Tearing down the wall to Myanmar's information ecosystem:

The case of one local organization in producing and providing credible information

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Executive Summary

This study highlights the experiences of one of Myanmar's leading research organizations in compiling, analyzing, and publishing political data for local audiences on an online information platform (called MyPILAR). The development of this digital information platform from January to June of 2016 fostered better collaboration and provided first-hand experience in learning how to work with and manage databases; however, it also alluded to the limitations that organizations face amidst Myanmar's current data culture. In subsequently conducting a needs assessment among other government and civil society organizations that collect and use data for decision marking to learn how they collaborate, identify distribution and utilization paths, and process data, the Enlightened Myanmar Research Foundation (EMReF) discovered that these institutions have faced similar experiences in navigating a muddled and complex information environment and data culture. EMReF, one of two local organizations collaborating with the University of Washington, the Tableau Foundation, and the United States Agency for International Development (USAID) to improve data literacy and data strategies for evidence-based decision making in Myanmar, identified and addressed data management, production, curation, analysis, and sharing practices while launching the MyPILAR information platform and conducting an assessment among prospective members for a cohort to collectively address gaps in the emerging environment and improve good data practices across individuals and organizations partaking in Myanmar's data ecosystem. Members included government ministries, civil society organizations, and the media. EMReF selected those interviewed by their important role in collecting, sharing, or using data for public purposes or by their willingness to participate. Through EMReF's experience, this study documents two important and interconnected situations: 1) it sheds light on the array of data culture practices and situations contributing to Myanmar's data environment, and 2) it provides details on how one organization, in working within this environment, learned to identify these practices and overcome obstacles in producing high quality and accessible data for the public.

In undergoing the process to create and launch MyPILAR, EMReF shared their learnings on the limitations of data availability, data format, data quality, and data utilization and distribution and identified several practices to be addressed. Combined with findings from the needs assessment, it became clear that there is a need for data quality, transparency and collaboration in Myanmar. Many institutions have yet to develop a strong understanding of the importance of sharing data, and communication networks within and between institutions are limited. Collection and compilation practices lack standardization. This is a result of decades of political isolation and sensitivity that limited opportunity for the infrastructure, training, and space needed for information utilization and distribution. Individuals within and between organizations need to agree on methodologies, formats, and common indicators – such as place name codes – to ensure the credibility of the data within a given data set and that organizations can effectively use the data set for their own analysis. The sparsity of data digitization practices further affects data collection, production, and curation. Most institutions collect, compile, and store their data in hard-copy files. Digitized data are needed to ensure that data can easily be shared

between institutions and verified for credibility and clarity, both essential practices of a flourishing information environment. Lastly, collecting, compiling, managing, and maintaining quality data for a platform like MyPILAR requires a full-time data management staff and sufficient funds. In Myanmar, staff turnover is common and most projects rely on short-term grants, complicating the continuity of data collection and distribution.

EMReF's findings regarding Myanmar's data ecosystem from the MyPILAR process and needs assessment are not entirely unique. Studies from other countries or regions indicate that digitization, standardization, underdeveloped communication networks, and ambiguous verification procedures are common practices that various actors identify and address globally. There are, however, some unique features of the Myanmar case that may be applicable to stakeholders in other societies. Organizations producing and disseminating data in Myanmar navigate an environment that lacks a universally used digital Burmese font, has underdeveloped collaborative networks as a result of military rule, and has tedious bureaucratic procedures for retrieving government data that are both unspecified and unclear. The intention is that this study will assist private and public stakeholders working in Myanmar to better understand the challenges affecting data access, sharing, and use in the country as well as provide a framework for identifying and working through similar practices in comparable environments.

The Case of EMReF

In light of recent political developments in Myanmar beginning with the 2010 elections and subsequent transition of power, there has been unprecedented opportunity and increasing desire for information exchange, political participation, and public decision making. The country quickly transitioned from having limited access to information sources to being connected to the abundance of news exchanged over the world-wide web. This recent development has had mixed results. Although individuals can openly use and exchange data to formulate opinions and develop informed individual and community decisions, the rapid liberalization and exponential growth of digital data created an environment wrought with non-credible information sources and limited user awareness and education regarding ethical data management. These issues are not limited to consumers. Producers, like EMReF, are baffled by the questions and complexities of effectively working with other organizations to provide data in meaningful ways to audiences that have not yet been fully exposed to the necessary critical thinking skills and experiences to be active consumers in using and interpreting information.

The MyPILAR political information platform was created as part of the Information Strategies for Societies in Transition program, developed to address the challenges Myanmar faces as it seeks to "catch-up" in the world's most economically competitive region. Housed at the University of Washington and implemented in conjunction with local Myanmar partners EMReF and the Myanmar Book Aid and Preservation Fund (MBAPF), the project was supported by USAID, Microsoft, the Bill & Melinda Gates Foundation, and the Tableau Foundation. In addition to developing their online platform, EMReF also participated in activities geared to assist local organizations in developing effective data practices and environments to support the role of data for decision making across institutions and individuals in Myanmar.

