Digitization of NGO Management System focused on Women Empowerment

Abstract—The Database Management System (DBMS) for an organization enables the users to define, create, maintain and control the access to the database. It is a process of storing information and retrieval in an orderly fashion. Non-Government Organizations (NGOs) have immense contribution towards sustainable community development in Bangladesh. Particularly, NGOs focused on women empowerment have many programs, functions and roles which assist community to become empowered and eventually attain sustainable development. To expedite their work and minimize traditional record keeping system this paper is focused on incorporating Electronic Data Processing and Management System in the Organization with necessary guideline and detail laid down procedures based on studies conducted in two local NGOs (Nari Uddug Kendra and Friends In Village Development Bangladesh (FVDB)) at Dhaka. It will help the NGOs to understand the weaknesses of manual data processing and preservation, the requirements of automation, data integration, data security, real time data sharing and collaboration maintaining data integrity. Further, the NGOs will have an insight in understanding the design concept of a database, work flow and ties between Entity Relationship (ER) diagram and relational schema.

Index Terms—Database management system on NGO Bangladesh, NGO administration automation, Cloud database, ER diagram, Mobile and web technology

I. Introduction

Women empowerment entails giving power and authority to the women. The process of empowerment requires transformation of structures of sub ordinance, control over material and intellectual resources, gaining decisions, making authority and reduction of gender inequality. This requires that women must recognize their strategic needs, their social position and understand how coercive it is. The woman's strategic needs are here defined as to increase the woman's bargaining capacity, reduce violence against women and make them gain more influence over decision-making. Multidimensional difficulties and constraints have been encountered in the work for woman's empowerment. Most of the violence towards women in Bangladesh takes place within the households [1]. Thereby to achieve the objectives NGO works as an important development agent in parallel to the government led activities in Bangladesh. This sector is increasingly becoming important because of claims that they are efficient and effective; they are innovative, flexible, independent and responsive to the problems of poor people at the grass-roots level [2].

One of the biggest operational challenges faced by organizations today is information management. Their work greatly depends on collecting, storing, sharing, and archiving information related to their target audience. While the world is moving towards virtualization, our local NGOs are still holding their side on manual systems [3]. Where the level of service is completely dependent on individuals and thus it puts a requirement on management to run training continuously for staff to keep them motivated and to ensure they are following the correct procedures. It seem to be very easy to accidentally switch details and end up with inconsistency in data entry or in hand written orders. This has the effect of not only causing problems with customer service but also making information unable to be used for reporting or finding trends with data discovery. It takes more effort and physical space to keep track of paper documents, to find information and to keep details secure. When mistakes are made or changes or corrections are needed, often a manual transaction must be completely redone rather than just updated. With manual or partially automated systems information often has to be written down and copied or entered more than once. Systematization can reduce the amount of duplication of data entry in addition fulfilling simultaneous access while maintaining data integrity. The primary reason of not utilizing the technology in their field has to motives. One, it seems costly to implement on ground and second, limitation in understanding the multiplier effect of utilizing database as a baseline. Our study will help the organization to understand their actual needs and better way-out to run organization effectively employing more in humanitarian work other than in-house file management duties. In recent years there were few initiatives taken to make the system automated but no such massive system design was made for the NGOs as like we have done in this paper. However some relevant projects and papers are summarized in Table I.

The rest of the paper is organized as follows: Section II demonstrates the present scenario while III describes the features, conceptual design and implementation along with the work flow of our proposed approach. The over all discussion has been added in Section IV which also concludes the paper.

II. Present NGO Management System and it's Limitations

A. General scenario of existing NGO Management System

At present in most of the NGOs of Bangladesh manual system of Data Management is used. In this system information or data is not maintained centrally instead maintained at different levels shown below: Head Office: Maintain organization information, branch information, key information about the projects which includes project budget, donors, key expenditures, employee information etc. Branch: Maintain information of the beneficiaries, trainers, volunteers, project

