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Big Data and 17 SDGs: The role play in India's GEM Governance Revolution

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ABSTRACT
This paper presents a study of the implications of big data analytics towards realization of sustainable development goals (SDGs). The paper begins with a brief overview of the concept big data and its potentials followed by a discussion of the role of big data in the realization of SDGs. In 2015, world leaders agreed to 17 goals for a better world by 2030. These goals have the power to end poverty, fight inequality and stop climate change and so on. Guided by the goals, it is now up to all of us, governments, businesses, civil society and the general public to work together to build a better future for everyone.
Keywords: Big Data, SDGs ,NITI Aayog, MoSPI, UNPAN

1. Introduction

Big data applications may offer the ability to collect and analyze 'real time' information from across India for policies that relate to the 2030 Agenda's 17 goals and their 169 targets. The scope of this information is vast, and big data applications can facilitate policy making in the all states of India that would otherwise require dedicated intensive and continuous human and financial resources.
The data revolution is associated with three "Vs": the volume of the quantity of data; the velocity, or speed, at which data are created; and the variety of sources of data.

2. The Sustainable Development Goals

The Sustainable Development Goals (SDGs) which came into effect on 1 January, 2016 is an improvement on the Millennium Development Goals (MDGs). In India, as far as MDGs are concerned, considerable progress has been made in the field of basic universal education, gender equality in education, and global economic growth. However there was slow progress in the improvement of health indicators related to mortality, morbidity, and various environmental factors contributing to poor health conditions .With SDGs in place the Indian government is now trying to integrate the efforts taken towards achieving MDGs with SDGs. SDGs are wider in scope. The 17 SDGs are as follows:

Table.1: Sustainable Development Goals

Goal 1	End poverty in all its forms everywhere
Goal 2	End hunger, achieve food security and improved nutrition and promote sustainable agriculture
Goal 3	Ensure healthy lives and promote well-being for all at all ages
Goal 4	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
Goal 5	Achieve gender equality and empower all women and girls
Goal 6	Ensure availability and sustainable management of water and sanitation for all
Goal 7	Ensure access to affordable, reliable, sustainable and modern energy for all
Goal 8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

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Goal 9	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
Goal 10	Reduce inequality within and among countries
Goal 11	Make cities and human settlements inclusive, safe, resilient and sustainable
Goal 12	Ensure sustainable consumption and production patterns
Goal 13	Take urgent action to combat climate change and its impacts
Goal 14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development
Goal 15	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
Goal 16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
Goal 17	Strengthen the means of implementation and revitalize the global partnership for sustainable development

Source: https://www.globalgoals.org/

Sustainable Development Goals have been built on the universal principle of 'leave no one behind'. As far as India is concerned, the national development goals of India, converge well with the SDGs and India is expected to play a leading role in determining the success of the SDGs, globally.

3. Role players for implementing SDGs in India

NITI Aayog, the Government of India's premier think tank, has been entrusted with the task of coordinating the SDGs. States have also been advised to undertake a similar mapping of their schemes, including centrally sponsored schemes.

In addition, the Ministry of Statistics and Programme Implementation (MoSPI) is engaged in the process of developing national indicators for the SDGs.

Many of the Government's flagship programmes such as Swachh Bharat, Make in India, Skill India, and Digital India are at the core of the SDGs. State and local governments play a pivotal role in many of these programmes. State governments are paying keen attention to visioning, planning, budgeting, and developing implementation and monitoring systems for the SDGs.

4. Big Data and the Data Revolution

Big data can be defined as large volumes of high velocity, complex, and variable data that require advanced techniques and technologies to enable the capture, storage, distribution, management and analysis of the information. Big data can be characterized by 3Vs: the extreme volume of data, the wide variety of types of data and the velocity at which the data can be processed.

