Knowledge Management Practices for Development - Lessons from Post-Earthquake Nepal.

A case-study on using technology to facilitate inclusive data gathering

Aske Robenhagen
Vrije Universiteit Amsterdam
Department of Artificial Intelligence
Faculty of Sciences

Marije Visscher
Vrije Universiteit Amsterdam
Department of Organization Sciences
Faculty of Social Sciences

Dr Victor de Boer
Vrije Universiteit Amsterdam
Department of Computer Science
Faculty of Sciences

Dr Julie E. Ferguson
Vrije Universiteit Amsterdam
Department of Organization Sciences
Faculty of Social Sciences

ABSTRACT

Responding effectively and appropriately to large scale natural disaster requires information-driven coordinated action between many different stakeholders. Evidence from one NGO engaged in reconstruction work after the 2015 Nepal earthquake sets out some of the knowledge management practice issues faced by an organization performing this work in a challenging geographical environment with low-connectivity. Key issues are identified and a data gathering tool that encourages data-driven bottom-up development practices is presented.

Keywords

ICT4D, Knowledge Representation, Emergency Response, Inclusive Development

1. INTRODUCTION

Responding to widespread destruction wrought by natural disasters requires the coordinated long-term efforts between many different actors spanning from the local community level to large international NGOs and state actors [10]. Responding effectively requires precise and continuous input of information which can be turned into appropriate action. In recent years technology has increasingly been used to facilitate development data gathering processes[1]. Given the changing complex environments and resource limitations, different development efforts have to prioritized based on the collected data. Within the domain of inclusive development and empowerment of peoples, affected citizens have a legitimate part in choosing these priorities[3]. Based on a field-study within a Nepalse NGO, the particular knowledge management issues facing an organization engaged in reconstruction and development work after the 2015 Nepal earthquake were identified. One of the key findings was that the information gathering processes and technological tools used, can lead to affected citizens having a reduced say in the relative prioritization and choice of development goals. Instead objectives set by donors and higher management are favoured, even if organizational goals include inclusive development. Development is a complex, multi-aspect endeavor and having an organizational focus is important, however it can lead to priority-biases. In this paper, the CitizenHelper data gathering tool is presented as a solution to highlight these organizational priorities as part of the data gathering process, whilst simultaneously aiding their information gathering processes.

2. CASE STUDY - ACCOUNTABILITY LAB

At 11:56 Nepal Standard time 2015, a 7.8Mw earthquake struck Nepal with its epicenter in the Gorkha district approximately 80km from Kathmandu. The earthquake left nearly 9000 people dead, injuring 22000, and caused widespread destruction of buildings and infrastructure[2]. Nepal is poor landlocked mountainous country ranking 144th on the UN Human Development Index[1] and responding effectively to a disaster of this magnitude is a challenge for any country. In the aftermath of the shock and subsequent aftershocks, many local organizations and self-organizing groups started to organize to deliver aid and coordinate response efforts affected areas outside of Kathmandu not yet reached by government and NGO workers. One of these organizations is the Citizen Helpdesk project[2], at the time known as the Quake Helpdesk. This organization established a network of volunteers to visit remote rural villages either not connected in the first place or disconnected from the mobile phone networks due to quake damage, in order to asses the damage and needs of affected citizens. This information could then be brought to NGOs to help ensure a more accurate picture of the needs across Nepal and help to organize the response effort accordingly. As the emergency response efforts progressed from immediate needs for medical treatment, shelter, and food towards the long-term development goal of reconstruction - the nature of the work changed. The

[1] `http://hdr.undp.org/en/countries/profiles/NPL#` Accessed 03/03/2018
[2] `http://citizenhelpdesk.org` Accessed 02/04/2018

needs of affected citizen, some of them among the most vulnerable in the world, remains significant. More than two years after the earthquake more than 600000 families were still living in temporary shelters and less than 10% of homes had been rebuilt with many more suffering from damaged property, farmland, and irrigation systems. Money has been earmarked for reconstruction effort, but many of the most vulnerable people are still suffering the consequences of the quake. Helping these people requires an understanding of their needs and data gathering to find out where the issues of accessing and utilizing the earmarked resources fail. Citizen Helpdesk does this through a team of Community Frontline Associates (CFAs) who each cover a geographic area and their communities, conducting surveys, interviews, and organizing community meetings in response to the specific needs of their communities. The organization does not provide aid itself, but seeks to use data to break down barriers and bring the information to relevant stakeholders who can take action and be held accountable. In many the cases access to local government is geographically hard to reach, otherwise inaccessible[3] or unknown to citizens in the communities.

2.1 Knowledge Management Practices

For this case study, a living labs[11] field study was conducted during 6 weeks in April and May 2017. The study was conducted through a mixture of participant observation, semi-structured interviews, and subsequently an agile development process whereby technology was used to ameliorate some of the identified knowledge management issues identified. The identified issues were:

1. Communication issues between main office staff and CFAs.
2. Existing data collection tools not suited to the Citizen Help Desk work practices.
3. Limited knowledge sharing between CFAs.
4. Differing information requirements at the different levels of the organization not being met by existing tools.
5. Evidence of organizational focus biases not visible to stakeholders.

