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Analysis & prognosis of sustainable development goals using big data-based approach during COVID-19 pandemic

Muskaan Chopra\textsuperscript{a,*,} Dr. Sunil K. Singh\textsuperscript{a}, Anshul Gupta\textsuperscript{a}, Kriti Aggarwal\textsuperscript{a}, Brij B. Gupta\textsuperscript{c,d,e}, Francesco Colace\textsuperscript{b}

\textsuperscript{a} Chandigarh College of Engineering and Technology, Sector 26, Chandigarh, 160019, India
\textsuperscript{b} University of Salerno, Italy
\textsuperscript{c} Department of Computer Science and Information Engineering, Asia University, Taichung 413, Taiwan
\textsuperscript{d} King Abdulaziz University, Jeddah, Saudi Arabia
\textsuperscript{e} Staffordshire University, Stoke-on-Trent ST4 2DE, UK

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The world has changed considerably in the previous two decades. Today, people are facing extreme poverty, global warming, and unwanted climate changes. The economic gap between countries is continuously growing. Moreover, with the expanding influence of technology, governance is getting more difficult. To address these issues, the UN announced Sustainable Development Goals (SDGs), also called Global Goals, in 2015. These goals fill in as an overall source of inspiration to annihilate poverty, protect the environment, and guarantee that all individuals live in harmony and thrive by 2030. The 17 SDGs are interconnected in that they recognize that activities in a single region sway result in others and that improvement should adjust to social, monetary, and natural sustainability. The SDGs intend to kill poverty, hunger, AIDS, and gender discrimination against women and girls. The COVID-19 epidemic, on the other hand, has hampered attempts to accomplish the 2030 Agenda for Sustainable Development. As a result, the impact of these SDGs must be thoroughly studied and analyzed. As a result, the purpose of this research is to examine the SDG before and after Covid-19, as well as how they have influenced various national and international markets. The research also assesses the 17 SDGs in each of India’s 29 states in depth. Since SDGs have a larger scope, this paper predicts the SDG-9 scores of few countries like UAE, New Zealand, Japan, India, Germany, China, Bhutan, and USA.

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\textbf{Introduction}

The United Nations established the Millennium Development Goals in 2000, a set of goals aimed at reducing poverty in the world. They aspired to alleviate severe poverty in all of its forms, including hunger, disease, gender inequity, an absence of schooling and admis-
underscore the dire need to address environmental change and shield the climate by moving to sustainable utilization and creation. The SDGs are intended to be worldwide, including all nations rather than essentially those in poor countries. They recognize the private sector’s critical role in seeking and funding sustainable advancement in collaboration with state-run administrations and common society. As a result, the current study discusses the importance and significance of SDGs in the modern-day. The writers also discuss in great detail the 17 SDGs and their aims. Furthermore, a significant reduction in these targets has been noted because of the COVID-19 pandemic in the year 2020. Thus, the essential objective of the research is to plan the impact of SDGs before and then afterward Covid-19 on the world’s significant nations. The report thoroughly investigates all 17 factors for India’s states. The overall description of the paper is as follows: First, Section 1 covers the introduction, terms and terminologies. Secondly, Section 2 confronts about the literary work in SDGs. Next, Section 3 discusses the significance of SDGs followed by other important aspects such as spillovers. Section 4 ponders upon Big Data Insights on the data collected over years through Visual Analysis. Section 5 describes the effect of COVID-19 on SDGs. Section 6 concludes the paper.

Motivation and literary work

There are approximately 800 million people who live in extreme poverty and suffer from hunger, with delicate and conflict-torn nations experiencing the most profound neediness rates. Natural disasters displaced 144 million people between 2008 and 2012, a number that is expected to climb as the globe warms, bringing more harsh climate and rising oceans. Water lack impacts 40% of the overall people and is projected to increase. Open defecation is still practiced by 946 million people. Sex imbalance perseveres regardless of more portrayal for ladies in parliaments and more young ladies going to class. The United Nations says the SDGs go a lot further than the past objectives since they address the underlying drivers of poverty and vow to abandon nobody, including vulnerable groups. They additionally stress the importance of acting quickly to address environmental change and secure the climate by moving to sustainable utilization and creation. The SDGs are relied upon to be far and wide, applying to all countries rather than the causing situation.