TABLE I: Summary of the Related Works to Digitize the NGO Management System

Authors	Paper Title	Proposal	Platform
Tanrikulu et. al. [4]	A web portal model for NGOs' knowledge management	Communication among NGOs, their members, branches and the civil society considered while making this web portal model/prototype. Any NGO can use this prototype as a base and can implement their information on it or can change if needed.	HTML frame based overall infrastructure, MS Access for creating table and connecting with prepared HTML pages, ASP for getting and writing data between forms and database and finally using CSS arrangement of colors and style were made.
Lamba et. al. [5]	Cloud Computing Future Framework for e-management of NGO's	Providing a framework, education cloud for NGOs emanagement, issue education as a tool to solve social issues, e-cloud provide student facilities with Non-functional aspects, economic and technical aspects. Different NGOs use education cloud to spread the education at rural world.	
Vasconcelos et. al. [6]	Knowledge management in non-governmental organisations: a partnership for the future	Provide Knowledge Management(KM) practices to use portal technologies in NGOs. It also presents the necessity of a responsible, cooperative NGO from a KM perspective, for promoting the growth of Communities of Practice both in local and global network.	Based on multitier architecture which allows a web enabled personal computer (client) to interact with application server computer. Microsoft(MS).NET Framework with ASP.NET for application server of the Web-KM system. Software, Web-based applications were build using .NET Framework.
Rathi et. al. [7]	Role of ICT in Women Empowerment	Here the role of ICT in women empowerment have been discussed and illustrated various cases to give light on changes ICT has brought to the society. It says about the things women can get (Security, awareness, knowledge, employments, confidence, popularity)using ICT.	

officials, branch employees, branch expenditures in detail, project expenditures, project assets in detail etc.[8]

In some of the big NGOs automation is done. But that is at head office or branch level. They usually maintain the data related to the employees and the trainers. It includes basic information of the employees and trainers, their salaries, major expenditures, yearly budgets etc.[9] However, in most of the cases, logbook is the only medium of data storage at root level of NGOs.

B. Limitations of existing NGO management system

The difficulty level becomes excessive when the NGOs work with the existing system of management. First of all, cost is one of the primary drawbacks of manual data entry. Manual data entry is a labor-intensive process. The cost of hiring data entry workers is likely to exceed the cost of purchasing basic equipment and software to automatically enter data into a computer, especially if large amount of information must be entered. However in some case, for small data entry tasks, manual entry may be cheaper than the cost of buying the appropriate equipment for automated data collection. For maintaining same data at head office and branch duplication of human effort is used and double number of stationary are utilized. Manual data entry and maintenance has the potential to be less accurate than automated data entry. A human worker can not always recognize and correct errors as they occur which could easily be identified in an automated system. Workers that do not have close attention to detail or that are suffering from a lack of concentration or fatigue may make more errors [10].

Manual file management and organization does not have enough security. Paper files can be lost in fires and floods, but electronic data is easy to backup in multiple locations, reducing the potential for permanent data loss. At the same time accessibility to data can be restricted in automated

system which is difficult to implement in a manual system. Complexity problem emanates in paper filing system which is complex than electronic system. Anyone can look through and operate the automated system with minimum of training and basic knowledge about computer. Though in an alphabetized filing cabinet it is easy to find a file but difficult to maintain a big volume of data. Another disadvantage of traditional file systems is the time it takes to access data. It can take minutes or hours to locate a few files in a large paper filing system. Furthermore traditional file systems are cumbersome in that they do not allow users to easily edit files or send information to others. Paper files often cannot be edited directly, forcing users to make new copies to update old files. To distribute data on paper files, users must mail, fax or scan the data. Again data can be get out of order in traditional filing systems. If someone accidentally puts a file in the wrong place, or takes a file out of a cabinet and forgets to put it back, it can lead to lost data or the creation of additional copies of files. Manual system is time consuming and costly to produce reports where data duplication is of great concern.

III. PROPOSED SYSTEM

A. Requirement Analysis

- Two local NGOs (Nari Uddug Kendra and Friends In Village Development Bangladesh (FVDB)) at Dhaka were visited to understand the existing system.
- Detail information about the activities, work flow and project of the NGOs were studied from the papers, brochures, log book collected from the above mentioned visited organizations.
- Besides, a short survey was conducted at field level projects of the NGOs where we have met with the officers liable for the projects and the beneficiary women of the projects to get the real scenario of the system.