A leading and well-respected research organization in Myanmar, EMReF collects data and conducts local political, social, and economic research to revitalize independent research among various local actors and promote evidence-based decision making in Myanmar's new environment. In creating a platform compiling information on the recent election to inform politicians and the general public, EMReF identified further obstacles and learned to overcome several in a learn-by-doing approach. This study describes EMReF's experiences and findings.

Background to the Information Environment in Myanmar

1962-2010

Myanmar, formerly known as Burma, endured 48 years of military rule from 1962 until 2010 when an unexpected democratic transition began with elections and a transition of power. Throughout the previous 48 years, the military dictators and junta isolated the country from nearly all foreign influence and heavily controlled and monitored internal affairs. The information environment was one of many sectors heavily impacted by this political position. While most of the world progressed through new technological advances and international collaborations, creating a global tech savvy population and international digital exchange networks, Myanmar remained frozen in time.

Military rule deeply affected the growth of the information environment and public awareness regarding proper information decision-making skills. For many, information access and sharing was kept a secretive activity; being caught in the act of exchanging non-government produced data often resulted in harsh

penalties. In addition, the government monitored and controlled all media, suppressed alternative media, and exiled and imprisoned numerous journalists. Information exchange became institutionalized as an activity to fear, distrust, and keep secret.

The policies and restrictions on information access during Myanmar's military reign also suppressed the growth and development of information and technology literacy. In 2009, only about 0.45% of the population had a fixed broadband subscription. This number did not start increasing until 2011. By 2015, only 35% of the population had a fixed broadband subscription.[1] Fixed broadband remains expensive and unaffordable to most the population and connection is weak. The growth of broadband connectivity and computer ownership during political liberalization contrasts drastically to the growth and use of mobile phones and data-enabled SIMs since 2011, discussed in the following section.

Mobile phones also remained largely inaccessible to the public prior to market liberalization in 2013 and 2014. Under military rule, individuals could enter a lottery to receive a mobile sim card from the state-owned Myanmar Post and Telecommunications (MPT), the only company offering sim cards in the country. If selected, sim cards cost $1,500-2,000. For many, the only means of accessing and sharing information not produced in hard copy by the government was by word of mouth. All of this changed as the market liberalized during the first term of the new political administration and mobile technology became readily accessible and affordable.

Changes since 2010 for New Information Sharing and Access Opportunities

Although far from a transition to a liberal democracy, the political transformation in 2010 was an important unprecedented step towards democracy. In the years following the 2010 election, the country continued to exhibit its commitment to a transition through credible and respected 2012 by-elections and 2015 general elections. The information environment has also liberalized. Following the transition of power, the new government relaxed censorship, released several journalists and bloggers imprisoned under laws prohibiting the exchange of non-government information, and amended some draconian laws with harsh sentences for individuals participating in information exchange. Although these legal changes have fallen short of standards advocated for by international human rights workers and several improvements are still needed, these liberal initiatives paved the way for the acceleration of open information exchange in Myanmar's new political era.[2]

The liberalization also allowed private sector market competition. The new government extended invitations to two international providers, Telenor and Ooredoo, to develop the needed infrastructure and provide the necessary services and devices for public mobile data.[3] This 1) replaced the previous lottery system, 2) made mobile phones and data-enabled sim cards affordable and accessible, and 3) connected the public to international news sources via unrestricted internet. Whereas in 2011 only 2.38%

[1] World Bank, "Fixed Broadband Subscriptions (per 100 People) (Myanmar)" (The World Bank, n.d.), http://data.worldbank.org/indicator/IT.NET.BBND.P2?end=2015&locations=MM&start=1960&view=chart.

[2] Burma Partnership, "Advances and Challenges to Media Freedom in Burma," *Burma Partnership*, May 6, 2013.

[3] "Telenor and Ooredoo Win Myanmar Telecoms Licenses," *Financial Times*, June 27, 2013, www.ft.com/intl/cms/s/0/bd52d930-df36-11e2-a9f400144feab7de.html#axzz2XsfyjL9p.

of the population had a mobile phone, 49.47% had a mobile phone – predominantly smart phones – in 2014.[4] This surged connectivity to the internet (estimates put mobile phone usage at 90% in 2016[5]) and normalized digital avenues of information access, use, and sharing in Myanmar. Unfortunately, user awareness and the necessary critical thinking skills to ethically exchange information and determine the credibility of sources did not develop commensurate to the spread of mobile technology. As connectivity exponentially grew, so did the spread of hate speech, revenge pornography, and opinionated statements through social media.[6] Facebook, a new phenomenon for several in Myanmar, became the leading and virtually exclusive source for accessing and sharing information.[7]

[4] World Bank, "Mobile Cellular Subscriptions (per 100 People) (Myanmar)" (The World Bank, n.d.), http://data.worldbank.org/indicator/IT.CEL.SETS.P2?end=2015&locations=MM&start=1960&view=chart.

