SUSTAINABLE

ECONOMIC AND MANAGEMENT PRACTICES:

CHALLENGES AND FUTURE PROSPECTS

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Volume 1

Sustainable Economic and Management Practices Challenges and Future Prospects Vol.1

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Sustainable Economic and Management Practices Challenges and Future Prospects Vol.1

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Preface

Nowadays, growing environmental concerns in all sectors are increasing the demand for sustainable living practices that not only help to reduce pollution but also conserve natural resources like water and energy. The environment is an exhaustible resource that needs rational utilisation and protection of natural resources for the good of the earth, our environment, humanity, and all living things. This is a well-known fact, economic growth and environmental protection are inversely related to each other. Rising economic activities degrade the environment. Therefore, policymakers need to explore alternative measures and environmental policies that manage finite resources for an infinite population. In this context, Sustainable 'Economic and Management Practises' are the backbone of every nation. Economic agents, businesses and people who care about sustainability are less likely to encroach on the natural habitats of wild animals, helping protect our planet's biodiversity.

Keeping this crucial aspect of sustainable development, the book entitled *"Sustainable Economic and Management Practices: Challenges and Future Prospects*" discussed numerous sustainable practices related to economics and management doctrine that can contribute to achieve United Nations Sustainable Development Goals (UN-SDGs).

This book presents unique perspectives and dynamics that illuminate economic and management practices in the complete diaspora of sustainability. This book gives a holistic perspective of sustainability in terms of green building, ESG aspect of cryptocurrency, social entrepreneurship, energy economics, circular economy, green HRM practices, employee retention, green marketing, sustainable consumption & production and so forth.

Acknowledgement

With the grace of Almighty God and blessings of our parents, we are delighted to share the edited volume of the book. We would like to express our sincere gratitude to everyone who has contributed and made this book to be turned into reality. This edited book could never come into existence without their contribution and support.

Firstly, we are grateful to our esteemed authors for their insightful chapters that have enriched the content of this book.

We are further grateful to Empyreal Publishing house, Ghaziabad, India for the publication of this book within stipulated time. We as an editorial team has worked sincerely to navigate the challenges of this book. The finished result reflects our rigorous attention to detail, organizational prowess, and commitment to upholding high standards. We are thankful to our family and friends who have supported us in completion of this book. We also thank our colleagues and friends from academics and industry who have helped us in giving valuable suggestions whenever needed.

We humbly show our gratitude to each and every one who has supported the publication of this book.

Finally, we extend apology for errors or omissions, if any, in the book, as they are sheer unintentional.

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About the Editors

Dr. Namrata Anand, currently working as an Assistant Professor in the Department of Economics, Dayalbagh Educational Institute, Dayalbagh, Agra. Her research specialization is in International Economics, International Business, Development Economics and Sustainability. She has total 6 years of work experience. In academics she has excellence on International Economics, Microeconomics and Macro Economics. She consists of research experience from Indian Institute of Foreign Trade, an apex think tank of Ministry of Commerce and Industry. At IIFT, she has worked over various government and ministerial projects. In Academics she have experience of Manav Rachna International Institute of Research and Studies, Faridabad and The NorthCap University, Gurgaon. She has immense number of research papers and book reviews in esteemed journals, articles in magazines & newspapers and book chapters in book.

Dr. Saumya Sharma, in her pursuit of academic excellence, is a firm believer of knowledge upgradation. Apart from her double masters, she holds a doctorate degree from ICFAI University Dehradun in the field of training. Her academic and teaching interface, student engagement and research skills were honed during her work experience of 10 years in the field of higher studies with institutions like IMS Unison University, Kelvin Institute, UPES-Dehradun and ICFAI University- Hyderabad. At present, she is associated with The NorthCap University- Gurugram. Being an astute academician, her teaching skills have hovered around subjects like Organisational Behaviour, Human Resource Management, Career Management, Training & Development, Performance appraisal, Performance Management, Syndicate Learning Program, Industrial Management, Professional Ethics. Her area of research entails the domains of Organisational Commitment, Emotional Intelligence, Knowledge Management and others. Her extensive contribution towards numerous Books, Book chapters, journal articles, conference papers extends a vibrant reflection towards her widely ranging research interest.

Ms. Shikha Yadav is a dedicated and accomplished academician with a distinguished career spanning over 8 years in both academia and industry. With a profound commitment to her craft, she has earned her reputation as an esteemed academician. Ms. Yadav possesses a diverse background, having accrued invaluable expertise in Human Resources across a spectrum of industries, including Manufacturing, Telecom, and Education. Her proficiencies encompass the entire HR landscape, from Recruitment and Talent Management to Training & Development, Employee Engagement, and Employee Relations.

