Smart Villages With a Two Way Digital Governance For an Atma Nirbhar Bharat

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Abstract—

As of 2018, there are 649,481 census villages in India. Smart villages have been a great initiative by the Government of India. The Prime Minister's thrust on Atma-nirbhar Bharat is a step towards making India for a self-reliant and self-developed economy, a dream that was first envisioned by Mahatma Gandhi that covered aspects of agriculture, village industry, animal husbandry, transport, basic education, health and hygiene, core towards a larger goal of economic development of the nation. However the progress of 72 years after independence has just been a pipe dream with no significant progress. The present research paper aims at smart governance in the Government Sector particularly of the elected representative using a two way digital technology in which the citizens and the government administration communicate with one another with the use of digital dashboard on a day to day basis by providing status report and feedback. This digital smart governance could results in the development and progress of the rural India with the help of geo-spatial technology. The paper also proposes the design of a dashboard that is a major challenge for determining performance parameters of elected representatives during their tenure. The research is purely based on secondary data. The digital mode can bring about a better commitment for a progressive India where 60 percent population live in villages.

Keywords—Smart villages, smart governance, digital, dashboard, India

I. INTRODUCTION

Indian prime minster initiated National Smart Cities Mission in 2015 for urban renewal and retrofitting program with the mission to develop smart cities across the country with seed funding Rs. 98,000 crores. This mission initially included 100 cities and implementing in collaboration with the state governments. But there are many challenges to develop Indian cities which has town-planning history of 100 to 300 years only. Many towns and cities developed in British colonial period for the trade purpose. India is a developing country where migration from rural to urban is at the peak due to employment opportunities, education,

lifestyle and infrastructural facilities available in cities. For the first time since Independence, the absolute increase in population is more in urban areas that in rural areas. The rural population was 68.84 percent and urban population was 31.16 percent as per 2011 census. It was 72.19 percent and 27.81 percent in 2001 respectively.

For the development of smart cities huge funds are required. State government has paucity of funds to fulfil all criteria. Government used competition based method. Due to financial crisis, West Bengal government and Mumbai have been withdrawn from smart cities mission. The share of rural to urban migrants in the population rose from 5.06 percent in 2001 to 6.5 percent in 2011. Migration to urban centers leads overburden of urban resources and many other problems created in cities. Smart city mission again attract rural population. Therefore, government initiated smart village mission at large scale.

India has to achieve a target of 5 trillion economy in coming 10 years which is very difficult task if we study our economy from Hindu Growth Rate to new Economic Policies. But this can overcome under the dynamic leadership of the Prime Minister from the economic perspective, with steps in the right direction to make smart villages a success and this can be possible if there is a one to one understanding between the Government and schemes and the ongoing status and citizens' knowledge of its performance

The slow progress and the political commitment has hindered progress of smart villages to a large extent. This has naturally led to a serious trust deficit between the government way of administration and citizens.

It has also been observed that media's role though being very important in providing the right information to the stakeholders has been confusing and lack development.

The Government of India's initiative for a website on digital village (digital-village.in) comprising of banners displaying digital status pertaining to 1. Surveys 2. Financial Awareness 3.Solar 4. Education (with categories of CCC, BCC and Tally) 5. Health Human 6. Nielit Facilitation 7. Wifi Choupal 8. Health Veterinary 9. Skills- Handset repair 10. Skills Electricians

The present mode of digital communication suffers from following limitations

- Interfaced communication digital mode between the residents/citizens of India and the Government administrative machinery.

- The present digital information has a dearth of online dynamic digital status that changes on day to day basis.

- The information that is provided have information that cannot be challenged digitally with the help of online voting by stakeholders.

- The digital information does not provide detailed vital information of financial details such as allocation, expenditure, savings etc. in a nutshell for updating online progress of the Government projects to the stakeholders

- The information provided is inclined towards a singular representation without adequate details

  Therefore there is an urgent need for more simplistic and objective oriented visualization that is most relevant to decide performance of elected representatives.

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Considering above limitations, there is an urgent need to establish a better mechanism of the digital platform by a two way communication between the governance and stakeholders for a transparent and effective governance.

Studies reveal that the political environment works in a different realm and opacity in which case the stakeholders have less access to the inside functioning.

There is a need to a robust digital technology that ensures internet speed, cyber security and safety, affordable internet pricing. The digital dashboard can be a useful tool that can be put up at a conspicuous position like a running score of the performance of an elected representative on a day to day basis that does not lead to a sudden surprise for a next roller coaster ride at the end of the tenure.