[5] Aung Kyaw Nyunt, "Ministry Puts Mobile Penetration at 90 Percent," *The Myanmar Times*, July 19, 2016, http://www.mmtimes.com/index.php/business/technology/21466-ministry-puts-mobile-penetration-at-90-percent.html.

Percentage estimates vary and do not accurately reflect the number of individuals with a mobile phone and SIM card. In Myanmar, it is common for one individual to have several different SIM cards as this allows them to alternate between cards depending on where and when the service is best for each provider. As a result, mobile penetration estimates are a bit skewed as they are based from the number of SIM cards sold and registered against the estimated total population count. However, despite this, mobile penetration is still very high and the figures still indicate a rapid and widespread public connectivity to mobile communication.

[6] See Chapters 3 & 4.2 in Myanmar Centre for Responsible Business, Institute for Human Rights and Business, and Danish Institute for Human Rights, "Myanmar ICT Sector-Wide Impact Assessment," September 2015, http://www.myanmar-responsiblebusiness.org/pdf/SWIA/ICT/complete.pdf.

[7] Nancy Joseph, "Myanmar Goes Mobile, with UW's Help," *University of Washington Perspectives Newsletter*, March 2016, https://artsci.washington.edu/news/2016-03/myanmar-goes-mobile-uws-help?utm_source=perspectives&utm_medium=email&utm_campaign=Mar-16.

The Current Situation: Myanmar's Data Ecosystem as informed through the building of the MyPILAR website

EMReF, MBAPF, and the University of Washington identified the need for an information platform that provided accessible, credible data sources, analyses, and reports on national and local developments to improve people's access, interpretation, and production of their own information for decision making. The project targeted government entities, CSOs, and the public. Following the launch of MyPILAR, EMReF engaged similar organizations wanting to work in the process of providing and using data to collectively identify and address challenges and collaborate on ensuring the dissemination of good data practices and credible sources in Myanmar.

MyPILAR and the needs assessment, which fostered discussion between ministries and organizations involved in data collection and production, support the long-term goal of providing the Myanmar public with quality information for decision making and building needed collaboration between government institutions, CSOs, the media, and the public. The following section discusses EMReF's experience navigating Myanmar's information environment. EMReF's learnings and findings from this experience, however, are not unique; the needs assessment confirms that EMReF's observations are familiar among other institutions in Myanmar. What was learned by the subsequent needs assessment among various institutions supports and adds to the findings discovered in the MyPILAR process in navigating Myanmar's data ecosystem.

The Case of Myanmar Informed by the Needs Assessment

As part of the Tableau Foundation sponsored work, EMReF connected with similar local institutions to discuss their learnings and challenges in producing, exchanging, and maintaining data. The questions EMReF asked these organizations regarding their data practices, needs, suggestions, and challenges derived from their own experience completing the MyPILAR platform. The needs assessment remains an internal document as its intended purpose was for EMReF to determine shared observations and challenges as well as commonalities in the needs and suggestions of organizations. Key findings from the assessment, however, are included in this report to show how EMReF's case is a common experience among data producing, sharing, and using institutions in Myanmar.

The Case of EMReF in developing the MyPILAR platform for a local audience in a complex and uncultivated data ecosystem

EMReF collected data from the UEC (Union Election Commission) – in both Burmese and English – on the election outcomes in each township and the demographic information of the candidates. EMReF then used these data to create informative and accessible analyses on the margins of loss between winning and losing parties in each township, predominantly between the NLD and ethnic parties, and to understand the demographic representation of newly elected MPs (Members of Parliament), particularly their educational attainment, previous occupational and political experience, gender, age, and religious/ethnic affiliation. The process of preparing these data for visualization and distribution, however, was not simple. EMReF shared many of the complexities of Myanmar's data environment that became evident to them as they worked with these data sets to prepare and disseminate high quality data and visuals to the public. The process of creating MyPILAR thus helped EMReF identify challenges and new methods for preparing and using data to produce analyses for decision making. These methods

and lessons learned will be used to provide other institutions with the information and networks needed to develop data skills for critical thinking.

Findings from the MyPILAR building process

Observations on Data Collection and Compilation Practices in Myanmar

In working with the data to develop MyPILAR and learning modules, EMReF and the UW identified practices that need to be addressed: 1) a lack of communication among data collectors within and between institutions, 2) uncertainty of funding and long-term staffing commitments, 3) lingering sensitivities among the population regarding the purpose of information collection, 4) digitization, and 5) the absence of well-documented collection methodologies. Developing these practices will cultivate the country's data ecosystem to complement current political change and contribute to continued positive transformation. This section will speak to specific examples from the challenges and observations articulated by participants in the needs assessment. Certain specifics regarding the organization have been omitted to protect privacy.

