faced in the design and adoption of the HHIS in the organization. The next section on case findings is presented through the vehicle of vignettes.

4 Case findings

To strengthen follow up of its medical interventions in the field, MSF initiated a project to change its information system from a set of Excel spreadsheets to a centralized web-based health information system, based on the District Health Information System platform (DHIS2). DHIS2 is an open source software platform for reporting, analysis and dissemination of data for health programs. It is developed and maintained by the Health Information Systems Programme (HISP) in the University of Oslo (UiO), supporting its use in more than 70 countries and more than 60 international organizations like MSF.

DHIS2 has been configured and adapted by MSF in terms of content, functionality and technical architecture for being the HHMIS used at the headquarters and field level. The system collects and reports aggregated data from most of their medical activities and is accessed by all projects and coordination offices in the field and medical and operations department at headquarters. All users have access to the same generic configuration and specific modules available depending on the services provided at the facilities and the types of users. At the project level, data is collected in health facilities, then aggregated and introduced into the system. This happens in an offline instance that guarantees access to data independent from the availability of Internet connection. From there, data is periodically sent up to the coordination office where it is validated and imported in an online server. Coordination offices and HQ have access to that central server through the Internet.

The design, implementation and deployment of the described system encountered several challenges, which we illustrate through 3 vignettes. Through these, we describe the contradictions between the intrinsic characteristics of the HHMIS and the particular requirements of information (referred to as use cases), and how those contradictions led to change or carried the potential for change.

4.1 Vignette 1: complex design methodology in a "hectic" and dynamic setting

The process of data modelling and design process was led by two health data technicians and one epidemiologist, and included the following aspects: i) data flows from collection to integration and analysis (*organizational aspects*); ii) standardization of nomenclature of data being collected across existing legacy systems (consisting of 21 Excel files) currently in use in the field (*data source aspects*); and, iii) the rationalization of information to be collected to support decision making (*information needs*). The intention was to reconcile the three inter-related aspects of the HHMIS in order to more completely satisfy the information needs, while minimizing data collection workload at field project levels.

The process of gathering information requirements involved active participation from users from the field and the headquarters. In the first step, users were asked to go through all the indicators present in the legacy system and provide information about which managerial decisions they made on their daily activities based on the information provided. The second step consisted of designing an abstract model of information requirements by adapting the i* modelling language suitable for early phase of system modelling. The methodology was applied because one member of the team had positive experience in using this technique, which however in hindsight was seen to be ill-suited to the context of MSF.

Using this methodology, one model was generated to represent every health service such as external consultations, hospitalization ward, emergency room or operating theatre. Each model was a graphical representation of the relations of their internal processes, goals and information required to measure the achievement of the goals (information needs). To help illustrate the idea, the legend used for the models can be seen in Figure 2. The last step was to share the models with all users to comment on its suitability.

To obtain feedback, in addition to the medical managers in headquarters, a group of nine medical staff from the field with experience in coordinating interventions were selected to participate. The first step planned was to conduct a two-day workshop with them to share the models and have an open discussion in person; however, it was not possible due to their lack of availability to travel to headquarters. It was then decided to share the models and encourage the discussion online, with users given a period of 1 month to share their feedback. During that period, the team at headquarters in charge of the design was available for support through email or Skype (or in person for those in the headquarters).

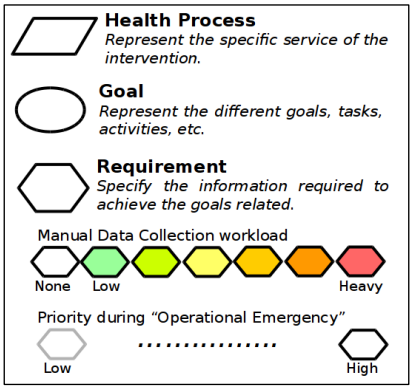

Figure 2 - Legend for the i models*

The overall participation of users in the process was below the minimum required to make informed design decisions. The medical referents in headquarters adopted successfully the upper three levels of the representation (health process, goal, requirement), but were unable to use the two layers in the lower level (data collection workload and priority in emergency), crucial for designing a dynamic and flexible system. Secondly, after the model was distributed to the participants from the operations department (field and headquarters), feedback was very weak in terms of the number of responses and the comprehensiveness of their inputs. After the model was distributed to the participants from the operations