Merging these perspective ideas, conceptual design of the system was developed with the keen interest of making the system automated.
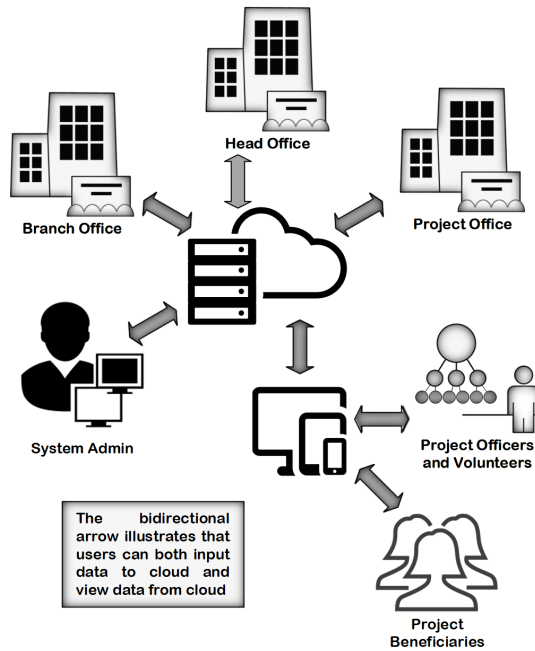

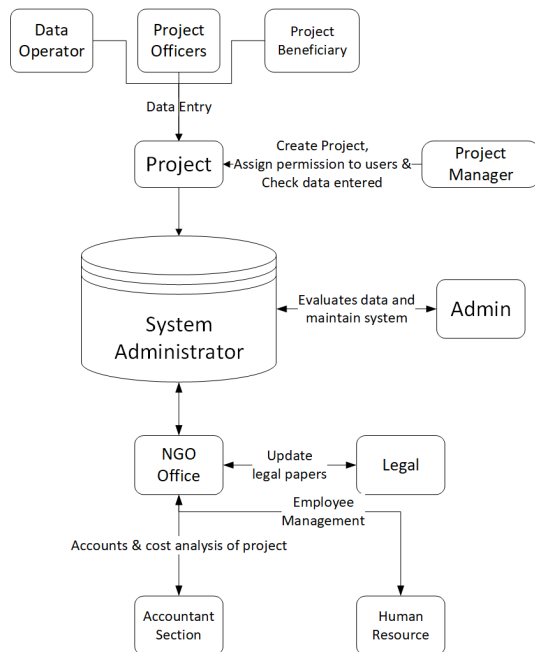Fig. 1: System architecture involving all stakeholders

Fig. 2: Work flow of proposed system

B. Conceptual Design

Figure 1 demonstrates the overall architecture of the system. The key concepts of the proposed system are listed below:

1) **System integration and synchronization:** All the projects, branches, beneficiaries and all types of people involved with the projects will be under same system through the cloud facility.

2) **Mutation:** Each time a new beneficiary of any project is added or any asset is provided to beneficiary, everything will be handled by the system through the unique accounts and online verification process that the data entry officer will pass through.

3) **Triggering update:** Whenever a new beneficiary is added at project level or any new asset transaction is done through the system and data will be updated which can be reviewed by the senior manager.

4) **Project status:** The status of any project at any corner of the country can be monitored by the head office at any instant of time.

5) **Finding exact task or support available for beneficiary:** Through the online account, the beneficiary can log-in and can know about the asset(sewing machine, dairy animals etc.) or service(health-care, nutritious food etc.) assigned for her at any project and can get the idea from which location she will collect the asset.

6) **Generate report:** Reports are frequently required for any project and branch offices which can be easily generated by the system software at any time.

7) **Easy access:** Due to user friendly UI and UX, the account holders can easily use the system. Since the root level users or beneficiaries of project have little literacy, Bengali font and appropriate icons have been used for them.

8) **Security:** Online security for all the users have been ensured through user verification system. Unique identification number has been provided to all the people involved with the project by the system admin which ensures the online verification security. Data of one user can not be seen by others. The edit privilege of data is only given to admin of head office.

9) **Unique account for all users:** All the people involved with projects will have their own online accounts. As a result the beneficiary will be able to know about the benefits or assets or service she will be getting from the project and the root level officers, volunteers will know about their assigned tasks in the projects.

10) **Avoid misuse of service or asset for projects:** The beneficiary will be able to know about the service or assets she will get from the project. As a result, the officers or volunteers can't use the project assets of beneficiaries for their own personal purpose.

11) **Alert to head office:** In any case of misuse of project asset or service by root level volunteers or officers, the beneficiary can directly complain to the head office through the system. As a result necessary steps can be taken to avoid or resist such incidence by the senior authority liable to project. Being an online complaint system, the identity of beneficiary or complain launcher will be kept secret which avoids the future harassment of her by those against whom complain was initiated.

12) **Updated project state:** The officers and beneficiaries

liable to project will update their own account after each task completed which indicates project progress.

13) **Mobile notification system for users:** When any asset or service becomes available for any beneficiary, she will get mobile SMS. Similarly, when any officer or volunteer will be assigned to any particular task of the project by head office, he/she will be notified by mobile SMS. Thus such quick notification system will make the users aware of their task or service.