Having earned her UGC NET qualification in Labour Welfare, Industrial Relations, and Human Resource Management, Ms. Yadav exemplifies her dedication to continued learning and specialization. Her influence extends beyond her personal accomplishments to her role as an educator, where she has orchestrated and conducted numerous sessions, webinars, and seminars at both university and departmental levels. Ms. Yadav's dynamic prowess as a speaker is evidenced by her invitations to lead discussions on pertinent topics such as Emotional Intelligence and Entrepreneurship. She actively contributes to the academic community by participating in National and International Conferences, attending seminars, workshops, and Faculty Development Programs (FDPs). Her intellectual impact extends to her contributions as an author in internationally acclaimed publications, thereby solidifying her standing as an esteemed figure in academia and HR.

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Abbreviations

SDG	Sustainable Development Goals
SCP	Sustainable Consumption and Production
CE	Circular Economy
MF	Material Footprint
GDP	Gross Domestic Product
ESG	Environmental, Social, Governance
OLS	Ordinary Least Square
RES	Renewable Energy Sources
FDI	Foreign Direct Investment
BIP	Bitcoin Improvement Proposal
LCA	Life Cycle Assessment
USD	US Dollar
BTC	Bitcoin
PoW	Proof of Work
IEA	International Energy Agency
OECD	Organization for Economic Cooperation and Development
EIA	Energy Information Administration
HVAC	Heating, Ventilation And air Conditioning
UN	United Nations
IGBC	Indian Green Building Council
AI	Artificial Intelligence
EU	European Union
CSR	Corporate Social Responsibility
NGO	Non-Government Organization
NRLM	National Rural Livelihood Mission
IIIF	India Inclusive Innovation Fund
RBI	Reserve Bank of India
CBDC	Central Bank Digital Currency
IMPS	Immediate Payment Service

BBPS	Bharat Bill Payment System
UPI	Unified Payments Interface
NETC	National Electronic Toll Collection
WG	Working Group
SWOT	Strength Weakness Opportunities Threats
DPI	Digital Payment Index
FEMA	Foreign Exchange Management Act
SEBI	Securities and Exchange Board of India
FSC	Forest Stewardship Council

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COMPREHENSIVE ANALYSIS OF SUSTAINABLE CONSUMPTION AND PRODUCTION IN INDIA

Dr. Tripti
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ABSTRACT
This is an extensive evaluation of sustainable development goal number twelve for the world and complete review for India's performance with respect to sustainable production and consumption goals based on the recent data and estimates. Data visualisation methodology is used for wide ranging exploration so that the complex data can be provided in an accessible format to draw insights from the in-depth assessment. The graphical data visualisation highlights the ascendancy of India and accentuates the tremendous prospect for success through optimum utilisation of the available resources, technologies and knowledge. The study also highlights the plans, programmes and policy initiatives undertaken by the Indian Government under its ministries to achieve all sub targets in a time bound efficient manner. India is performing significantly well with the incorporation of the sustainable lifestyle in the teacher education and national education policies. Apart from this the number of companies reporting sustainability practices are also increasing. In addition to this, it has also been observed that more proportion of solid waste is getting treated and recycled and less is going to the landfills. Overall, the analysis shows, being a developing country, India is performing incredibly well and showing light to other countries as well.

Keywords: Sustainable Production, Sustainable Consumption, Sustainable Development, Sustainable Consumption and Production in India.

1. INTRODUCTION
SDGs are a framework to realise a sustainable future pertaining to combat global challenges: climate change, inequality, poverty, environmental degradation, peace and justice. There are 17 interconnected SDGS targeted to be achieved by 2030[1] as mentioned in Table 1. SDGs are a call for action by the global community composed of all the rich, poor and middle-income countries, to encourage a flourishing present while preserving the planet for the future generations. These goals provide a pivotal blueprint for COVID-19 recovery also[5].

Table 1: Seventeen SDGs

1. No Poverty	7. Affordable and Clean Energy	13.Climate Action
2. Zero Hunger	8. Decent Work and Economic Growth	14.Life below Water
3. Good Health and Well Being	9. Industry, Innovation, and Infrastructure	15.Life on Land
4. Quality Education	10. Reduced Inequalities	16.Peace, Justice, and Strong Institutions
5. Gender Equality	11. Sustainable Cities and Communities	17.Partnerships through the goals
6. Clean Water and Sanitation	12. Responsible Production and Consumption	

Source: Ensure Sustainable Consumption and Production Patterns, 2023 [1]

Now that the planet has formally entered the Global Boiling Stage, the research and study on sustainable development has become even more important and immediate action is required to stop the worst climate change to take place.

"An in-depth analysis of the Indian literature associated with the ancient practices provides infinite references for the conservation and the preservation of the climate and the environment.

Indian literary texts guide us to understand the previous knowledge behind the vitality of preserving balance in forest ecology. Furthermore, the ancient scriptures (Arthshastra, Brahamans, Upanishads, Vedas, The Ramayana, The Mahabharata) and the Indian archaeology also provide evidence of the existence of extremely developed and coordinated city planning, well-organised sewage system, and water treatment methods in the urban civilization"[8].