COMMUNICATION WITHIN AND BETWEEN INSTITUTIONS

Strong data exchange networks to improve data credibility, dissemination, and utilization in Myanmar are underdeveloped due to weak, irregular, or-not-yet established communication practices both within and between institutions. EMReF expressed frustration with verifying data and data collection procedures as well as with the lack of centralized and standardized collection and compilation procedures. Organizational responses to the needs assessment allude to the fact that improvements in communication practices and increased awareness regarding the importance of communication networks are needed to improve the quality and accessibility of information exchange. Within an organization, data collectors in different regions correspond to different supervisors and regional offices. Direction for collection differs between offices, and collection ethics and the interpretation of indicators varies among collectors themselves. CDNH, an organization conducting community surveys and using existing baseline data for conflict analysis, acknowledged that they do not have a central compilation location that is accessible to all staff; different teams collect different data at all times and are not centrally supervised and managed. This poses several difficulties in ensuring the standardization and credibility of the data in each survey. For these reasons, EMReF and other organizations find it difficult to interpret and define indicators of secondary data and replicate or continue the data in a different time and place.

Two factors have contributed to limited communication between organizations in Myanmar overtime: 1) data sensitivities because of the previous regime, and 2) a lack of awareness regarding the importance and usefulness of sharing data sets and methodologies. Under the previous regime, sharing information often carried penalties against both the institutions and individuals involved. As a result, data collection and use by local CSOs was limited and kept relatively secret. Furthermore, because of the sharp separation between the government and the civil society, bureaucratic procedures made it difficult and timely for CSOs to request and receive information from government departments. Currently, the GAD (General Administrative Department), the government department in charge of collecting and publishing baseline data on the country, remains under the control of the military. Several institutions in the needs assessment iterated similar problems to EMReF in effectively communicating with the GAD to retrieve or verify data. OMI (Open Myanmar Initiative) mentioned that CSOs often need a personal connection within the GAD to get access to relevant staff to assist with data requests. Contacting the GAD, and other government departments, otherwise requires organizations to follow official procedures that are both unclear and inefficient. Organizations need to submit an official letter via fax and wait for approval by the relevant party. Due to weak communication networks within organizations, the wait is often lengthy or the request is never completed.

There is also no clear framework or policy that allows government departments to share documents and information. As a result, CSOs have limited knowledge of the available procedures for requesting and retrieving information from the government. In preparing for the 2015 election, the UEC had to compile voter lists from the household registry provided by the Ministry of Immigration and Population, according to election laws. Due to these restraints, the UEC could only access information from fifteen years prior. The outdated information affected who had the right to vote in the 2015 election. Increased communication networks between institutions and transparent procedures for accessing and verifying data from government departments may have resulted in the UEC being able to produce up-to-date data sources for important events. Although the country is liberalizing and avenues for information exchange have grown, institutions and individuals still practice the precautions and procedures exercised during the previous regime. This has hindered open exchange practices, especially between government ministries and CSOs.

The lack of widespread understanding regarding the importance and usefulness of openly sharing data also contributes to underdeveloped information networks. Restrictions on data exchange and the limited communication technologies and resources under military rule resulted in an environment where organizations collect and use data primarily for their own specific projects. In an interview with MIMU (Myanmar Information Management Unit) for the needs assessment, staff articulated a desire to compile further information on the country. They are aware that many organizations conduct assessments and surveys; however, these organizations often do not share their data or make them publicly available. Many institutions do not yet fully understand the benefits their specific data could have for the projects of another organization. However, it is often the case that data collected by one organization for a specific project are useful to other institutions, particularly other local institutions working in the same geographic region or sector of the population. As University of Washington students created informative reports and analyses on specific demographic features of elected MPs using the UEC demographic data for the MyPILAR project, they encountered limitations in finding supplemental data to use for relevant comparisons. EMReF also expressed that the availability of such data could be particularly useful to institutions working at the local and regional levels. This need was reiterated by MIMU and CDNH during the needs assessment, two key civil society organizations that collect and compile baseline data.

UNCERTAIN FUNDS AND FLUCTUATING STAFF

Data collection requires a full-time data collection team and sufficient funds to properly design the project, train the staff, complete data collection, compile the data, curate the data, and repeat collection later. In compiling data for MyPILAR, EMReF shared their restraints in being able to hire and assign a full-time data staff to the project. Most of the staff involved in MyPILAR maintained duties in several other projects. Organizations interviewed for the assessment communicated similar concerns, indicating that these are common features organizations navigate in Myanmar's data culture. Organizations often do not have the human and financial resources to designate full-time data collection teams and often rely on general office staff to complete collection tasks in addition to their general day-to-day assignments and duties.

