Designing a Community-Based Disaster Relief Management System for the Non-Government Organization, OG Cares Foundation

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Abstract: During typhoons and calamities, proper relief good allocation has always been an issue. People in the affected areas are eager to get help in order for them to survive and the foundations and organization are abrupt to answer to these needs given that their resources are handled well. OG Cares Foundation is one of these organizations who try to answer to the needs of the victims as soon as they can. However, the organization is unable to fully maximize their services for the relief operations due to poor donor and inventory management, and not being able to identify exactly the list of members and areas affected by disasters.

This study is focused on how an information system (IS) can help address these issues and in turn enable the organization to perform their operations efficiently. The proposed IS solution is a community-based disaster relief management system (CBDRMS). A community-based approach is deemed more effective in the current situation as government help commonly fails to reach local sectors. A CBDRMS will help communities maximize all their resources efficiently and help out more affected areas and victims. Disaster relief is performed in order to alleviate a disaster's impact and hopefully reduce its potential for long-term casualties. Because of this, fast and immediate response is highly reliant on efficient operations which could be aided by a properly developed CBDRMS.

The said CBDRMS developed specifically for OG Cares Foundation will have a Member Status Management Module, Planning Module, Donor Management Module, Inventory Module, Resource Allocation Module, Reports Generation Module and a mobile application. These modules were defined and customized based on the operations of OG Cares Foundation. Furthermore, the CBDRMS is deemed to help the foundation to manage and keep records of their operations despite the rushed and fast-paced activities of disaster relief.

Key Words: CBDRM, disaster preparedness, disaster response, relief allocation, relief management, Philippine flooding

1. INTRODUCTION

According to the Philippine Disaster Report by Citizens' Disaster Response Center, the Philippines is one of the countries which is frequently hit by disaster. In fact, during the year 2011, among 302 of the natural disasters that happened around the world, 33 of which took place in the Philippines. Approximately 11.7 million of people are affected by natural disasters, which also makes the Philippines ranked third among the countries which are affected the most by disasters (Citizens' Disaster Response Center, 2011).

The role of non-government organizations is seen as important for it is one of the major players in catering to the needs of people when government can only provide limited assistance if

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disasters occur. Local communities rely on how NGOs address disaster with the use of planning, preventing and responding to the disaster. The target of NGOs is the population who is the most vulnerable and needs immediate relief assistance (United Nation, 2006).

In the occurrence of typhoon Pablo, 6.2 million people were affected. World Food Programme responded immediately and they had forecasted approximately 20 billion dollars needed for the relief operation. They measured that the relief goods they projected can benefit approximately 590,000 people. And they were able to provide the needed goods to the ones in need (World Food Programme, 2012).

The importance of having information available in the relief operations is relevant for it helps in the immediate response of organization towards disaster (Int. J. Logistics Systems and Management). Critical Information such as the location of disaster, the resources needed, and the current progress of relief operation are needed (Sobel & Leeson).

The relief operation considers the importance of providing appropriate quantity of relief goods to meet the demands of people in need (Wyk, 2010). More importantly, problem that usually occurs in relief operations is not just about the availability of relief supplies but how these supplies should be provided immediately in the right quantity. However, information regarding the accurate quantity of goods are often not provided (Int. J. Logistics Systems and Management)

Retaining and acquiring donor is important for it is one of the sources of funding and donations. In fact, based from the report conducted by Financial Tracking Service: Tracking Global Humanitarian Aid Flows (2013), the amount of total funding provided by the Philippines' donors as of March 2013 for humanitarian relief have already reached up to $2,128,446. Top three donors that donated funds to the Philippines includes European Commission, consists of 23.9%, Central Emergency Response Fund consists of 18% and United States consists of 14.6% among the total funds donated by donors to the Philippines. Moreover, in the World Food Programme(2013), donors including United States, Canada, Spain, Saudi Arabia, Philippines and private donors have also donated in order to support the activities initiated by World Food Programme in terms of addressing disaster relief.

Some other few reasons of why organizations are not able to retain or acquire new donors is due to donor's private financial reasons, or they feel that there is no appreciation or acknowledgement with regards to their contribution. For an organization to have donors, they have to provide a thank you letter or use other means of communication such as newsletters to acknowledge them. Having a database to be able to track contact details of valuable donors also served as a way to maintain relationship with them (Cornerstone, 2010).

OG Cares Foundation Philippines is a subsidiary organization of Organo Gold Inc. and is also its corporate social responsibility arm. It is founded in the year 2012 and it aims to provide relief operations to their members. They established a venue to serve people who are in need by providing them with specific beneficiaries using whatever the members' gain from their own commission.