department (field and headquarters), feedback was very weak in terms of the number of responses and the comprehensiveness of their inputs. Despite several communications to encourage participation, limited response was received, and so was the requests for online support. A field medical coordinator commented that every time she decided to work in this task, when she understood what had to be done, she did not have time to do it anymore.

In retrospect, the methodology selected was inadequate, as it required the ability of users to think of information conceptualized in modular representations. In addition, this type of activity cannot be done in a fragmented manner, requiring quality time and specific dedication. The users did not have the expertise of using modelling languages or the time required to engage resulting in inadequate feedback. Consequently, the resulting system design could not meet the goal of minimising data collection to only those indicators that supported decision making. The resulting system was designed by keeping almost the same amount of existing information, resulting in limited change.

The methodology and approach followed by the design team contradicted with the institutionalized routines of the users and their skill sets, and set the basis for further challenges. A positive outcome of this process was the building of realization of the HHMIS team on the need to find adaptive mechanisms to engage with the users.

4.2 Vignette 2: Real-time information in offline settings

Timely consolidated analysis of health data from the field by headquarters demands close to real time access to information. At the project level, where data is generated, it is rare to find reliable internet connections with sufficient bandwidth, eliminating options to use a web-based system which can facilitate real time access. To overcome this limitation, the architecture proposed was to have a local server in every field project, and at the end of the reporting period (day, week, month); each project will send their data to the coordination level, in charge of validating it and uploading it to the central server, where it can be accessed by headquarters.

The intervention we refer to in this vignette is of a country that has suffered prolonged armed conflict, making it difficult for expatriate teams to operate. The project office was then placed in the nearest border of a neighbouring country to coordinate required medical activities which were implemented in-country by a local team. This led to having two teams and two project offices.

The original architecture designed included one offline server at the project level which could not respond well to this situation, as two servers were required, one each in the field project offices. This added one more manual step of exporting/importing data across the servers, which could not be automated due to internet constraints. The external team considered this would introduce a risk of having data going directly from the internal team to coordination without passing through them and decided that the offline server will only be installed at their office outside the border.

After the system was running for some months, staff in the coordination office were collecting data twice, first in the in-country office in Excel files, and then from there to the new HHMIS in the office outside. This introduced delays and an extra data collection step, which was opposite of the intended purpose. This situation made the medical coordinator of this country to say that entering data in the offline server was like having data in a heavy suitcase that she had to haul with me her in case of evacuation. She couldn't imagine herself in an evacuation saying, "don't forget the HHMIS!"

This example reflects the contradiction between headquarters needs, field technical limitations and software architecture. In-country coordination office and headquarters required close to real time data, but there was no internet access at the project level, where data was generated. The resulting complex technical architecture was not agile for the field staff, and inadequate in performance. It was difficult to invest in improving the offline capabilities of the system before demonstrating that it was functional for the organization. Even not being perfect, the architecture described was deployed and is working since August 2015.

When a second partner section of MSF selected the same software for their operations, having an example of a working system, helped justify further investment in improving offline functionalities of the DHIS2 software. They decided to invest in developing a synchronization module for DHIS2 in collaboration with the University of Oslo, which later evolved into a generic functionality of DHIS2. Having automatic synchronization between offline and online servers, reduced the manual steps and the system became more agile with data being automatically sent whenever internet connection was available. This maximized availability of "as real time data as possible.".

4.3 Vignette 3: Stable population figures for displaced populations

The population targeted in humanitarian interventions fluctuates due to unstable contexts and forced displacement of people. The MSF HHMIS, initially, was collecting population figures on a yearly basis at project level on the assumption of a stable population which was reflected in the software configuration.