II. RESEARCH OBJECTIVES

To find out an efficient and effective mechanism
1. By way of a two way digital communication between the stake holders of smart villages and Government administrative machinery
2. To suggest ways to achieve greater transparency in Government administration about the status

reports of smart village and the elected representatives' individual performance.
3. To eliminate the layer of confusing media reporting and bring about a focused tracking system of the Government's performance.

III. LITERATURE REVIEWS

Literature review was undertaken to understand the various earlier researchers who have studied on the aspects of digital dashboards for smart villages and smart cities.

The research paper lay special emphasis on the Geo spatial dashboards to monitor smart villages(Jing et al., 2019) and the Triangulum city dashboard (Farmanbar & Rong, 2020), with added feature of village improvement status report from time to time. The research paper titled 'CityEye: Real-time Visual Dashboard for Managing Urban Services and Citizen Feedback Loops' discusses about the stakeholders participation and feedback.

The smart village concept as was first envisioned by Mahatma Gandhi focuses on self-reliance and self-sufficiency (Harijan 26-7-1942) and give more thrust on employment generation, have been a pipe dream even after 72 years after independence as most people from villages migrate to cities in search of employment. Prof. Gilbraith, Acharya and Shri Vinoba Bhave have concurred with the idea of employment through agriculture, village industry, animal husbandry, transport, basic education, health and hygiene. Thus inferentially the idea of Governance was embedded in the theory of decentralized political system that could be built on scientific lines for a strong national defense (Gandhi, 1962)

The aim of smart village with bundle of services by effective use of local self-governance, access to assure basic amenities and responsible individual and community behavior to build happy society, coupled with smart decisions using smart technologies and services.(Somwanshi et al., 2016). This theoretical concept must be made to work through smart Governance using digital technology. The Smart villages should move towards understanding the significance of communities and sustainability.(Zavratnik et al., 2020). The authors have acknowledged that to make any proposal successful the role of governments and other regional and local authorities, decision makers must take up political responsibility for an effective pivotal role in the Corporate Governance in the government sector.

The Government's initiative towards Performance dashboard of the India is a great initiative (Performance Dashboard-Transforming India, n.d.) The Government of India aims to achieve growth on multiple fronts with the Digital India Program with nine 'Pillars of the Digital India' such as

1.Broadband Highways 2. Universal Access to Mobile Connectivity, 3. Public Internet Access Program, 4. E-Governance: Reforming Government through Technology, 5. E-Kranti – Electronic Delivery of services, 6. Information for all, 7. Electronics Manufacturing, 8. IT for jobs, 9. Early

Harvest programs. The point 4 of E Governance, Reforming Government through Technology, it becomes vital to understand the community needs to bring about transparency for an effective governance.(Priyadarsini & Vijayaratnam, 2016):

Figure 1   *(Index @ Www.Digital-Village.In, n.d.)*

Table -Summary of literature review

Sr. no.	Digital village broad topics	Areas of improvement	Papers / References
1	The PM's flagship program of building model villages under Sansad Adarsh Gram Yojana (SAGY) will have it all — smart schools, universal access to basic health facilities, pucca houses for the homeless, universal PDS for eligible families, e-governance, and Aadhaar cards for all was first of its kind to build smart villages	• Transparency and validation by stakeholders is required • Follow up	(Tiwari, 2014).
2	Digital Performance dashboard from the Government official site	• Has merely the figures, that must provide with a basis and a scope for comments on a real time basis • The report must be comprehensive to give a complete picture • It must have scope to challenge the same by stakeholders (Test for data validation)	Refer image 1
3	IOT based smart villages	the technical solutions for the	(Natarajan & Ashok

Sr. no.	Digital village broad topics	Areas of improvement	Papers / References
		energy management, smart irrigation system and waste management which can be adopted in the rural development mission are the core issues that needs to inculcated using digital technology	Kumar, 2017)
4	Technology, people and institutions	These parameters are important for smart villages. Thus a lot of improvement is needed for bringing about complete transparency	(Nam & Pardo, 2011)
5	Governance by Dashboard: A policy paper	Digital Dashboard has a tendency to obscure information and may be difficult Therefore a careful design of the dashboard is required	(Bartlett & Tkacz, 2017)
6	Corporate Governance in the Central Government Departments, a Code of Good practices	Governance code to be applied over wide with respect to size, status and legal framework of the organization.	(HM Treasury & Cabinet Office, 2017)
7	IOT based smart village	The paper argues that IOT being a smart way to communicate, very little has been done in such context.	(Jayashree et al., 2019)
8	Use of mobile an essential conduit for employment opportunities	Use of mobile phones can also be an essential mode to communicate via digital boards	(Fennell et al., 2018)
9	CAG Reports	The performance report of the Indian Audit and Accounts department is almost 6-9 months from the close of the financial year, so this problem needs to be addressed on real time basis on a digital platform (unaudited basis)	(India, 2017)
10	Detail project report on smart village Kandalgaon	The paper discusses on major thrust on information and technology. However a two	(Chavan et al., 2018)