Communication issues between the staff in the headquarter in Kathmandu and the community front line workers caused by many different modalities of communication (some used CFAs primarily used Facebook messenger, others email, text, or phone calls). This paired with the differences in access to internet and phone connectivity mean that organizing and disseminating information in both directions suffered. The organization had gone through a number of different data gathering practices, but reported that the **existing tools** all were too rigid and schematic for the open forum format used by the CFAs for their community meetings where the citizens often were the driver behind the choice of topics. **Knowledge sharing** between CFAs was limited due to the different ways of communicating and infrequent in-person meetings due to long travel costs and distances caused by the topography of Nepal. **The information Requirements** at the different levels of the organization varied and were sometimes in conflict. Three main levels of information requirements were identified, one for the CFAs who favoured personal stories and localized information to bring local organizations and stakeholders to help with issues in their communities and administrative wards. The staff in the main office on the other hand primarily dealt with larger organizations at the governmental and UN level, where the need for stricter data formats and standardized practices were demanded. Finally the donor organizations were interested in statistics and impact assessments in the form of reports. **Organizational focus** was found to be primarily driven by the donor organizations. During the course of the 6 weeks field study, a new donor organization began to fund the project and with that the project changed focus from reconstruction to issues surrounding labour migration. The issues of reconstruction, development, and migration are deeply interlinked and all are important aspects of the overall development efforts. Labour migration is the largest export of Nepal and it has large consequences, good and bad, for those leaving and for those staying behind (See [13], [8], [7], and [6] for an overview of some of the effects of large-scale migration). However, one issue that appeared in many communities and community meetings was water issues including drought and water uncertainty. Little of this extra information made it to the higher levels of the organization because the data gathering tools rigidly imposed a particular format for reports. This is important as Nepal, despite its large water resources in some parts, lacks significant planning in water management with many of those most adversely affected living in remote mountain areas.

[3]Nepal suffered through a long and protracted civil war[12] which mean that local elections where not held for more than a decade. During the field study the first local elections since the new 2015 constitution where held.

3. THE CITIZENHELPER TOOL

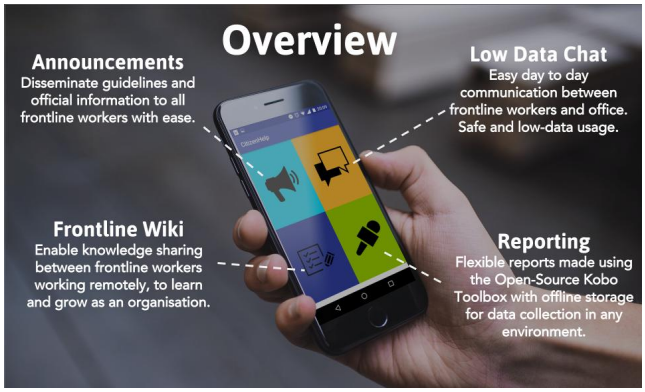

Figure 1: CitizenHelper App Overview

The CitizenHelper tool was developed in Nepal with the office staff of the Citizen Helpdesk and their community front line workers during focus groups and testing in Kathmandu and in the field. The CitizenHelper tool combines an app built around four modules, which together aims to solve the problems identified in the previous section of this paper. Together the intention is to create a synergy that amplifies the reach and effectiveness of the Citizen Helpdesk project's work. The app combines a simple low-data use **chat module** which stores messages locally and sends and receive them when the phone is connected for easy field com-

munication between CFAs and office staff. The apps **reporting module** is built around a Kobo Toolbox[5] backend, but uses Enketo webforms to display freeform reports which allows flexibility in the reporting instead of the strict progression enforced by other data collection tools. Kobo was selected in accordance with the criteria set out in [1] for mobile data gathering tools, but with the extra criteria of easy maintenance, higher emphasis on low-cost, and the extra criteria of external acceptance and data integration (The open-source Kobo Toolbox is supported by the United Nations with free hosting and allows sharing and queries across different data sources). An **Announcement Module** allows dissemination of guides and training to CFAs from the main office, whilst a **Wiki Module** allows CFAs to share their knowledge and experiences. Finally the application auto-generates additional meta-questions about the structure of each report with the aim of providing a mechanism where extra information in meetings can be gathered and priority mismatch can be identified. This final feature means that, in conjunction with organizational practices that encourages it, the opportunity for inspection and adaptation of the work increases.