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Table 2: Big Data Adopted in SDGs

SDGs Adopted by India	Big Data Examples	What is monitored	How is monitored	Advantages of Using big data
1.Poverty Eradication	➢ Satellite and Biometric data to estimate poverty. ➢ Internet based data to estimate consumer price index and poverty rates.	Poverty Indexes	Satellite images & Aadhar Data	➢ To identify poverty trends. ➢ State wise comparable data, which can be updated more frequently. ➢ Spending patterns on mobile phone services can provide proxy indicators of income levels
2.End hunger, achieve food security and improved nutrition, and promote sustainable agriculture	Using remote-sensing data for drought assessment and monitoring	Drought	Remote Sensing	❖ To create an Action Plan for Natural Disaster Management. ❖ Crowd sourcing or tracking of food prices listed online can help monitor food security in near real-time.
3.Ensure healthy lives and promote well-being for all at all ages	Internet based data to identify disease breakouts. Monitoring disease outbreaks using Social Medias.	Diseases	♣ Electronic Health Records &Hospital Information Systems Clinical Data, Genomic Data Health Tracker Data, Web and Social media. ♣ Voluntary reporting through the internet.	○ To predict disease outcomes. ○ Mapping the movement of mobile phone users can help predict the spread of infectious diseases
4.Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	❖ Social Networking Sties like Facebook, Twitter, Linkedin, Blogs etc., ❖ Course Management System (CMS).	Academic Analytics	Smart System 3D Printing Mobile Devices Cloud Computing The internet of things Artificial Intelligence	❖ Enhancement in teaching. ❖ Student acquisition. ❖ Helping students' progress.

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	❖ Learning Management System (LMS).		Massive Open Online Courses	❖ Matching students to programs and employment. ❖ Improving student's experience. ❖ To develop an effective administrative system. ❖ To enhance research effectiveness. ❖ Better data transparency. ❖ Citizen reporting can reveal reasons for student drop-outrates
5.Achieve gender equality and empower all women and girls	Medical records, social media data, mobile phone surveys, Job applications data, satellite imagery, call records data.	Monitoring Gender Issues.	Medical records, social media data, mobile phone surveys,Job applications data, satellite imagery, call records data.	▪ To identify and assess the women's equality and empowerment issues such as child marriage, domestic violence, and women's labor-force and political participation. ▪ Analysis of financial transactions can reveal the spending patterns and different impacts of economic shocks on men and women
6.Ensure availability and sustainable management of water and sanitation for all	Data from energy meters, satellite data, call records or other mobility data, and citizen-generated data	Water and Sanitation	Intelligent water metering (IM)	○ To address India's growing water crisis. ○ To improve health Practices and Management.

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				○ Sensors connected to water pumps can track access to clean water.
7.Ensure access to affordable, reliable, sustainable and modern energy for all	Data from energy meters, satellite data, call records or other mobility data, and citizen-generated data to estimate electric power consumption	Electric Power Consumption.	Data from energy meters, satellite data, call records or other mobility data, and citizen-generated data	# Smart metering allows utility companies to increase or restrict the flow of electricity, gas or water to reduce wasteland ensure adequate supply at peak periods # Regular Updates
8.Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	Internet-based data to monitor inflation in real time.	GDP and Employment at state level	Web search data, TV and radio data, digital news data, and job applications data, social media data	* Patterns in global postal traffic can provide indicators such as economic growth, remittances, trade and GDP. * To improves estimates for poor national accounts data.
9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	Map showing internet devices which could be logged in using default passwords or no passwords. Despite biases towards unsecure devices, the map may reflect online usage around the world.	Map with internet devices by location	Internet tools to scan all addresses of the fourth version of the internet protocol	❖ Easier, cheaper, quicker than internet use surveys. ❖ Data from GPS devices can be used for traffic control and to improve public transport.
10. Reduce inequality within and among countries	Mapping socio-economic status by analysing airtime credit and mobile phone datasets, Credit card data or other financial transaction data.	Wealth and inequality	Airtime and Credit card purchase.	Speech-to-text analytics on local radio content can reveal discrimination concerns and support policy response
11.Make cities and human settlements inclusive, safe,	* Satellites imagery to estimate rural and urban extents.	* Rural and Urban Extent * Flood hazard and	* Satellite images * Cell phone Records * Social media,	* Satellite remote sensing can track encroachment on public land or spaces