Education is widely acknowledged as a fundamental human right as well as a significant engine of advancement in areas such as economic development, wellbeing, richness, governmental issues, social strengthening, and human resources (Friedman et al., 2020; Nilsson, Griggs & Visbeck, 2016; UNESCO, 2018). In the Millennium Development Goals (MDGs), the international community identified educational attainment as a crucial advancement aim, and it became a focal point for a wide range of global players. Until 2015, the MDGs primarily aimed to expand primary education (UN, 2015), which led to a great deal of progress. In the SDGs, schooling was exceptionally focused once again, with a more extensive degree that highlighted reducing inequality. The inspiration for this work gets from long stretches of interdisciplinary work identifying with displaying high-dimensional data. The intricacy of SDG collaborations and elements, in particular, fits the issue of data randomness. Spatially and chronologically varying attributes can make it challenging to pinpoint what triggers the indicators across sectors and countries (Mwitondi, Munyakazi & Gatsheni, 2020).

Significance of SDGs

What is SDG

Over 178 nations endorsed Agenda 21, “a plan of action to establish a global partnership for sustainable development to improve human lives and protect the environment” at the United Nations Conference on Environment and Development (UNCED) in June 1992. In September 2000, every one of the 191 part conditions of the United Nations endorsed the Millennium Development Goals (MDGs) (Hansson, Pargman & Pargman, 2021).

The MDGs enveloped eight unique objectives, and the principal objective was to destroy outrageous poverty and hunger by 2015. All part conditions to the United Nations accepted the Sustainable Development Goals and the 2030 Agenda for Sustainable Development in 2015. The 17 undeniable levels of Sustainable Development Goals together fill in as a common plan for a manageable vision of things to come, and they are addressed by 17 famous images that address the objectives. These 17 objectives have 169 subgoals ("targets", from now into the foreseeable future alluded to as “SDG targets”) that, thusly, can be separated into 231 interesting pointers.

The objectives were embraced by all UN part states in 2015, building up a 15-year intend to accomplish them. Today, progress is being made, however, in general, activity to meet the objectives isn’t yet progressing at the vital speed or scale (Bjørner, 2021). The idea of sustainable development has been some way or another restored in the computerized age, by the UN’s Agenda 2030. From time to time implied as “progression that resolves the issues of the current age without compromising the limit of individuals in the future to resolve their issues” as portrayed in an accomplishment report distributed in 1987 (Medaglia, Misuraca & Aquaro, 2021), the current conceptualization of maintainable improvement has extended its extraordinary focus on the possibility of monetary advancement just, to even more comprehensively wrap the three components of financial development, social development and biological confirmation (Menagh, 2019). The 17 Sustainable Development Goals expand upon and consolidate the three mainstays of maintainability (environment, society, and economy) and lengthen a wide range of angles identified with supportability, for instance, social and regular effects of industry, poverty reduction, sexual orientation uniformity, ensuring admission to clinical consideration for all, assurance of biodiversity, etc.

The SDGs work in the soul of association and logic to settle on the ideal decisions presently to further develop life, economically, for people in the future. They give clear standards and centers for all countries to take on according to their own requirements and the normal hardships of the world at large. The SDGs are a complete arrangement. They tackle the fundamental driver of destitution and combine us to carry out an improvement for the two people and the planet (Chowdhury, Sohag, Mosabir & Nur, 2018).

Goals of SDG

Taking effect on 1 January 2016, the Sustainable Development Goals (SDGs) improve upon the Millennium Development Goals (MDGs) (Mohandas, 2018). Millennium Development Goals focussed principally on the requirements of emerging nations building up a double perspective on rich and more unfortunate nations, of benefactors and beneficiaries and suggesting that the worldwide test is an issue of advancement which global guide can help address, rather than a bunch of shared issues which just aggregate activity universally can resolve (Morton, Pencheon & Squires, 2017). Unlike the MDGs, the SDGs are more ambitious, more collaborative, and more specific, with a clear message that every nation must exert effort to achieve them.

