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Cloud, Big-Data and Human Centered Computing towards better Information and Technological Solution in MGNREGA: An Existing and Possible Overview

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ABSTRACT

The use of Information Technology applications in almost all the sections of the society became one of the common practices in the society. Education, health, government, business, commerce, environment, and other areas, IT and Computing are plays a leading role. The Information Technology is also changing its shape and expanding its components every day. The latest in the list are Cloud Computing, Green Computing, Human Computer Interaction, Big-Data, Analytical Tools, and parallel computing. In the Government sectors, these technologies have valuable contribution and the magnitude of such contribution is increasing day by day. In the MGNREGA project, India, huge amount of information and computers are used and here these emerging technologies may be applied based on requirement and need. This paper discusses the potential applications of Cloud Computing, Big Data. Human Computer Interaction and Parallel Processing to improve the magnitude and speed of information processing in this rural employment project, which is officially termed as MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act, 2005).

Keywords: Information Technology, Computing, MGNREGA, NREGA, Cloud Computing, Big-Data, Human Computing, Social Informatics, E-Governance, India, Rural Development.

1. INTRODUCTION

Mahatma Gandhi National Rural Employment Guarantee Act, 2005 (MGNREGA) is an important rural development initiative in India which empowers the rural men and women towards their better employment opportunities. In this project, People have been engaged as workers and have been employed for creating infrastructure including roads, canal, ponds, well, and also water harvesting, drought relief, flood control, disaster management, and so on [1-3]. Crores of rural Indians have been registered and engaged till now and are working on the project based on their need. Currently, MGNREGA project running in the 31 states and Union Territories of the Republic of India and thus huge amount of information is generated in each and every day. Thus latest technologies of Information Technology are playing an important and valuable role. All these technologies have the feature of efficiency, cost-effectiveness, easiness, flexibility, and fulfillment of the main aim of IT and Information Management.

2. OBJECTIVES:

The following are few main aims and objectives for which this case study has been undertaken—

- To know basic of Information Science and Technology applications in the social development projects specially in the MGNREGA.
- To learn about the MGNREGA project and its basic features with potentiality and uses of IT and Computing for wider applications.
- To understand and find out latest of Cloud Computing, Big Data Technologies, HCI, parallel computing and their potential role and relationship with NREGA project.
- To dig out the potential opportunities and possible challenges, issues and SWOT analysis (in respect of Information Science and Technology) in MGNREGA context.

3. MGNREGA AND CLOUD:

The MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act, 2005) has been practically launched in 2006 as a measure of social development tool for offering work and job to the Indian rural men and women. Crores of workers engaged in this project for at least hundred days in a year [4-6]. The Stakeholders of MGNREGA are listed in Fig: 1. This scheme has many benefits; first of all, it is ensuring the right of work and thus solving the problems of employability. Secondly, it is reducing the migration of rural Indians to urban zone or international places. Thirdly, it is ensuring rural development as several works have been dealt by these workers and ultimately this result in rural and side by side social development.