Quick staff turnover also affects collection and compilation. In Myanmar, staff frequently leave and join organizations, and government employers are moved between different positions in the department. There are constantly new staff members continuing the duties of previous employees. Staff limitations also result in the inadequate training of new employees as current employees cannot dedicate enough time to sufficiently train new members. As a result, most employees do not receive the needed training to accurately continue the duties of the previous staff or fully understand the history, processes, and status of any given project. Many staff members are also not personally invested in the quality of the

project, further affecting the quality of collected and compiled data. This culture contributes to the lack of indicator and methodology standardization.

DIGITIZATION AND VERIFICATION

In compiling the election data for MyPILAR, EMReF shared that they had to work with varying practices of data digitization, verification, and standardization to compile these data. The absence of a universally used digital Burmese font, weak technological infrastructure, and a political sphere that hampered the exchange of information, impeded the development and normalization of data digitization, verification, and standardization practices among data collecting institutions, particularly in government departments. Digitization affects both primary and secondary data collectors. In Myanmar, most data are collected and stored in hard copy prints. For primary data collectors, digitizing data requires the infrastructure, software, and training to digitize and curate the data. For secondary data collectors, an environment of non-digitized data creates difficulties in ensuring receipt of a complete data set, verifying missing or questionable data, and digitizing the data for their own use.

Digitizing and verifying hard copy data from other organizations is challenging due to time, staff, and technology limitations. EMReF shared that they encountered several blanks and illogical data while compiling and cleaning the excel spreadsheet containing the demographic information of elected MPs. Verification of the data required the Asia Foundation and UEC to refer to individual hand written forms for each candidate. To create the digital spreadsheet, the Asia Foundation had to input the data for each candidate from these forms, written in a mix of English and Burmese and to varying degrees of completeness and legibility. EMReF shared that not all data could be verified because of blanks, illegibility, or missing forms. Other organizations (MIMU in particular) expressed similar frustrations with irregular digitization and difficult verification procedures. In the assessment, MIMU said that they receive data, particularly government data, in hardcopy format or electronic in Microsoft Word, an ineffective platform for providing usable digital data. Employees at MIMU must then digitize the data in excel. They typically must first translate the data into English as well because of Burmese font incompatibilities. This is a lengthy process and often yields incomplete data due to blanks in hard copy forms and illegibility.

Data Production in Myanmar's Current Environment

In creating meaningful analyses for MyPILAR, EMReF shared that they confronted limitations in effectively comparing indicators within a data set and between data sets because of the lack of data standardization. They also identified that transparent verification procedures are needed to ensure the credibility of information. In their learn-by-doing endeavor to provide the Myanmar public with a central platform for accessible credible information, they identified key data standardization and verification practices that have not yet been widely addressed. Standardization and verification are two key elements of a flourishing data ecosystem supported by information exchange networks.

EMReF's experience preparing credible data sets and creating relevant analyses emphasizes that data standardization practices can best be understood and addressed through further learn-by-doing approaches to data management. EMReF shared that they were able to identify other critical standardization issues affecting other institutions after identifying these problems in digitizing, publishing, and visualizing data for their public information platform. Their experiences resulted in the well-crafted and informed questions on data practices and standardization challenges they asked during the needs assessment. Addressing these concerns in the assessment fostered a stronger awareness among interviewed institutions regarding the absence of widespread standardization and the importance of such practices.

CHALLENGES OF STANDARDIZATION

Data standardization is pertinent in providing audiences with analyses and visualizations supported with evidence from meaningful data. EMReF expressed that creating MyPILAR helped them realize the importance of format standardization and the consistency of indicators, place names in particular, as preliminary steps to effective visualization. EMReF is not the only organization in Myanmar that has navigated the absence of data standardization. From the assessment, we concluded that the lack of standardization remains the single most common challenge to cultivating a flourishing data environment in Myanmar. This was the top concern shared by most interviewed organizations. Procedures for digitizing data sets vary. Many organizations, predominantly government ministries, use Microsoft Word to digitize data. Although the data are digitized, they are provided in an unstandardized format and software that requires the organization using the data to re-enter the data manually into a useable and shareable format, such as excel.

Without clearly defined indicators, the translation of certain returns from Burmese to English and the re-categorization or bucketing of returns is difficult. In the demographic data set EMReF used for MyPILAR there were several English translations of common occupations. Staff members cleaning and translating the Burmese data set translated occupations differently into English. As a result, the document was an enigma for anyone attempting to analyze or bucket these returns. If definitions for indicators, code lists for translation, and collection or survey methods are standardized and respected, several existing standardization challenges will be alleviated for future collection and compilation.