Sr. no.	Digital village broad topics	Areas of improvement	Papers / References
		way technology can play a bigger role	
11	Smart village and Sustainability, Southern Moravia Case study	For digitalization digital literacy is required	(Vaishar & Šťastná, 2019)
12	The smart village model for village area	• The proposed smart village model was categorized into 6 dimensions including **Governance, Technology, Resources, Village Service, Living, and Tourism** • 7th dimension of digital governance of smart villages by a two way mode is required	(Aziiza & Susanto, 2020)
13	Monitoring of implementation of smart villages	• The pace of improvement in all the sectors of development should be fasten to match with the timeline of SAGY Scheme. This can be achieved by giving more efforts from Government and local leaders along with the will of residents of these Panchayats	(Gupta et al., 2017)
14	Digitalization of smart villages by studying 9 pillars, in which the 4th pillar of E-Governance needs special emphasis	1. Broadband Highways 2. Universal Access to Mobile Connectivity 3. Public Internet Access Program 4. E-Governance Reforming Government through Technology 5. E-Kranti – Electronic Delivery of services 6. 9 Information for all 7. Electronics Manufacturing 8. IT for jobs	(Priyadarsini & Vijayaratnam, 2016)

Sr. no.	Digital village broad topics	Areas of improvement	Papers / References
		9. Early Harvest programmes. The pillar 4 of E-Governance will be required to be taken at the next level by a two way digitalization and validation	
15	Dashboard for supporting slow tourism in Green Infrastructure	The technique of the Dashboard for effective smart villages can be very useful	(Balletto et al., 2020)
16	Sansad Adarsh Gram Yojana	Stated the benefits of smart villages but needs speedy, timely and transparent governance	(Department of Rural Development, 2014)
17	Smart villages through information and technology	The importance of technology is observed as a catalyst for development, enabling education and local business opportunities, improving health and welfare, enhancing democratic engagement and overall enhancement of rural village dwellers	(Ranade et al., 2015)
18	Sustainable and community centered development of smart villages	The paper discusses that mere technology is not important for smart villages but there has to be sustainable development, but this argument has another view point that effective digitalization by a two way communication can be very helpful for fulfilling the goal of smart villages	(Zavratnik et al., 2020)
19	Study and development of smart village	Smart decisions can be made by smart technology	(Somwanshi et al., 2016)
20	Dashboard as a service	The questions and problems of developing a dashboard	(Pauwels et al., 2009)
21	Real-time Visual Dashboard for Managing Urban Services and Citizen Feedback	Use of smart phones to enable a richer communication between the	(Lee et al., 2015)

Sr. no.	Digital village broad topics	Areas of improvement	Papers / References
	Loops	general population and maintenance service	
22	Geospatial dashboards for monitoring smart city performance	Usage of visualization model and validity of model for designing a dashboard	(Jing et al., 2019)

The research paper Triangulum city dashboard: an interactive cloud-based visualization system named Triangulum City Dashboard An interactive data analytic platform for visualizing smart city performance (Farmanbar & Rong, 2020). The paper discusses about the efficacy of the usage of this model for smart cities that can be useful for smart villages in India. The scope for further research includes

The standardization of dashboards could be possible to an extent as there are certain common goals of the villages such as status of health care, education, quality of drinking water, agricultural production, electricity and employment. However there are certain issues that are village driven and important to certain villages that becomes a part of the election manifesto. This aspect can be considered while design of a dash board. The researcher has argued on the following points
1. Flexible dashboards can provide short term solutions
2. Further research could offer strong theory driven guidance to dashboard designers and decision support systems. Regardless of the potential interest, it is difficult and challenging to undertake such an effort
3. Example the validity of the analysis drawn from a dashboard (must be verified and valid)
4. Other issues such as data quality, i. how much clean, accurate and reliable the data is.
5. Another issue of data access and whether it could be reused
6. Since data is under license, data is personal and cannot be used for public access

7. A well designed and tested processes of data generation and handling be documented for others to know the issues.

The study of literature review leaves a research gap for lack of a platform that can prove effective to bring about communication, transparency and feedback mechanism between the community and the government administrative machinery

The literature review for digital dashboards helped in understanding the following lacunae in the current digital dashboards

- **It must have design features that are built up with most relevant performance indicators of elected representatives in respect of smart villages**

- **Must have provisions for the current status and future plans**

- **It must consist of a mechanism to connect with the citizen's grievances, comments and feedback with simplicity, comprehension and relevance**

- **The digital dashboards must have scope for users to access details of a particular topic through smart phones for performance validation by stakeholders**

This two way communication would be a step towards greater transparency and confidence building between the stakeholders and the government administrative machinery

IV. RESEARCH PROBLEMS

- To develop an interlinking mechanism across different villages to access the project status at a given point of time

- The cost and the necessary infrastructure required to train the stakeholders

- To ensure the safety, security and authenticity of a two way system with better internet connectivity and flow.