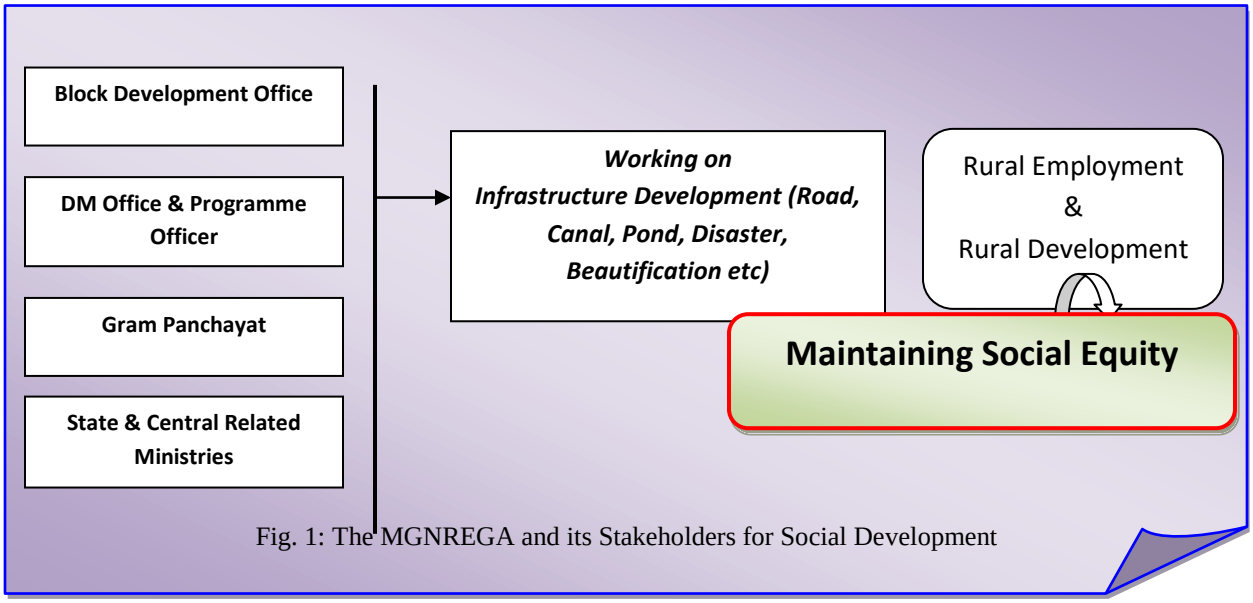

Fig. 1: The MGNREGA and its Stakeholders for Social Development

Today crores of people have registered in this project and it is spread around 600+ Districts and 240000+ Gram Panchayat. Thus in all these sites, many computing devices are used for better and healthy information management and information technological utilizations. There are many technologies namely database technologies, networking technologies, multimedia technologies, communication technologies, and parallel processing of information have played a lead role for healthy information management and more emerging technologies are awaiting for. Cloud Computing is an important and latest technology which is a kind of virtualization and helps in minimizing uses of hardware, software, database, applications, firmware etc by installing these tools in a centralized place and used at the remote places (Refer Fig: 2). Moreover, in this technology, it is possible to save the finance as by the limited numbers of computers or centralized devices managing large areas become easy.

It also gives the flexibility of using space, data, and interest connections depending upon need. Hence in this system, some block may use a centralized Data Centre (Cloud Computing Centre)—which offer hardware, software, apps and thus it does help in economic perspective. Moreover each block and Gram Panchayat no need to use separate high skillful manpower to manage sound IT Systems, however, they have to use a minimum number of data entry operator for managing and creating the job cards, Muster rolls, and for the initial registration [7-9]. The flexibility and licensing are other benefits of cloud integration in the MGNREGA which ultimately gives freedom of using separate applications, software, depending upon need and without any additional charges as with centralized payment, everything is possible. Cloud Computing based parallel processing do the works of thousands of computers and other devices by few machines and thus it minimizes the use of other computers and hence indirectly helps to maintain a clean environment. The less use of computers and machines leads to low degradation of the environment [10-11, 6]. Also, manufacture and use of these large number computers affect the society as these products have several harmful chemicals and thus shifting to cloud computing based new technology system in MGNREGA project indirectly helps in the betterment of the society through its indirect environmental benefits too.