2. METHODOLOGY

For the development of the project, the team used the standard Systems Development Lifecyle (SDLC) which is composed of several phases – planning, analysis, design, implementation, and maintenance (Shelly, Cashman, Rosenblatt, 2009). However, in the design phase, the team infused a heavy dependency on prototyping and testing. This was done in order to ensure that the system is well functional before implementation. Furthermore, this helped the developers prevent possible errors that could've occurred in the implementation; thus, saving time and effort.

The team started the project last January 2013 and spent about three months in the planning, analysis, and design phase. In this phase, requirements gathering was conducted through multiple organization visits, interviews, and research. Through the organization visits and interviews, the team got to know and understand the specific operations performed and how the processes actually work. This helped them in the problem analysis and guided them in conceptualizing and designing a framework for an IS solution that would best fit the organization and its needs.

After this phase, the team then proceeded with developing a working prototype of the system.

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It took them about three months before coming up a prototype that could handle a full cycle of the processes involved in the organization's operations. Initial testing was done as a module or an individual functionality has been developed.

Before moving forward to further system enhancement and development, the team first presented the prototype to the organization just to ensure whether they are on the right track; and at the same time, to get some input and feedback as to how the organization feels about the initial prototype.

After getting the approval and some recommendations from the organization, the team spent another two and a half months in developing, polishing, and testing the system.

For testing, the team spent an entire week to conduct both a black-box testing and white-box testing. After ensuring that the system passed all the sets of testing conducted, the team then executed a user acceptance test (UAT) with some representatives of the organization. The team requested one representative per kind of user (i.e. financial manager, operations manager, etc.) to test the system according to its functionality and usability. The UAT was conducted in the organization's headquarters where the actual system shall be implemented and the users were given a scenario to simulate the processes of the system.

3. HIGHLIGHTS OF THE SYSTEM

The system consists of the processes of disaster reporting, planning, acquiring donations, volunteer allocation, relief goods procurement, delivery and distribution, and generation of reports. Disaster reporting involves member's reports on a particular area affected by disaster. Planning includes identifying affected members, nearby stockist centers, and fund estimation. Local government unit coordination involves identifying the needs of the communities. Acquiring of donation involves how donations, whether cash or in-kind are managed, together with donor contacts and donation history. Volunteer allocation consists of how volunteers are scheduled and assigned tasks to them. Relief goods procurement, delivery and distribution involve how the inventory of relief goods are done at the moment it is procured, delivered and distributed. Finally, post operation meeting consists of the reports being generated at the end of the relief operations which are financial, operations, and donations report.

3.1 Member Status Management Module

At the beginning of the relief operation process, disaster reports would be reported by the member through mobile or web facilities. Through this, the system would be able to have basis on which areas are affected and to prioritize which affected areas the relief operation should take place. The intensity level of disaster will also be based from the report of the members and volunteers. Apart from that, members will be able to request for additional support by inputting their needs. The system would be able to capture the information of the support requested by their members and notify OG Cares so that they can manage member's needs. Once the relief goods are received by the members, a notification will be sent, confirming that the goods were received by the members. This would be able to solve the problem of inability to track whether the affected members received the goods or not.

Moreover, through the mapping features, it can already identify where the member is located for the user to have a basis on the member's needs base on their geographic location. This would be able to solve the problem of inability to identify the needs of the members.

3.2 Planning Module

After the decision to start an operation it is essential to set a baseline for the first day of operations, it is necessary to identify your possible affected members considering the areas you wish to target. Next, we find where we can set the field quarters, and lastly estimate the necessary amount to procure and start repacking.

The planning module will provide a streamlined list of possible affected members in the target area and using that list to estimate funds and deliver a recommended amount to be requested for procurement. In addition, using information on current stockist centres situated around the Philippines, provide the closest centres that may be designated as field quarters. This module would help in addressing the inability to logically produce list of affected members and areas.

3.3 Donor Management Module

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With the donor management module, it would help in solving the problem of poor donor management. This module would have the features of recording donor's basic information. It would also enable the foundation to add or look for donors, track their donation history, sending mails to them. Moreover, when the foundation would be in need of donation, this module would be able to send out announcements and mails to notify the donors. For the donors, this module would enable them to view their donation history, the breakdown of expenses, and view mails sent by the foundation. It would also provide them a quicker way of donating cash through online donation.