In a project in Sudan, the use of population data on annual basis was completely unmanageable. This project offered health services to three Internal Displaced Population (IDP) camps. In June 2016, the population of two camps had been relatively stable for some years, which however was not the case for the third one. Its name, "New Arrivals" indicated this sudden establishment. At the moment of deploying the system, population had arrived three months before, fleeing from rebels' attacks in their region of origin. Displaced population kept on increasing gradually, and the project was reporting their indicators based on population data updated every two months out of manual headcounts in the refugee camps

The workaround to have population-based indicators was to generate tables in the new HHMIS with the volume of the activities (i.e. number of consultations, doses of antigens, disease cases) and then export those values into an Excel file to keep track of the fluctuating population figures and calculate indicators on coverage of activities, or the incidence of diseases. Nowadays, "New Arrivals" in IDP camp has been assigned a different and permanent name, with the intention of using "New Arrivals" to refer to sudden displacements of population. This situation of unstable population is not universal, and in many project sites, project population figures are stable and can be collected annually.

In this case, the contradiction resulted in the use of third party custom-made tools in the project, while abandoning the use of a standard tool. Due to the risk of failure in adopting the new system, it was configured to collect population figures every six months in all settings, as it was not possible to have different reporting periods for different settings in the software, and 6 months was considered a middle point between the one-year stable numbers and the two-month dynamic ones. Practically, this meant that every project had to collect their population figures twice every year which actually, was an extra step for those with stable populations and a halfway solution for the ones working with IDP's.

This example reflects contradictions at two levels. One, between the built-in functionalities of DHIS2 which was not built to handle multiple periodicities, and also cater to the need for both dynamic and stable figures in varying settings. The second version with a new configuration offered a slightly better solution for some projects and worsened the functionality for others, reflecting a contradiction from the user perspective where improvement for one contributed to a negative effect on the other. MSF still has to invest in a better solution for all projects to resolve this contradiction and also avoid third party competing tools being established instead of their HHMIS.

In the next section, we further discuss the role of these contradictions in shaping the HHMIS use.

5 Analysis and Discussion

In this section, we draw upon our institutional perspective to analyse the nature of the contradictions and how potentially these can become agents of change. First, we identify the different institutional logics in play, and how they create contradictions. We next discuss how these contradictions may carry the potential for change.

5.1 Identifying institutional logics

The logic of routine health management information systems (HMIS)

A HMIS is typically a routine system responsible for the periodic collection and reporting of predefined data primarily upwards for monitoring and evaluations purposes. Since its inception, the MSF system was envisioned as an HMIS, which largely assumes stable and homogeneous settings and systematic actions. These principles were inscribed in the software design and shaped the institutional logics around the system.

In the first vignette, we exemplify the institutional logic of **stability** in location and day-to-day practices of MSF staff, and their expertise to work with formal software design methodologies that had prior application in non-humanitarian organizations. Using this methodology required skills in interpreting abstract representations of information and based on-site workshops that was physically not possible. Existing work routines were deeply institutionalized, and space and time for the introduction of new routines and was not possible at the higher levels. Operational level efforts to gain feedback or have meetings failed in this absence.

The second vignette exemplifies contradictions between the required need for real time information, assuming stability of location and **dependencies** on Internet connection which was at odds with the existing reality. While DHIS2 provided functionalities for unstable and weak connections, it did not support completely offline work. This set up required manual actions for synchronizing data, resulting in rigid processes that did not respond well to different project configurations. There was thus this on-going contradiction between the assumption of a generic setting and internet supply which largely did not exist.

The third example assumes stable and homogenous populations targeted in the interventions. The software was not designed for collecting population figures with different periodicities and varying levels of stability. It could handle shorter or longer periods but assumed **homogeneity** amongst all settings, which encouraged a design of a homogeneous configuration of periodicity for collecting population, but doing data collection twice a year, significantly increasing workload.