The biggest barrier to standardization in Myanmar, however, is place name variation. In Myanmar, place names vary between Burmese language names, British implemented names, and local names. The choice of name is often a political statement. This creates difficulties and inconsistencies when compiling and comparing data sets. These variances in places names must be identified by those using the data and changed accordingly before data analysis is effective. MIMU has taken leading initiatives in creating, sharing, and advocating for a standard format and set of indicators. They have published a set of place codes (PCodes) and geographic shape files for institutions to include in their databases. This is similar to a U.S. zip code, with each township and region represented by a PCode. Including PCodes with the data would ensure one common indicator across data sets despite other indicator and place name inconsistencies between organizations. We learned from the needs assessment, however, that only a few organizations actively include PCodes in their data and most do not recognize the need for including these data in their own data. EMReF reiterated the need for a standardized PCode based on the challenges they encountered when linking different data sets by township name, the smallest geographic unit in Myanmar. The need for standardization became clearer through the process of preparing data for publication and visual analysis.

DATA VERIFICATION

Several factors in Myanmar contribute to difficulties in verifying data. For EMReF and other organizations, verification is timely and often does not result in additional information or clarity. Even if the organization contacted for verification can locate the original hard copy data entry forms, data are often missing on the forms or illegible. Verification is also difficult because of undefined indicators both prior to data collection and during compilation. Responses to inquiries during data collection are often open-ended and undefined. EMReF expressed that these practices presented difficulties in verifying the education backgrounds of elected MPs in the demographic data set. The differences between completion of a certification prior to a Bachelor's degree and after a Bachelor's degree were not clearly defined on the forms the candidates completed during data collection. Thus, while analyzing the highest educational attainments of the elected MPs based on these data, the differences could not be verified as, aside from personal knowledge of the program at the respective university, there were no mechanisms through which to distinguish these differences in the data after collection.

Lastly, verifying government data is a sensitive issue. Burmese organizations have expressed hesitation in contacting government ministries to verify data. Many believe such contact questions the authority and practices of the government. Furthermore, government officials are often unlikely to provide verification as they 1) cannot or 2) do not want individuals in other institutions to identify flaws in their practices. As a result, most find it better to conceal the data to hide past errors and inconsistencies.

LEARNING DATA CLEANING PROCEDURES

Preparing the data sets for visualization on MyPILAR provided insight into the data cleaning and managing procedures required to effectively use data sets to produce visual analyses. In order to visualize data, data need to be properly cleaned and standardized for the computer to correctly compare, group, and re-produce visualizations reflecting the data. EMReF expressed that they identified issues with the data through attempting to display the data in meaningful visualizations. These attempts indicated where further cleaning, bucketing, or verification was needed. In the demographic data set, questions regarding occupation and education were left open ended during collection, yielding an overwhelming number of returns worth little in the way of effective visualization for analyzing representative demographics and making decisions.

Data visualization is also a newer practice in Myanmar given the previously identified challenges to information exchange prior to the recent liberalization. As a result, without the practice of visualization, data cleaning skills have not flourished. Currently, many employees working on the same data set use different methods for cleaning and bucketing section of the data. Despite having set and discussed standards for translating and bucketing the categories, the lead data manager at EMReF said that staff inconsistencies prevailed as a result of staff 1) not having the time to follow set standards, in turn following their own interpretations, 2) not sharing the same concern or understanding of the importance of following standards, and 3) not understanding the task at hand but not wanting to ask, a common practice in Myanmar. As lead researchers became aware of these variations, they identified data cleaning as a practice to be discussed and addressed through inter-organizational collaboration and training.

Budget and Staff Needs for Effective Data Maintenance and Curation

In thinking ahead to the conditions required to maintain MyPILAR, EMReF emphasized the long-term staff and budget conditions needed to ensure long term data maintenance stability. In Myanmar, however, ensuring long-term commitments from staff and securing long-term finances is difficult. For many organizations, particularly CSOs, funding for data collection and reports is often short-term and specific to the tasks of conducting the initial study; funding is often not provided for the long-term upkeep required to maintain project results, continue the study, and disseminate the information. Many institutions that provide funds for local organizations to conduct studies provide funding with the intention that the project will sustain itself in the long run; however, self-sustainability will take time to develop in Myanmar given the long period of isolation and poverty. Long-term staff ensures that employees are familiar with the different stages of the project and can productively devote their time to improving the quality of the project. Quick turnover results in new staff at various stages of the project. This is an aspect of the current data environment in Myanmar that is unlikely to change in the short-term. The learnings from the MyPILAR process and the past experiences of other institutions, highlighted in the needs assessment, can be utilized to best address how to navigate these situations given the environmental constraints.