3.4 Inventory Module

The inventory module would help address the problem encountered in poor inventory management by tracking the number and availability of relief goods in the inventory. Once the relief goods on the inventory is not enough to be distributed to its members, there should be a notification to notify the top management that there is insufficient relief goods so that they would be able to contact their donors to raise funds immediately.

Donations are received daily and some even in bulk. The procurement process of OG Cares assumes that in creating the breakdown for the estimated funds necessary that there are no goods on hand despite the fact that they do. When buying goods they already consider the goods on hand and adjust the list of items they need to complete the packs, leaving sums of cash that is unspent and has to be returned. It becomes an issue with the accounting as each centavo has to be accounted for, and when the estimates are repeatedly exceedingly over, this questions the necessity of the amount and slows down the releasing and actual buying processes. This module now allows the integration of goods on hand to the creation of the breakdown so that estimates are closer and adjustment is faster. Moreover, this module handles the data on packs that are ready for deployment and those that have been delivered. Each member is entitled to one pack which is good for four persons of a small family. The tracking of whether recipients received the goods or not are done through confirmation messages.

3.5 Resource Allocation Module

The resource allocation module allocates the necessary resources needed in the relief operations. The assigning of volunteers is done base on the task that were given to them. The system would be able to show who the volunteers are, the task that were assigned, and the number of volunteers allocated for a specific task. Scheduling is also provided to organize members to go to the stockist center. In addition to that, the allocation of relief packs is also done by under this module. The number of packs and volunteers allocated for each stockist center can be seen with the use of mapping. This module would serve as a basis for the users to balance out the resources being allocated, after gathering the information on affected areas on the disaster reporting module.

3.6 Reports Generation Module

This module addresses the issues of poor inventory management, and complete the cycle as concluded by the generation and submission of reports.

This module would be able to generate different reports for the planning, on-going, post operation information, at the planning stage, the master list of affected members, initial estimates and breakdowns for procurement are to be created, during the operations this module will be able to provide inventory reports, and after the operation, financial reports (i.e. Summary of Expenses), operation reports (i.e. number of packs deployed, estimated number of families aided) are to be produced.

4. CONCLUSIONS

For this project, the team developed a Community-Based Disaster Relief Management System for OG Cares Foundation, the social responsibility arm of Organo Gold International. This system is intended to aid the organization in their problem of inability to fully maximize the services of their relief operations. As the team have observed, this main problem is caused by the following:

Information collected are not properly utilized. With the very little data that they collect from their operations, they are unable to convert this into information that may help them in the decision making processes of their operations. Because of this, the team has developed a planning module in the system where information on hand

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are already translated to meaningful suggestions for the organization's processes. This planning module also addressed their issues in logically coming up with a list of affected members and affected areas.

Poor donor management. OG Cares does not have very detailed list of their donors and they couldn't properly track everything. In line with this, the team developed the donor management module wherein all the data about their members are stored such as contact information, location, donation history, volunteer history, reported incidents and the like. This way, the organization has an organized tracking and records of the activities of their member in line with their operations.

Poor inventory management. OG Cares rely on manual tracking of their inventory during operations. This is a problem because they handle large amount of relief good items and it becomes a difficulty to keep track of where everything is going. To aid this, the team also included an inventory management module for the system. This module automatically computes for the number of items used in a relief pack and deducts it from the existing stocks. This way, it will be easier to identify which stocks they need to replenish at once.

Aside from these, a resource allocation module was also created to help the organization in determining which areas to prioritize in their operations. This module shall take into consideration what the organization has and which area will be able to utilize those resources. This module is designed in a way that it would automatically suggest where the goods would be allocated; however, the management still has the power to override this feature.

Overall, the team was able to address the primary needs and issues of the organization. The management was very happy when the system was presented to them. However, before it can be fully implemented in the organization, the team has to make a little modification in the system especially with the security.

Since the system developed is web-based, online security is one of the major concerns of the management of the organization. The system is available to almost everyone and they want to be ensured that no one could easily hack into the system and tamper with their operations especially that it holds a lot of critical information and money

is very well involved in the process. So before implementation, security functionalities such as limit in failed log in attempts, tracking whether two devices are logged into a single account, and others shall be developed.

Another recommendation is for the team to add a disassembly feature in the inventory management module of the system they developed. This will be useful in cases where not all relief packs were allocated. The system must be able to disassemble a relief pack and count back the goods in the stocks.

Other than the stated recommendations, the team believes that the system developed will be very useful not just for OG Cares but any organization with similar operations.

5. ACKNOWLEDGEMENTS

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