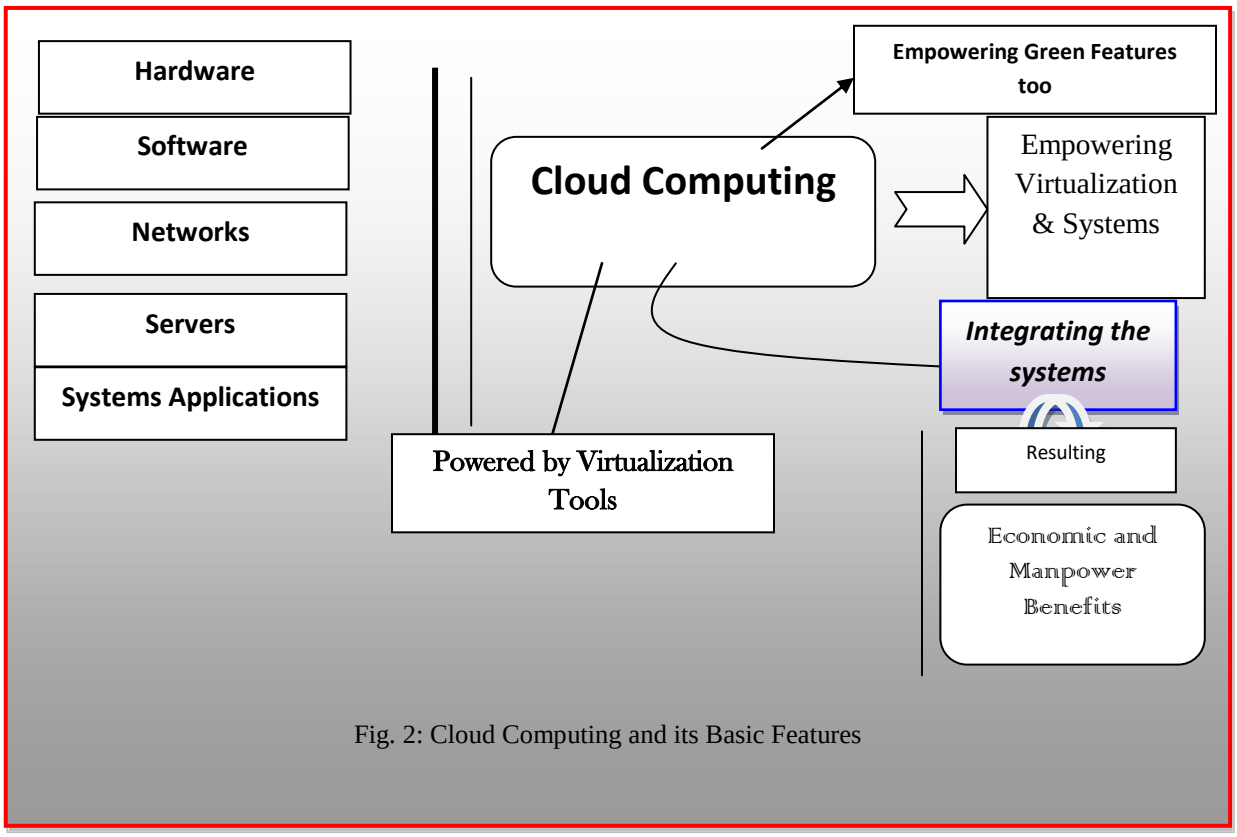

Fig. 2: Cloud Computing and its Basic Features

4. MGNREGA AND BIG-DATA:

Big-Data is an important and valuable term in the latest Information Science and Technology practice. The Big-Data is helpful for a large and complex data processing and it deals the challenges of analysis, data-curation, sharing, storage, transfer, and virtualization and also the information privacy. In the MGNREGA project, crores of people have registered and managing these data is important and most challenging for us. Moreover, the project has to deal with a large amount of data. Creating data and generating data in this project is most important activity in the information system section. The project is spread over 600 districts and nearly seven lakh of villages and in the villages crores of people working so that their daily, weekly, and monthly data is updating day by day [12-14]. It is fact that in around 25000 blocks the data entry is being done and managing this heterogeneous data is becoming complex enough, thus here Big-Data analytics tools and software play an important and valuable role. In decision making, report generation, MIS reporting, annual reporting etc., Big-Data technology plays a lead role. However, apart from emerging Big-Data products, some important peripheral technology tools like database management software and database applications are also used. These analytical tools may help to lead more confident decision making and also healthy result may bring better operational activities, efficiency, and indirectly helps in cost reduction [15-16]. See Figure 3 for visualize data.