14) **Prevent inferior service:** If any service or asset assigned for any particular beneficiary is not given to her, then an alert will be generated to the head office which will in result consistently knock the involved officer to ensure quality handle of service or assets.

15) **Feedback data analysis:** At end of each project, online feedback is taken from project beneficiaries and liable officers. Besides, the tracking result of service or assets provided to the beneficiaries are also taken to consideration by the system. Combining all these data, an analysis is done by the system which generate the success percentage of the project.

16) **Success prediction of new project:** Based on the success percentage of previous projects, feedback data of beneficiaries of project, data analysis is done. A machine learning and artificial intelligence approach are taken which can predict the success rate of any new proposed project of the organization.

C. Development of the Prototype

Generally, the NGOs of Bangladesh work on project basis. Based on that requirement, the database management system is built to ease the project based activities of the NGOs. Whenever a new project is initiated, the project admin can add the other officers and the beneficiaries of the project through the system. The beneficiaries and the other officers linked to the project can observe their task and update of work through their own account in the system. Apart from that, every NGOs have their own core management and central office which coordinates the overall activities of their projects throughout the nation which has been eased here in this system through their own individual accounts. As a result, the overall activities of the project can be monitored online by the associated people. The challenge of performance analysis of the beneficiaries of the project and their improvement and development can be easily justified from the update of their activities through the automation in system. As a result the success parameters of the project can be easily evaluated. The complete work flow of system is shown in Figure 2.

Laravel framework has been used to develop the front end and back end, Android OS is used for the mobile platform whereas MySQL is used as the database. Google Cloud has been incorporated to ensure the cloud database for the system which permits to focus more on coding rather than the underlying infrastructure. The service comprises 24/7 online capacity and assistance. The three phases of database design has been maintained: Conceptual database design, logical database design, and physical database design. To translate the conceptual design to a logical design an Entity Relationship Diagram has been uploaded in [11].

IV. DISCUSSION AND CONCLUSION

To enhance the domain of the NGOs within the population needs time, experience, facilities, enough fund, intelligent handling of information and most importantly manpower who ensures other attributes. We have identified the manual workforce management as the prime concern. To negotiate with this limitation we proposed a robust database management system whose ultimate objective is to allow manpower to get involved into business other than clerical or courier duties.

Our proposed system is a combination of security, concurrent data accessibility, data handling, information storage and maintains data integrity. Therefore organizations can handle more precisely their everyday tasking in a better way then previous time. It will deliver powerful results for our clients or beneficiaries. This can meet all the challenges an NGO faces in the digital age and thereby is sure to accelerate women empowerment in the country. The success of the project will highly depend on the timely execution, proper utilization and enriching the database with data. Following the system will help the NGOs to work more professionally with an ultimate goal to accelerate the development of the country helping women to grow independently.

REFERENCES

[1] M. J. Abdin, "Women empowerment in bangladesh," 05 2008.

[2] M. Islam, "Bangladesh and the emergence of ngos for development," pp. 21–38, 09 2016.

[3] Bangladesh ngo foundation. [Online]. Available: http://www.ngofoundation.org.bd/

[4] Z. Tanrikulu, "A web portal model for ngos knowledge management," 2015.

[5] H. S. Lamba and G. Singh, "Cloud computing future framework for e-management of ngo's," *arXiv preprint arXiv:1107.3217*, 2011.

[6] J. Vasconcelos, P. C. Seixas, P. G. Lemos, and C. Kimble, "Knowledge management in non-governmental organisations: a partnership for the future," in *Proceedings of the 7th international conference, enterprise information systems (ICEIS), Miami, USA*, 2005.

[7] S. Rathi and S. Niyogi, "Role of ict in women empowerment."

[8] Ministry of social welfare. Government of Peoples Republic of Bangladesh. [Online]. Available: https://msw.gov.bd/

[9] Ngo affairs bureau. Prime Minister Office - Government of Peoples Republic of Bangladesh. [Online]. Available: http://www.ngoab.gov.bd/

[10] Problems of governance in the ngo sector: The way out. Transparency International Bangladesh. [Online]. Available: https://www.ti-bangladesh.org/research/ExecSum-NGO-English.pdf

[11] Er diagram of ngo management system. [Online]. Available: https://drive.google.com/file/d/1DxiioZDxjm3uksAgBboQZQaMMYVY2ItS/view?usp=sharing