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resilient and sustainable	* Times series of satellite images of flooded areas are used toidentify flood risk areas. * Analysis of the temporal evolution of nightlights along the river network to obtain a global map of human exposure to floods. * Using satellite imagery, GIS and precipitation data to produce a flood risk map along the rivers. * Using satellite remote sensing and GIS techniques for flood hazard and risk assessment in Chamoli district, Uttarakhand ,India. * Assessing flood impact with cell phone records. * Analysis of Social Media data to identify which data may be useful in disaster response. * Satellite scan to monitor population and energy related greenhouse gas emissions.	risk * Night lights as a proxy for population/infrastructure along the river network * Flood risk * Flood hazard and risk * Flood impact * Tweets about the natural disasters.	mobile surveys, TV and Radio broadcast data, digital news data, and crowd sourced data.	such as parks and forests * A consistent way to map rural and urban extent; more regular updates. * Data Available Frequently. * Separate emissions of rural and urban populations from other sources; more regular updates.
12.Ensure sustainable consumption and production patterns	➢ Online search patterns or ecommerce transaction can reveal the pace of transition to energy efficient products. ➢ Open Government Data Platform.	Forecasting GDP, NNP, GNP, WPI, Index of Industrial Production, etc.,	Year wise crop data at the district, state level by area, production and yield of various crop productions.	➢ To ensure sustainable consumption and production patterns. ➢ To analyze harvest and post-harvest losses.

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13. Take urgent action to combat climate change and its impacts	Satellite scan to monitor population and energy related greenhouse gas emissions.	Climate Action	Satellite Images	❖ Combining satellite imagery, crowd-sourced witness accounts and open data can help track deforestation ❖ Separate emissions of rural and urban populations from other sources; more regular updates.
14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development	Maritime vessel tracking data can reveal illegal, unregulated and unreported fishing activities.	Marine pollution	GPS Data	⇨To manage, protect and restoration of marine and coastal ecosystems. ⇨To minimize ocean acidification.
15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	Satellite-based monitoring.	Ecosystem, Biodiversity & Weather pattern.	Aerial Imagery	* Social media monitoring can support disaster management with real-time information on victim location, effects and strength of forest fires or haze. * To analyze short- and long-term trends in terms of biodiversity, pollution, weather patterns and ecosystem evolution, and to plan mitigation activities.
16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels	Use of mobile phone and demographic data Social media, SMS surveys, TV and radio broadcast data, digital news data, and citizen-generated data to predict crime.	Crime Detection	Social media, SMS surveys, TV and radio broadcast data, digital news data, and citizen-generated data	* To detect the crime and violent. * Sentiment analysis of Social media can reveal public opinion on effective governance, public service delivery or human rights.

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17.Strengthen the means of implementation and revitalize the global partnership for sustainable development	Government-to-Citizen (G2C), Government-to-Business (G2B), Government-to-Employee (G2E), and Government-to-Government (G2G)	Public and Private Partnership in promoting 17 SDGs.	Web search data, social media data, TV and radio broadcast data, digital news data.	Partnerships to enable the combining of statistics, mobile and internet data can provide a better and real-time understanding of today's hyper-connected world

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5. Big Data Revolution towards realization of SDGs in India

The formulation of the National e-Governance Plan (NeGP) in 2006 has boosted the e-Governance process in India . Ray mentioned that in the recent times majority of government initiatives are in the realm of e- Governance. Projects like Direct Cash Transfer (DCT), Aadhar (which is a 12-digit unique identity number allotted to residents of India, based on their biometric and demographic data) Enabled Payment System (AEPS), Digital India program, MyGov Portal and Digital Cloud for Everyone program have gained much importance. E-Governance laid the foundation for better governance – efficient, economical and effective in India. Meity mentioned The NeGP was conceptualized to focus on e-Governance initiatives at the national level with an aim to make all Government services accessible to the common man in his locality, through common service delivery outlets, and ensure efficiency, transparency, and reliability of such services at affordable costs to realize the basic needs of the common man.

As an extension of the NeGP and in cognizance of the vast mobile phone subscriber base (about 935 million in the country as of 2017), the Government of India is providing public services through mobile devices. Ministry of Electronics and Information Technology has laid a framework for mobile governance or m- Governance and is responsible for delivery of public information and services to citizens and stakeholders by leveraging wireless and new media technology platforms, mobile phones devices and mobile applications. Augmentation of m-Governance started from 23rd December 2013 under the guidance of Department of Electronics and Information Technology (DeitY). The m-Governance portal and the m-App Store can be accessed at http://mgov.gov.in/(61 Apps from 23 Sectors) and the service oriented statistics from this portal confirms that India Government is successful in implementing effective m-Governance and shows lot of improvement to the delivery of government services to the citizens with mobile technology. PIB mentions that m-Governance has put Indian Governance within citizen search.
Geospatial Governance or g-Governance can be treated as a geospatial plug-in to e-Governance and 'can be' defined as an extended module of e-Governance with the additional functionality of geospatial technology. The rapid proliferation of geospatial technologies includes advances in geodesy, photogrammetry, geophysics, computer science, statistics, remote sensing (RS) and geographic information systems (GIS) and web GIS. Geospatial tools and technologies provide information about locations, distances, directions, routes, travel time and cost, and the characteristics of places. The advantages of geospatial data will enable an unprecedented way to understand geographic relations among people, places and natural resources within and helps in decision making.