Summary of Key Findings

This case – a combination of findings from one local organization's experiencing building a public information platform and an assessment of the data practices of several institutions in the country – identified data practices that have contributed to a muddled information environment and addressed several in a learn-by-doing approach. As part of a larger collaborative initiative between the University of Washington, EMReF, MBAPF, and funded by the Tableau Foundation, USAID, Microsoft, and the Bill & Melinda Gates Foundation, this project contributes to improving data literacy and data strategies for evidence-based decision making in Myanmar. EMReF shared their findings and learnings regarding how to identify, navigate, and address the various practices that are necessary to collect, compile, manage, analyze, and curate data for an information platform intended to provide the public with credible data and accessible analyses for decision making. The opening up of the information sector that paralleled political liberalization allowed EMReF to undertake such an activity, an exercise that would have been near impossible under the previous political system. To learn the practices of other data collecting or using institutions, identify common challenges, and initiate collaborative discussion on the promotion of good data practices and open information exchange, EMReF also conducted a needs assessment. Many of the findings from the needs assessment match the findings described by EMReF during the creation of MyPILAR.

Key practices that need to be addressed are data standardization, verification, and collaboration. EMReF and institutions from the assessment identified the lack of standardization as their top concern. Currently, organizations do not use a standardized format for defining indicators and compiling data. They also do not all include a common indicator – such as a PCode – which would allow for data sets across organizations to be compared. The hard-copy data culture also affects standardization. Most institutions do not digitize data. When they do, they often use ineffective software for data entry. Digitization also affects data verification. The data are often illegible or missing from hard-copy forms and the transfer of data from hard-copy to digital platforms results in data being dropped or forgotten.

Past political sensitivities regarding information collection and exchange also make it difficult for CSOs to verify government data. Many do not want to appear as though they are questioning government authority and many government employees do not want others to identify past flaws. The data culture under military rule also did not permit for collaborative data exchange networks to flourish. Many institutions remain fearful of exchanging information or do not understand the importance of sharing the data collected for a specific project. Communication within organizations is also weak, largely the result of decentralized data collection methods and practices. The needs assessment, however, did foster new discussion between involved organizations regarding the need for improved data collaboration. Only through such collaboration and the exchange of skills and knowledge can an environment in Myanmar emerge where credible and open data practices are routine among all current and future parties involved. Lastly, this study identified that quick staff turnover and budget constraints – aspects of Myanmar's information environment that are more difficult to address in the short term – contribute to challenges in producing and maintaining data and relevant projects. These practices – standardization, verification, and collaboration in particular – need to be addressed for the quality and transparency of data to improve.

The Myanmar Case in the Context of Similar Environments

This case provides insight to support other projects through 1) highlighting the unique problems that can be observed in studies of other countries' information environments and 2) utilizing a learning procedure (i.e. the example of one organization navigating the challenges to produce a data platform and develop a cohort) that can be adapted to other countries and situations. In addition to what this Myanmar case study can teach others, there are also lessons from previous studies that Myanmar can learn from as they move forward in their developments.

A study of data practices and producing credible, meaningful information in an emerging information environment is not a unique research project to Myanmar; however, the Myanmar case does highlight unique situations with regards to digitization, political history, accessibility, and collaboration that can benefit studies in similar environments. In other surveys of data practices, we identified several common experiences similar to EMReF's in Myanmar: the lack of standardization, non-digitized data, weak accountability and verification mechanisms, and weak collaboration networks. The information that follows from reports on data practices during the Ebola outbreak in West Africa,[8] the Africa Data Consensus,[9] post-2015 data revolution goals in Bangladesh,[10] health management information systems in Rwanda,[11] and health insurance providers in India[12] emphasize how other national and regional actors encountered similar challenges and are developing their data practices to work within environments like Myanmar.

The absence of standardization is a common challenge faced by stakeholders in other environments. The Africa Data Consensus, a report that emerged from the 23rd ordinary session of the African Union in 2014 to provide recommendations to improve data practices during the African Data Revolution, considers the absence of common data standards among the top concerns to be addressed in cultivating the new African data ecosystem.[13] In India, a survey on data practices influencing information sharing in the health insurance sector found that third party administers (TPAs) compile data in different formats, resulting in inconsistency and variation and rending it difficult to leverage the data effectively to evaluate product design and pricing.[14] During response initiatives to the Ebola outbreak in West Africa, the lack of

[8] Larissa Fast and Adele Waungman, "Fighting Ebola with Information: Learning from the Use of Data, Information, and Digital Technologies in the West Africa Ebola Outbreak Response" (USAID, 2017).

[9] "The Africa Data Consensus."

[10] Mustafizur Rahman et al., "Measuring for Monitoring: The State of Data for SDGs in Bangladesh," Post-2015 Data Test: Country Level Experiences (Bangladesh: Centre for Policy Dialogue Bangladesh, The Normal Peterson School of International Affairs, and Southern Voice, September 2015).

[11] Marie Paul Nisingizwe et al., "Toward Utilization of Data for Program Management and Evaluation: Quality Assessment of Five Years of Health Management Information System Data in Rwanda," *Global Health Action* 7 (November 19, 2014); "Data Quality Assessment Procedures Manual" (Republic of Rwanda Ministry of Health, 2016), http://www.moh.gov.rw/fileadmin/templates/HMIS_Docs/Hmis_SOPs/Rwanda_Procedures_Manual_for_DQA_Version_2016.pdf.