Figure 2: Smartphone Use during Community Meeting[14]

4. EVALUATION

The CitizenHelper system, like all technological interventions, is a tool intended to facilitate the process of development and not an end in and of itself[4]. A tool has to be evaluated to answer the question of what, if any, change it has effected in the community where the tool was deployed. Extensive evaluation over time should be considered an integral part of the development process and for ICT4D interventions should draw on multiple fields of research [9]. The present research employs the evaluation framework of Mthoko et al.[9] where evaluation is carried out in line with the guiding themes of Strategic Value, Most Significant Change, Empowerment, Livelihoods, and Sustainability. Each of the themes are related and interdependent. Mthoko et al. make the distinction between outcome assessment and impact assessment, where the former is the direct effects observed and the latter is the contribution those impacts (long-term effects) make towards development goals (which can be negative)[9]. Strategic value asks for the immediate effects and reactions to the intervention with the other themes requiring progressively larger spheres of consideration to evaluate (community level, long-term sustainability of the livelihoods using the technology, amongst others). Providing mobile phones with free calls might have the outcome that people make more phone calls, which could have an impact on empowerment if that leads to citizens using phones to organize and putting pressure on elected officials. The evaluation of the current project is an ongoing process that evolves with the project and in the present focuses on the observed effect, with the long-term impacts being evaluated in upcoming work. During focus groups with the Community Frontline workers the immediate outcomes were a great desire to use the technology in their day to day work, the unexpected outcome that they expected to save money on paper by relying on the phone for their documentation, and appreciation that they felt that having a tool made for them was a sign of the organization investing in them.

5. FUTURE WORK

The informational needs and knowledge practice issues identified in the particular organizational setting discussed in this paper have a universality that could make the Citizen Helper applicable to situations where organizations are geographically dispersed in a low-connectivity context and engaged in information-driven development work. However, to ascertain its usefulness in other context more research is needed. Technology does not exist alone and consistent practices and long-term uptake determine their success, so long term evaluation of the impact is needed as well.

6. CONCLUSIONS

This paper has argued that effective disaster response requires long-term coordination between diverse stakeholders and that providing an effective response requires high-quality data gathering over time to monitor interventions. This data gathering can be facilitated by technology. It has been argued that organizational biases in choosing development priorities can be exacerbated by the use of data gathering technology without the flexibility and possibility for affected citizens to have an input into the prioritization process. To help alleviate this issue, the CitizenHelper data gathering tool was presented which auto-generates meta-surveys on deployed report formats to help show if there is a discontinuity in prioritization between the providers and recipients of development interventions.

7. ACKNOWLEDGMENTS

The author would like to thank Dr. Victor de Boer for setting out the path for this research project and the VU Network institute[4] for supporting and funding the present research.

8. REFERENCES

[1] M. B. Fisher, B. H. Mann, R. D. Cronk, K. F. Shields, T. L. Klug, and R. Ramaswamy. Evaluating mobile survey tools (msts) for field-level monitoring and data collection: development of a novel evaluation framework, and application to msts for rural water and sanitation monitoring. *International journal of*

[4] `http://www.networkinstitute.org` Accessed 02/02/2018

environmental research and public health, 13(9):840, 2016.

[2] K. Goda, T. Kiyota, R. M. Pokhrel, G. Chiaro, T. Katagiri, K. Sharma, and S. Wilkinson. The 2015 gorkha nepal earthquake: insights from earthquake damage survey. *Frontiers in Built Environment*, 1:8, 2015.

[3] J. Gupta, N. R. Pouw, and M. A. Ros-Tonen. Towards an elaborated theory of inclusive development. *The European Journal of Development Research*, 27(4):541–559, 2015.

[4] R. Heeks and A. Molla. *Impact assessment of ICT-for-development projects: A compendium of approaches*. University of Manchester. Institute for development policy and management (IDPM), 2009.

[5] H. H. Initiative et al. Kobo toolbox 2.0, 2018.

[6] M. Lokshin, M. Bontch-Osmolovski, and E. Glinskaya. Work-related migration and poverty reduction in nepal. *Review of Development Economics*, 14(2):323–332, 2010.

[7] M. Lokshin and E. Glinskaya. The effect of male migration on employment patterns of women in nepal. *The World Bank Economic Review*, 23(3):481–507, 2009.

[8] D. S. Massey, W. G. Axinn, and D. J. Ghimire. Environmental change and out-migration: Evidence from nepal. *Population and environment*, 32(2-3):109–136, 2010.

[9] H. Mthoko and C. Khene. Building theory in ict4d evaluation: a comprehensive approach to assessing outcome and impact. *Information Technology for Development*, 24(1):138–164, 2018.

[10] D. Sanderson and B. Ramalingam. Nepal earthquake response: Lessons for operational agencies. *The active learning network for accountability and performance in Humanitarian action ALNAP*, 2015.

[11] H. Schaffers, M. G. Cordoba, P. Hongisto, T. Kallai, C. Merz, and J. Van Rensburg. Exploring business models for open innovation in rural living labs. In *Technology Management Conference (ICE), 2007 IEEE International*, pages 1–8. IEEE, 2007.

[12] K. Sharma. The political economy of civil war in nepal. *World Development*, 34(7):1237–1253, 2006.

[13] S. Thieme and S. Wyss. Migration patterns and remittance transfer in nepal: A case study of sainik basti in western nepal. *International Migration*, 43(5):59–98, 2005.

[14] M. Visscher. Photo taken during community meeting, nepal, 2017.