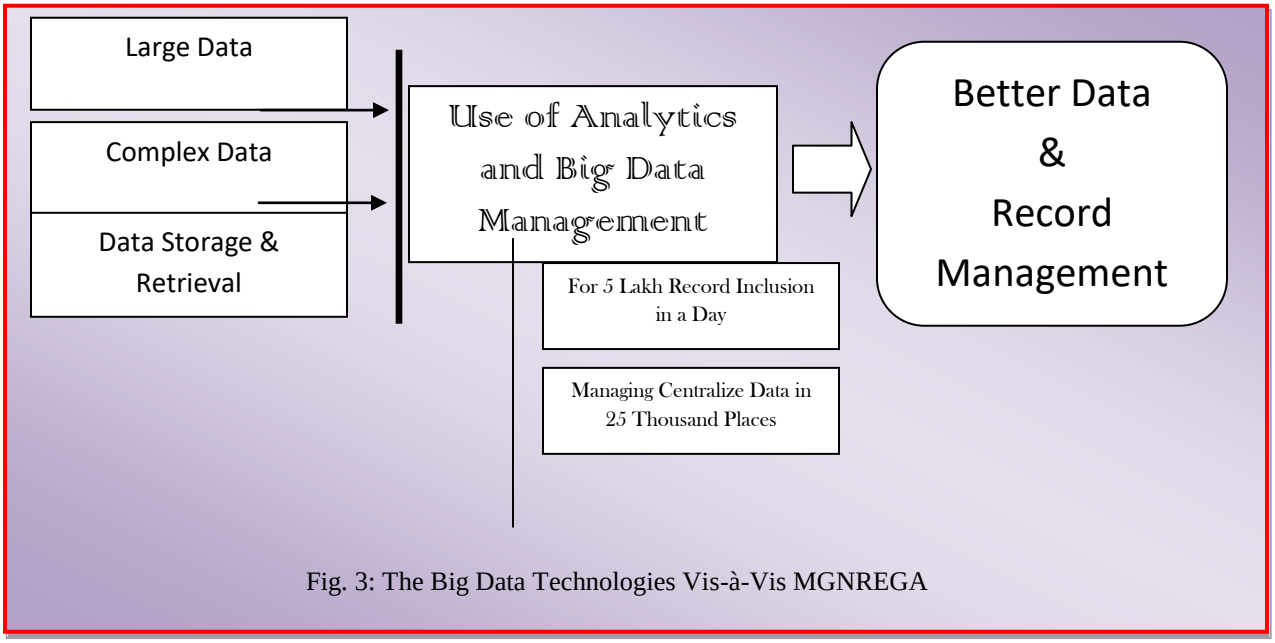

Fig. 3: The Big Data Technologies Vis-à-Vis MGNREGA

The MGNREGA supports five lakh record inclusions per day in different languages and hence all sections of the Big-Data management is helpful and these ultimately improve the information management modules and functions, which include—

- Administrative Module.
- Worker Management Module.
- Finance Module.
- Module of Store and Inventory Management.
- Cost Estimation Module.

Moreover, the large amount of data helps in future operations in MGNREGA in a different context. All sorts of characteristics of employment related data *(include the roll, inventory, velocity, machine learning, digital footprints)* are positively possible to manage through Big-data and parallel processing [17-18].

5. MGNREGA AND HUMAN COMPUTER INTERACTION:

Human Computer Interaction is similar to the Human Centered Computing Usability Engineering, and User Experience Design—in many contexts. It involves the designing and implementing Human Centered Computing and building computers which build by interaction. Human Computer Interaction normally deals with building of computers and computing and IT devices powered by human values and human need. Initially, Human Computer Interaction was mainly treated as the designing of the interface but gradually it is wider and spread in other areas and components of computing and IT devices. In Human Computer Interaction the principles of usability engineering mainly the activity theory, user interface designing, value sensitive designing etc, have played a lead and important role. The HCI is helpful in many MGNREGA areas which include (also refer Fig: 4).

- The designing of monitors of MGNREGA scheme is to keep in mind languages diversely and this simple and efficient designing is needed [19-20].
- The monitors and computers may be used the basic user experience design principles so that the less information literate people may also handle the machine.
- The small and smart devices including the smart-phone, I-Pod etc. are used by the Human Computer Interaction system and thus devices need to be much more simple and healthy to keep in mind the matters of digital divide and information divide as far as India is concerned.
- The server and cloud based apps are also used rapidly in the MGNREGA project and thus it is better if the product integrates with HCI and HCC principles to become much more user friendly and efficient.

- The centralized database, computer systems, devices—each and everything need to prepare with the principle of HCI and Usability Engineering for better and healthy output.
- Today mobile based information services become common. So at the root level, such services may be started to the mobile number of each job card and holders and here HCI and UXD principles need to follow with the provision of languages [21].
- In general, the website of the MGNREGA may be enriched and enhanced with the HCI and UXD so that it is possible to expect more than one lakh hits each day to the MGNREGA website.