So, the 17 SDGs are formed in such a way as to: End poverty in the entirety of its structures where (Goal, 2021; Ritchie & Roser, 2018); battle hunger, achieve food security, further foster food and advance sustainable farming; ensure sound lives and advance success for all at all ages; guarantee comprehensive and impartial quality training and advance long lasting learning openings for all; accomplish sexual orientation uniformity and engage all ladies and young ladies (NATIONS, 2021); ensure availability and reasonable organization of
water and sterilization for all; ensure permission to sensible, trust-
worthy, legitimate, and momentum energy for all; advance keep up
with, maintainable, and possible monetary turn of events, full and
helpful business, and reasonable work for all; structure flexible struc-
ture, advance complete and conservative industrialization, and
devlop progression; lessen disparity inside and among nations;
make urban communities and human settlements comprehensive,
protected, strong, and economical; guarantee manageable utilization
and creation patterns (Walker, 2021); take a critical action to fight
natural change and its belongings; proportion and financially use the
oceans, seas, and marine resources for viable development; guaran-
tee, restore, and advance useful use of natural frameworks, monetar-
ily administer woods, fight desertification, and end and banter land
degradation and end biodiversity disaster; advance quiet and com-
prehensive social orders for practical turn of events, giving admittance
to equity to all and building compelling, responsible, and
sustainable organizations at all levels; reinforcing the method for
execution and renewing the worldwide association for supportable
turn of events.

Sustainable Development Goals from 2016 to 2030 (adopted by
the United Nations General Assembly in September 2015) are part of
the UN’s global plan called ’Transforming our world; the 2030
Agenda for Sustainable Development, an agenda defining policies,
principles, and commitments that will lead to a more equitable and
sustainable future (Morton et al., 2017). The current SP drive plans to
use the strength of legislatures, the specialized and monetary bene-
fits of the private area, and the socio-financial improvement interest
of networks. People, Planet, Prosperity, Peace, and Partnership are
the five pillars of the SDGs (Biswas & Mhetre, 2020).

Indicators of SDG

The SDGs are more comprehensive than the MDGs, which were
set in 2000. As a result, the Inter-agency Expert Group on SDG Indica-
tors’ final proposal for indicators, due in March 2016, will need to be
more comprehensive than the 60 indicators used to monitor and
evaluate the MDGs. There is some arrangement that the overall num-
ber of indicators for the SDGs should be confined, as noticing and
appraisal can introduce authentic limitations and difficulties for
National Statistical Offices (NSOs) and other public bodies. That being
said, a perception of the quantity of markers that qualify as “limited”
isn’t uniform: a couple of experts propose that every one of the 169
targets is designated a lone indicator, many acknowledge that 100
overall noticing pointers address a valuable cut-off, and others
acknowledge there should be impressively less (Woodbridge, 2015).

The major disinbenefit to a far-reaching rundown of indicators is
the test of complete and compelling information assortment, espe-
cially at the city level. To address this test, there is a developing push
to configure cross-cutting, multifunctional indicators that, by esti-
mating a solitary data point can illuminate progress on different
objectives or targets. It is possible for an indicator to contain multiple
data series, for example, if it is broken down by sex, location, or age
(Rodarte, Israel, Verbeek, Gable & El-Maghrabi, 2018).

Big data insights into SDG progress

The Sustainable Development Goals require a lot of data, analyses,
and statistics. These are needed to make strategies and key decisions,
and these data need to be valuable, insightful, timely, apropos, and
adequate. Statistical volume still needs to be solidified, and data liter-
acy needs to be developed at every stage of the decision-making pro-
cess (Chopra, Singh, Aggarwal & Gupta, 2022). Getting to the point
of sustainable development will take a lot of collaboration among data
creators and users from various data solutions (Gupta, Bansal, Mam-
gain & Gupta, 2022). Generating and using data and statistics will
also entail the use of innovative technologies.

There are plenty of SDG indicators to review. With the help of Big
Data, companies can keep a track of the development plans more
smoothly because it supplements the customary data sources. The
Sustainable Development Goals include specific, time-sensitive, and
quantifiable objectives in relationship with the national development
strategies. There are probably over 230 SDG indicators. However, a
lot of these indicators require proper disaggregation by several
parameters like age, gender, location, and more. National Statistical
Systems (NSS) requires granular data.

World level SDGs 2021

As a result of the COVID-19 pandemic, sustainable development
has taken a step back. The global average score for the SDG Index
for 2020 decreased for the first time since the SDGs have adopted
in 2015: After the outbreak of COVID19, poverty rates and unem-
ployment have increased substantially. As a result of the time lags
associated with international statistics this year, the decline in
2030 SDG performance worldwide is likely underestimated. Vac-
cine access must remain the number one priority of all govern-
ments through non-pharmaceutical interventions and other non-
pharmaceutical interventions to slow the spread of this pandemic.
When the pandemic is raging, it is impossible to develop sustain-
ably and recover economically. The 2021 index has Germany has an
index of 82.5 whereas some countries have an Index as low as 38.3
Fig. 1. showcases some of the countries with their respective SDG
index.