- To know how to identify key performance metrics while designing a dashboard for better clarity, brevity, cost effective, comprehensiveness and simplicity.

V. PROPOSED SOLUTION / METHODOLOGY

A good evaluation of the status should have a two way mode of i. a claim by the government ii. Authentic validation by digital voting for effective feedback mechanism.

Thus the following improvement model is proposed for digitalization of smart villages

The digital communication of a two way communication can be addressed by using interactive python dashboards with-plotly and dash
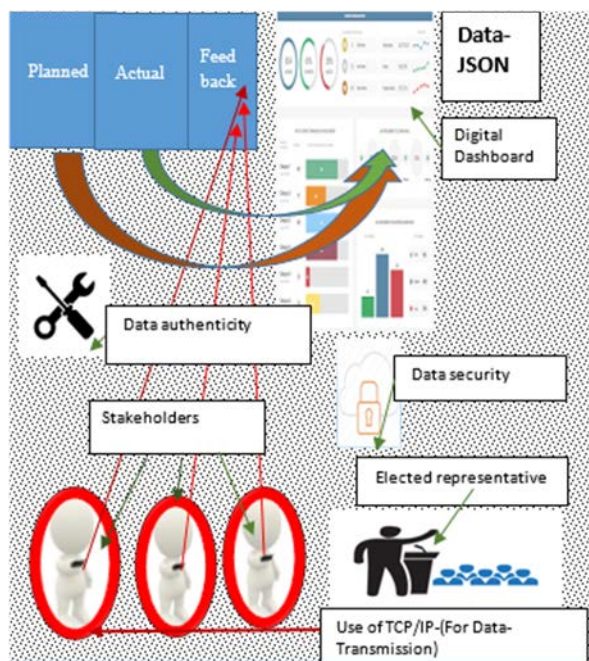
image 1-The proposed schematic diagram of a two way digital communication between the stakeholders and the administrative machinery for a smart village using big data

Recommendations –

a. The present dashboards used by the Government websites must be amended to bring about a comprehensive village status.

b. Important aspects of performance parameters to be incorporated in the Dashboards by making a committee at the Village Panchayat levels and meeting from time to time for giving recommendations to the Dashboard designers

c. Enthusiastic and novice creative educated software designer engagement could bring about a win-win strategy for creating jobs and cost effective measures for the Government.

d. The creativity characteristics could address better designing of dashboards that can bring about clarity, brevity, comprehensiveness and simplicity.

e. These committees must interact with other villages to form groups on WhatsApp or other social media platforms to exchange views and ideas to develop an interlinking mechanisms across different villages

f. The committees headed by the elected representative and local bodies must work for various aspects of legal agreements required, financial negotiations to see that the project of digital dashboard is upgraded with multiple reports with changing times. The local elected representative must also be a part of this group

g. There needs a continuous research and follow up with complete community participation

h. Usage of high end Ipad visualization apps such as Microsoft power BI or Zoho reports can be used for building the right design.

i. Use of data analytics tools such as python programing can be used for developing an effective model.

The development of this model would provide better transparency and communication between the stakeholders, administrative machinery and elected representatives.

VI. EXPECTED BENEFITS

Following benefits are expected from the proposed solution:

- Better communication and transparency in implementation of smart villages

- Engagement of local educated youth in the betterment of administration of smart villages.

- Employment generation in continuous digitalization of smart villages

- Better informed decisions for administrative machinery for smart villages

- Thus the layer of media driven confusing information could be eliminated

VII. LIMITATIONS

- The model relies on creating standardization in digital dashboard for performance parameters of the elected representatives. To create an environment free from working along with Indian administrative machinery requires consistent efforts on many psychological aspects of changing mindsets.

- A lot of research would be required in cognitive element of psychological studies so as to work in a conducive manner.

- Data sharing becomes a major concern with the stakeholders

VIII. CONCLUSION

The smart village in order to work smarter and to bring about an overall progress and development at a faster pace will require efforts and right moves from all directions. This will be possible if the right environment is created in coordination and involvement of stakeholders and the government administrative/political machinery. This effort will bring about oneness in the society that has been fragmented with divisions of caste, creed, educational and other socio differences. In order to bridge the gap there is an urgent need to bring about an open communication and transparency in the system which is possible with the help of an effective platform of communication though digital dashboard

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