[12] Alam Singh, "Challenges for Health Insurers and TPAs: Data Enhancement and Information Sharing in the Health Insurance Sector," *eHealth*, 2008.

[13] "The Africa Data Consensus."

[14] Singh, "Challenges for Health Insurers and TPAs: Data Enhancement and Information Sharing in the Health Insurance Sector."

standardization in indicators, system format, and collection procedures hindered the ability of international responders to effectively leverage data to track and respond to cases.[15]

Non-digitized data practices are also a common feature of several other data cultures. Ebola responders indicated that the predominance of non-machine-readable data, or hard copy data, slowed access to data, limited the breadth and amount of available data, and contributed to missing or unclear data.[16] Data often had to be transferred to a digital format, which, as EMReF and other institutions in the assessment noted, is timely and costly and often results in incomplete information. A study conducted to review Rwanda's health management information system emphasizes that efforts to facilitate the digitization of data have improved the quality of health care data. Prior to 2008, health management information system data were primarily collected and compiled in paper formats. Between 2008 and 2012, the Ministry of Health implemented several digitization initiatives, resulting in the DHIS2 web-based system, digitizing data collection and entry at each health care facility for a national database.[17] A study of data practices at the beginning of the data revolution in Bangladesh also identified non-digitized data formats as a primary practice to be addressed.[18] Similar to Myanmar, data in Bangladesh are often disseminated in hard-copy formats or digitally in pdf.

Data verification and accountability, particularly at the government level, are common concerns. The consensus among CSOs in EMReF's needs assessment was that data produced by the government lacked transparency and accessibility. In Bangladesh, the BBS (Bangladesh Bureau of Statistics) and other government entities are often hesitant to publish their data because they do not want to or are unable to manage data according to international best practices. This lack of transparency and limited public access contributes to low data quality in the country.[19] The Africa Data Consensus also emphasized that addressing weak data governance and accountability in relevant countries will be a key reform goal.[20]

Many institutions or stakeholders navigate limited or underdeveloped collaboration in other emerging data environments. In Bangladesh, government and non-government entities often collect data to serve a specific requirement. These data are not published publicly, resulting in multiple surveys on a single variable. In the absence of collaboration, this results in data discrepancies.[21] The Africa Data Consensus found that data collection is usually supply-driven by conditional financing and institutional interests that are sometimes at odds with national priorities, resulting in a mismatch between available data and the national and regional problems actors want to use data to address.[22]

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[15] Fast and Waungman, "Fighting Ebola with Information: Learning from the Use of Data, Information, and Digital Technologies in the West Africa Ebola Outbreak Response."

[16] Ibid.

[17] Nisingizwe et al., "Toward Utilization of Data for Program Management and Evaluation"; "Data Quality Assessment Procedures Manual."

[18] Rahman et al., "Measuring for Monitoring: The State of Data for SDGs in Bangladesh."

[19] Ibid.

[20] "The Africa Data Consensus."

[21] Rahman et al., "Measuring for Monitoring: The State of Data for SDGs in Bangladesh."

[22] "The Africa Data Consensus."

The existing literature situates Myanmar in a global comparison of data practices in other environments cultivating data ecosystems. Comparing the ways in which various stakeholders have identified challenges and adapted new data practices is one strategic way institutions in these environments can learn from one another. There are unique learnings regarding digitization, communication, and lingering fear from previous political practices from the Myanmar case, however, that can be used to identify previously unforeseen barriers to developments in other countries' data ecosystems. Through identifying these challenges, the Myanmar study contributes to global studies and awareness of data practices in emerging information environments.

The lack of digitized data is a common concern in several environments. In Myanmar, however, this is further complicated by the absence of a universally used digital font. As a result, in additional to limited access to technology, difficulties entering and reading digital data contribute to the limited desire and ability to digitize data. Military rule and political isolation impacted data demand and collaboration in Myanmar. The potential for harsh penalties limited opportunity and desire to establish information exchange networks. Government institutions are still hesitant to share their data, particularly with CSOs, and many institutions lack the needed trust in the government to foster an environment of open credible data exchange. When CSOs and the government do communicate, however, official data requesting and accessing procedures still complicate the ability of CSOs to retrieve or verify government data unless the institution has a personal contact in the respective department. Lastly, in addition to political sensitivities and limited data demand contributing to the underdevelopment of information exchange networks, the absence of widespread understanding regarding the importance of sharing data and standardizing collecting and compilation methods further contributes to weak collaboration in Myanmar. These unique learnings from this study can help stakeholders identify further environmental constraints and address current data practices in cultivating data ecosystems that promote public data accessibility and evidence-based decision making.

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