Prediction of indicators

Since the available data for SDG indicators of each country is very
huge, so for the scope of this paper, authors have analyzed the fore-
cast of SDG-9, Build resilient infrastructure, promote sustainable
industrialization, and foster innovation’s indicator Population Using
Internet.

Fig. 2 shows the prognosis of SDG in UAE, India, New Zealand,
Japan, Germany, China, Bhutan, and the United States over the next
2 years for the above indicator which shows that UAE, Japan, Ger-
many and USA have a possibility to attain the SDG-9 by this time.

Spillover scores

As a result of each country’s actions, it can negatively or positively
affect the ability of other countries to achieve the SDGs. The Spillover
Index analyzes these spillovers along three dimensions: economic
and social effects in trade, economy & finance, and security. Scores of
higher are indicative of more positive spillover effects and fewer neg-
ative ones Fig. 3. shows the spillover scores of countries worldwide,
where Myanmar and Sudan have the best scores of 99.99 and Singa-
pore has the worst scores of 20.55.

India’s first sustainable urban dashboard

This report presents an overview of India’s Sustainable Develop-
ment Dashboard for 2020 along with SDG Indexes and Dashboards,
outlines the short-term impacts of COVID-19 on the SDGs, and dis-
cusses how to frame recovery around the SDGs. The report was pre-
pared by NITI Aayog, Government of India. Urban local bodies
(ULBs) in 56 cities were analyzed by the City's think tank on 77 indi-
cators of SDG achievement (India's urban story, 2021). This was part
of an initiative to localize SDGs and ensure their effective monitor-
ing. According to the SDGs Urban Index, Dhanbad, Jharkhand, was
at the bottom of the list, while New Delhi was 20th along with Rai-
pur (Chhattisgarh). Within the top 10, Nagpur, Pune, Chandigarh,
Ahmedabad, and Coimbatore are the most advanced urban areas in
terms of implementing sustainable development goals. The
Sustainable Development Goals Urban Index placed Shimla at the top of the list. Kolkata came in at the 48th position among the bottom 10 cities, followed by Mumbai at 33rd and Chennai at 11th. The literature is demonstrated in Fig. 4.

The remaining 12 are capital cities with less than a million people and 44 have a population above one million. Under the Indo-German Development Cooperation umbrella, NITI Aayog-GIZ and BMZ prepared the index.

**Impact of COVID-19 on SDGs**

The Coronavirus disease 2019 (COVID-19) pandemic has dominated formative exercises across the world. COVID-19 has been contained due to an array of governmental, financial, and specialized resources (Aggarwal, Singh, Chopra & Kumar, 2022; Khetrapal & Bhatia, 2020). SDGs were embraced by the worldwide local area in 2015 to work on personal satisfaction, everything being equal, and to convey forward the
incomplete plan of the Millennium Development Goals (MDGs). The year 2020 launches the Decade of Action—a reaffirmation of the worldwide responsibility through sped up endeavors and supportable answers for the world’s greatest difficulties, going from eradicating poverty and reducing gender inequality to addressing climate change (United Nations, 2021). The COVID-19 pandemic has disrupted attempts to achieve the 2030 Agenda for Sustainable Development in just a short period of time (Min & Perucci, 2020).

One year into the pandemic, this new UNDP research shows that the destitution hole between nations is set to rise. By 2030, roughly
eight out of ten individuals who drove into neediness because COVID-19 will live in nations on the lower end of the human turn of events, with the heaviest weight falling on Africa.

Under a ‘COVID Baseline’ situation, 41 million individuals in low and medium HDI nations could be driven into destitution by 2030. Be that as it may, the course of the pandemic is yet obscure, and upwards of 169 million individuals could be crashed into outrageous destitution in these nations by 2030, accepting a ‘High Damage’ situation. Strategy decisions made now could adjust this situation, yet the additional time that elapses, the harder it will be to shift direction.

How SDGs were impacted?