Earth Observation (EO) systems informs wide verity of applications in the areas of agriculture, forest and ecology, water resources, land use changes such, mitigating, and managing the impact of natural disasters, including fires, floods, earthquakes, and tsunamis; sustainably managing natural resources, such as energy, freshwater, and agriculture, addressing emerging diseases and other health risks; and predicting, adapting to, and mitigating climate change. The recent trend of EO technology has the capacity to improve the living standards of human beings, development of social economy and contributes to the sustainable development goals.

In recent times there is increased trend of using Web applications of e-governance and Web-based mapping due to the Internet revolution. Bhuvan platform provides nation-wide seamless ortho-corrected image base, thematic datasets for natural resources, transport network, Digital Surface Model (DSM), hydrologic base (from basin to watershed) and millions of Points of Interest (POI) data. Bhuvan services include visualization of remote sensing data (India-centric), free satellite data download, geophysical products, host of thematic services and customized application tools for

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Government data collaboration and enabling g-Governance. Bhuvan platform renders near real-time data and information support towards management of natural disasters (like floods, landslides, forest fires and cyclones) in the country.

Services from e-Governance, m-Governance and g-Governance lead to the successful implementation of Government-to-Citizen (G2C), Government-to-Business (G2B), Government-to-Employee (G2E), and Government-to-Government (G2G) applications that would integrate all levels of government functions. The thrust given by mobile apps and the location based services of geospatial technology has enabled Indian government to achieve the feat of ICT based delivery of services. National Informatics Centre (NIC) has taken prime lead in this arrangement.

The implementation framework of NeGP contains various components that are governed by systematic treatment from various ministries. Ministry of Electronics and Information Technology (Miety) has taken the role of providing technology infrastructure and enabling the Processes. National Informatics Centre (NIC) has taken prime lead in this arrangement. The strategy of the plan includes the support from the National Mobile Governance Initiative (https://www.mgov.gov.in/) and also geospatial enabled services from Indian Space Research Organization (ISRO). NITI Aayog is credited with the role of programme management and is responsible for effective infusion of objectives for achieving SDGs to various ministries.

Authentic websites like Open Government Data (OGD), Press Information Bureau (PIB), Indian Development Gateway (InDG), NITI Aayog reports, Bhuvan portal's g-Governance Dashboard and individual ministry portals were used to extract necessary information. OGD (https://data.gov.in) is a platform for supporting Open Data initiatives of Indian Government. The portal gives information about various Ministries/Departments, details about published datasets, documents, services, tools and applications for public use. It intends to increase transparency in the functioning of Government and also acts as an avenue for innovative uses with Government Data for useful purpose.

CONCLUSION

UNPAN report predicted that e-government has the potential to help support the implementation of the 2030 Agenda and its 17 sustainable development goals. This survey finds that Indian e-government landscape has unleashed itself as an effective tool for facilitating integrated policies and public service by promoting accountable and transparency through open data and e-participation and participatory decision-making as well as by advancing online services to bridge the digital divides. Indian e-Governance has fostered the development through e-government with participation of 53 ministries and congregated the best practices, information and intelligent processes. The landscape shows that numerous public services were brought online in the recent years and this led to the development of digital government whereby back office procedures, as well as front office features were increasingly driven by technology. With the objective of ensuring the overarching objective of poverty eradication and 'Leaving No One Behind' as a key principal towards achieving the SDGs, Indian ICT based e-Governance strategy is making to realize the 2030 agenda demands.