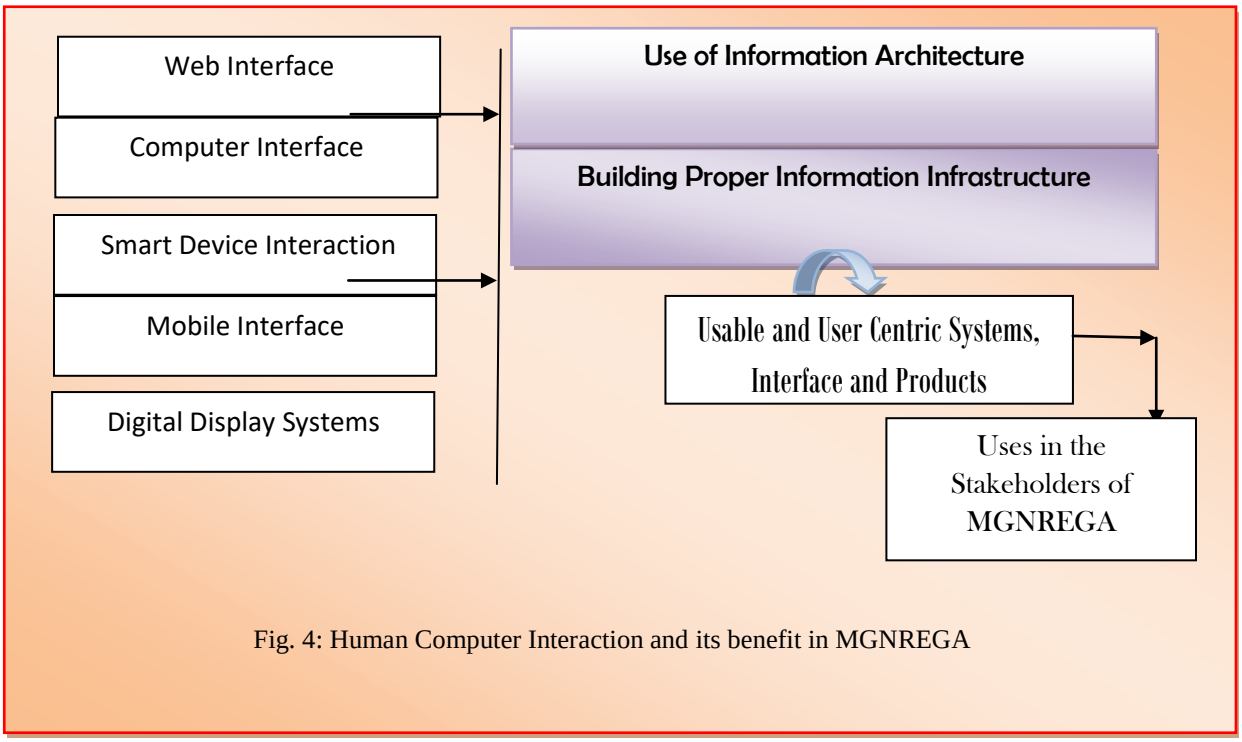

Fig. 4: Human Computer Interaction and its benefit in MGNREGA

6. SUGGESTION:

- It is better that there should be established, credible, reliable, and correct sources of information.
- Special attention is required on some of the aspects including information policy and technology policy.
- The HR related issues, confidentialities; RTI related matters may also deal with proper planning and here the use of Cloud and HCI positively possible.
- It is essential that proper measure should be established on prevention of fudged and spurious data.
- A healthy and hybrid designing is most preferable for building the IT and Information Systems much more efficient and effective.
- More advanced Bio-Metric system and GPS may be installed.

7. CONCLUSION:

This way the social development project may lead to successful implementation by the social computing and informatics implementation. The latest technologies and systems like a public cloud, private cloud, or hybrid cloud need to choose depending upon need and context. It is important and urgent that a proper communication should be there in between the stakeholders including worker, officer, Gram Panchayat, BDO, District Offices, State Level Offices and ministries with the central level ministries and others. Moreover, this cooperation and coordination are also needed for the other areas of IT which include Human Computer Interaction, Usability Engineering, Big Data Systems, Information Management, parallel computing, and future feedback monitoring systems and so on.

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