For one thing, the pandemic has made more separated financial aspects with the conclusion of boundaries and global relocation. Therefore, the SDG that takes all of this in and gradually self-destructs is #17 – Partnership for every one of the objectives. Unavoidably, the pandemic seriously influences SDG 3 (Good Health and Well-Being). As of November 2021, the infection has gotten clutch 262 billion individuals and has ended the existence of over 5.2 million people. As the world has assumed
the standards of social removing and quarantine, we witness a weighty dependence on computerized availability. Be that as it may, the failure of being obliged in the virtual world will prompt difficulties in the value aspect of all-encompassing turn of events, causing more elevated levels of destitution, hunger and in this manner hampering SDGs 1, 2, 4, 6, and 10 (No Poverty, Zero Hunger, Quality Education, Clean Water, and Sanitation and Reduced Inequalities respectively) (Arora, 2020). These SDGs are intertwined with SDG 5 (Gender Equality), SDG 13 (Climate activity), SDG 14 (Life submerged), and SDG 15 (Life on Land) which were additionally seriously affected (World Health Organization, 2020). Fig. 5 illustrates the effect of Covid-19 on the SDGs.

Based on four different scenarios, the following graph shows the predicted number of people living in poverty.

- In ‘Baseline COVID’, poverty and hunger are increased significantly and the long-term consequences are considerable;
- If there is more economic damage and recovery is delayed, then the ‘High Damage’ scenario describes the future;
- In the ‘SDG Push’ scenario, targeted policy interventions are presented as one mechanism to accelerate progress towards a more equitable, resilient, and sustainable future.
- The scenario called ‘No COVID’ describes a future in which COVID does not exist (UNDP, 2021).

What steps could be taken to decrease the impact of COVID-19

Contributing and helping the green economy ought to be one of the significant methods of beating the current circumstance. In India, the public authority previously pronounced appropriations and a venture of crores of rupees in agriculture. Aside from agriculture, a decrease in energy utilization by utilizing more sun-oriented energy, more open vehicles (rather than individual vehicles), and water collection could be conceivable measures towards the practical development of the economy. One of the basic variables to advance SDG8 (good work and monetary development) is human resources and that has been shaken (Srivastava, Sharma & Suresh, 2020). The equivalent goes for SDG 9 (industry, development, and foundation). Financial systems can assist with supporting recuperation and flexibility endeavors while advancing low-carbon improvement (Wang & Huang, 2021). Maintaining work-from-home policies can assist in reducing air pollution and driving congestion (Suresh & Jindal, 2019).

Coronavirus is probably going to adversely affect most SDGs. I am focusing on the Sustainable Development Goals 1 (No Poverty), 2 (No Hunger), 3 (Good Health and Well-Being), and 8 (Decent Work and Economic Growth). Coronavirus seriously enhances pay imbalances and different types of disparities. The brilliant spots in a premonition picture are the diminished natural effects because of the decrease in monetary action. A key goal is to reestablish monetary action without just reestablishing the old examples of natural debasement.

The SDGs and the Six SDG Transformations should direct the recuperation from Covid-19 and assist work with support better. No nation will be protected from the pandemic except if all nations manage the infection. The report presents a point-by-point structure for how nations can work back better utilizing the SDGs. The current emergency, including threats among significant powers, raises the ghost of worldwide struggle rather than worldwide collaboration. Fortunately, the vast majority of the world direly needs multilateralism and collaboration. The awful news is that a few nations don’t, while others are deadened by their own emergencies, spending plan shortfalls, and divisions of neighborhood legislative issues. The multilateral circumstance is hence laden and needs support.

Under SDG 17 (Partnerships for the Goals), global collaboration can accelerate the fight against the pandemic. For sure, there could be no alternate method for succeeding. Fig. 6 demonstrates how SDGs are linked inflow with the Covid crisis.
Conclusion

As part of Agenda 2030, all UN member states are committed to achieving the 17 Sustainable Development Goals (SDGs). The accomplishment of this plan essentially relies upon whether humanity will accept a literature want to amplify collaborations and resolve existing compromises between the SDGs. The discussion of this paper lies in the analytics of SDG Indicators. In a country like India, the steps to be taken by the authorities as well as the population matter a lot towards Sustainable Development Goals. If India achieves the SDGs, it would mean a major portion of the world has achieved it. India presented its first urban dashboard in which Shimla topped the list. The authors also highlight the setback COVID-19 has proved to be on the attainment of SDGs by 2030.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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