References

1. Anderson, K., Ryan, B., Sonntag, W.., Kavvada, A., Friedl, L., Earth observation in service of the 2030 Agenda for Sustainable Development. Geo-spatial Information Science 20(2), pp. 77-96. 2017.
2. Anita N. India′ s progress toward achieving the Millennium development goal. Indian J Community Med.2011;36:85-92
3. Bishop, M.P., James, L.A., Shroder, Jr. J.F., Walsh, S.J., Geospatial technologies and digital

geomorphological mapping: Concepts, issues and research, Geomorphology 137(1), pp.5-26, 2012.
4. Chatterjee S, Hammill M, Kumar N, Panda S. Assessing India's Progress in Achieving the Millennium Development Goals: Key Drivers of Inter-state Variations. United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) South and South-West Asia Office; 2015 Nov.
5. Downs, R.M., Coming of age in the geospatial revolution: The geographic self re-defined, Human Development 57(1), pp. 35-57, 2014.
6. Evangelidis, K., Ntouros, K., Makridis, S., Papatheodorou, C., Geospatial services in the Cloud. Computers & Geosciences 63, pp.116-122,2014.
7. Government Flagship Programs: Make In India And Digital India. Available from https://unacademy.com/lesson/government-flagship-programs-make-in-india-and-digital-india-for-upsc-cseias-exam/L26JW6RP
http://pib.nic.in/newsite/PrintRelease.aspx?relid=128215 , 2015.
8. https://archive.indiaspend.com/special-reports/how-india-could-be-a-global-beacon-of-gender-data-13321
9. https://cio.economictimes.indiatimes.com/dobig/news/detail/1623
10. https://insidebigdata.com/2016/05/18/big-data-and-the-fight-to-eradicate-poverty/
11. https://www.expresshealthcare.in/features/big-data-analytics-and-indian-healthcare/162330/
12. Kabeer N. "Leaving No One Behind": The Challenge of Intersecting Inequalities. ISSC, IDS and UNESCO, Challenging Inequalities: Pathways to a Just World, World Social Science Report. 2016 Sep 22:55-8.
13. Lu Y, Nakicenovic N, Visbeck M, Stevance AS. Policy: Five priorities for the UN Sustainable Development Goals. Nature. 2015 Apr 23;520(7548):432-3.
14. Meity, Ministry of Electronics & Information Technology, Retrieved on 2 November 2018 http://meity.gov.in/ Accessed 02 October2017.
15. Paganini, M., Petiteville, I., Ward, S., Dyke, G., Steventon, M., Harry, J., Kerblat, F., Satellite Earth Observations in Support of the Sustainable Development Goals. European Space Agency. Retrieved on 2 November 2018 from http://eohandbook.com/sdg/files/CEOS_EOHB_2018_SDG.pdf , 2018.
16. PIB, Text of Speech by Prime Minister at the Digital India Dinner 26 September 2015, San Jose, California, Retrieved on 2 November 2018
17. PIB, Popularity of GovernmentPortal Bhuvan. Retrieved on 2 November 2018 http://pib.nic.in/newsite/PrintRelease.aspx?relid=137293 Accessed 02 October 2018., 2016.
18. PwC, Digital India - Targeting inclusive growth. PwC. India, Retrieved on 2 November 2018 from https://www.pwc.in/assets/pdfs/publications/2017/digital-india-targeting-inclusive-growth.pdf , 2017.
19. Ray, S.S, Critical analysis of e-Governance in India, Retrieved on 2 November 2018 from https://medium.com/@shilpisinharay/critical-analysis-of-e-governance-in-india-3343ed8fa357, 2017.
20. Sachs JD. From millennium development goals to sustainable development goals. The Lancet. 2012 Jun 9;379(9832):2206-11.
21. UNPAN, UN e-Government Survey 2016. E-Government in Support of Sustainable Development, New York: UNPAN. Retrieved on 2 November 2018 from http://workspace.unpan.org/sites/Internet/Documents/UNPAN96407.pdf,2016.
22. Zhao, J., Coleman, D.J., 2006, GeoDF: Towards a SDI-based PPGIS application for E-Governance. In Proceedings of the GSDI 9 Conference, Santiago, Chile. Retrieved on 2 November 2018http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.455.117&rep=rep1&type=pdf
23. Zoughbi, S., Major Issues Affecting Government Data and Information in Developing Countries. In Securing Government Information and Data in Developing Countries. IGI Global, pp. 115-126, 2017.