In summary, this discussion highlights how design inscriptions in the software give rise to certain institutional logics, which then have to conform the logics inscribed in everyday work routines, realities of the empirical settings, and the changing nature of the context, like migratory populations. These engagements of the software with different realities becomes a source for the creation of contradictions. Humanitarian organizations like MSF are characterized by hectic day-to-day work, scarce human resources who are also overworked with high turnover rates, making it difficult for them to work with new and demanding institutions like which HHMIS entail. The HHMIS, like many modern-day software applications also assume stable and reliable internet, and its lack contributes to another source of contradictions. There exist also some inherent limits in technical design, such as the ability to deal with multiple periods and population types, further creating contradictions with the reality.

5.2 The nature of contradictions and their inherent potential for change

Summarizing from the above discussion, the HHMIS is designed under assumptions of ***stability*** (of context), ability to work ***independent*** of the internet environment, and the existence of ***homogeneous*** environments. The reality does not fit these assumptions, with the environment being extremely ***dynamic and heterogeneous,*** internet environment being ***restrictive***, and in some cases ***independent*** of the core functionalities available in modern software platforms like DHIS2. Figure 3 helps to understand the nature of the ensuing contradictions.

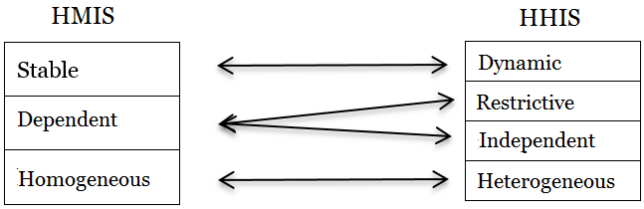

Figure 3 – Institutional Contradictions

Introducing technical and work routines inscribed in the software, necessarily require the creation of new institutions, and supporting logics. These are not easily forthcoming, given the existing challenges of the humanitarian context and their everyday work routines. Competing logics naturally get created. Drawing from the organizational field concept, the use cases presented through the vignettes coexist as independent organizations in a common field, and without coherent linkages with what exist become a source for discord.

An effective system requires both stability and to some extent flexibility to exist in different situations. Understanding the nature of these contradictions, technical and institutional, provide the potential to design possible solutions.

The three vignettes illustrate competing logics that create contradictions which can be both an enabler and barrier for change. Contradictions can block short-term initiatives of change if not adequately identified and considered from the early phases of a project. In our example, we observed how an initiative that had the main goal of reducing data collection at field level failed in its purpose of building a minimal data model due to an inappropriate choice of a design methodology. Understanding of this failure led the team to redesign feedback mechanisms, which although was still not optimal, was better than the original plan of co-located workshops. Most importantly, there was learning on how to approach this complex problem, which could not be just dismissed as "users are not interested in change".

Contradictions can introduce changes by adapting a competing logic in favour or the detriment of its opposite, and also reaches a broader scope than originally intended. In our example in the second vignette, having a setting of technical deficiencies, helped firstly in expanding the functionalities (for enabling offline use), and benefiting also the larger DHIS2 community. However, this also created the need for new routines of synchronizing servers, requiring new supporting institutions. Further technical and institutional work would then be required to deal with these consequences. There are thus dialectical influences at play between the multiplicity of institutional logics within the organizational field. Changes in reducing contradictions in one sphere can sharpen them in others. There is a need for a balanced response, examining the different trade-offs involved. in response to the change. The lens of institutional logics, their interplay, the ensuing contradictions and actions to try and unravel them provide arguably a sensitive lens to approach this complex problem.

6 Conclusions and future work

This paper has tried to identify the underlying multiplicity of institutional logics in an organizational field conceptualized in the context of a humanitarian organization. Contradictions arise through the interplay of the logics in play and often result in contradictions in domains of technology, everyday work, and the context of the intervention. While in the short-run, the challenges may seem difficult to surmount, however, through sensitive understanding of the nature of these contradictions, the potential for change can be positively leveraged. In future work, the plan is to apply this theoretical framework in other settings of humanitarian interventions, and examine how their potential may be effectively materialized.

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