1.1 LITERATURE REVIEW OF GOAL 12: RESPONSIBLE CONSUMPTION AND PRODUCTION (SCP)

United Nations defines sustainable production and consumption as: **"the use of services and related products, which respond to basic needs and bring a better quality of life while minimising the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or product so as not to jeopardise the needs of future generation[2]."**

It is of prime importance that we make alterations to our producing and consuming habits in the manner that leaves the minimum ecological and carbon footprint on the environment and the planet. This requires awareness to the producers and consumers, but the sole responsibility to make these awareness plans successful is of the government or public private partnership.

This chapter discusses the SDG 12 which deals with the promotion of SCP practices, central to fostering the current and future ecological life. Global governments in addition to global citizens should collaborate to enhance resource optimization, diminish waste and pollution, and move towards the development of a new circular economy[3]. "The achievement of various sustainable development Goals (SDGs) is closely linked with implementation of Circular Economy. Currently, a few European nations are leading the transition to CE. It is imperative that they share their technology and expertise with developing and under-developed nations, for enabling a worldwide shift towards Circular Economy"[9].

Table 2: Sub targets and Indicators of Sustainable Development Goal 12

Target 12.1: Implement the ten-year sustainable consumption and production framework	12.1.1 Sustainable Production and Consumption action Plans
Target 12.2: Sustainable management and use of natural resources	12.2.1 Material Footprint 12.2.2 Domestic material consumption
Target 12.3 Halve global per capita food wastage	12.3.1 Global Food Loss
Target 12.4 Responsible Management of chemicals and waste	12.4.1 International Agreements on hazardous waste 12.4.2 Hazardous waste generation
Target 12. 5 Substantially reduce waste generation	12.5.1 Recycling Rates
Target 12.6 Encourage companies to adopt sustainable practices and sustainability reporting	12.6.1 Companies publishing sustainability reporting
Target 12.7 Promote sustainable public procurement policies	12.7.1 National Sustainable Procurement Plans
Target 12.8 Promote Universal understanding of sustainable lifestyles	12.8.1 Understanding of Sustainable Lifestyles
Target 12.a Support developing countries scientific and technological capacity for sustainable consumption and production.	12.a.1 Support for developing countries capacity for sustainable production
Target 12.b Develop and implement tools to monitor sustainable tourism	12.b.1 Monitoring sustainable tourism
Target 12.c Remove market distortions that encourage wasteful consumption	12.c.1 Removing fossil fuel subsidies

Source: (Ensure Sustainable Consumption and Production Patterns, 2023)

1.2 OUTLINE OF THE CHAPTER

Section 1 provided a brief introduction of the SDGs and SCP and its indicators. Section 2 discusses the research methodology and tools used for each indicator within SDG 12. Section 3 highlights the detailed data visualisation for all the indicators within this goal and India's performance overtime. Sector 4 provides a conclusion and summary of observations.

2. RESEARCH METHODOLOGY

2.1 DATA AND METHODOLOGY

Table 3: Data used, and Tool Used for Each Indicator

Indicator	Data used	Tool used
12.1 SCP action plans	Countries having plan	World Map
12.2.1 Sustainable management and use of natural resources	Material footprint per capita and per unit of GDP	India's plan is under development (so no data)
12.2.2 Domestic material consumption	Domestic material consumption per capita and per unit of GDP	Line Graph
12.3 Halve global per capita food waste	Household food waste estimate	Tabular representation
12.4.1 International agreements on hazardous waste	The share of required information that has been submitted to international organisations as part of each agreement.	Horizontal Chart Graph
12.4.2. Hazardous waste produced	a. Hazardous waste generated per capita. Treatment of Hazardous Waste	a. World Map Line Graph
12.5 Recycling Rates	b. Solid Waste Treated	b. Line Graph
12.6 Sustainability reports published by the companies	c. Ministry of Corporate Affairs	a. Line Graph c. World Map
12.7 National sustainable procurement plans	d. Data Unavailable	b. Data unavailable
12.8 Understanding of sustainable lifestyles	a. Sustainable Development into teacher education b. Sustainable Development in curricula c. Sustainable Development in Student Assessment e. Sustainable Development in National Education Policies	a. World Map b. World Map c. World Map c. World Map

The source of data for the above indicators have been clearly mentioned when discussing those indicators in the next section. All the data has been collected from reliable resources to maintain the accuracy of the analysis and not include any kind of bias. All the secondary data have been used for the study.

2.2 OBJECTIVES OF THE RESEARCH

(i) To understand India's status in all the sub indicators.

(ii) To compare the India's development in the SDGs with the world

2.3 LIMITATIONS OF THE RESEARCH

(i) The data of India in some parameters are not available.

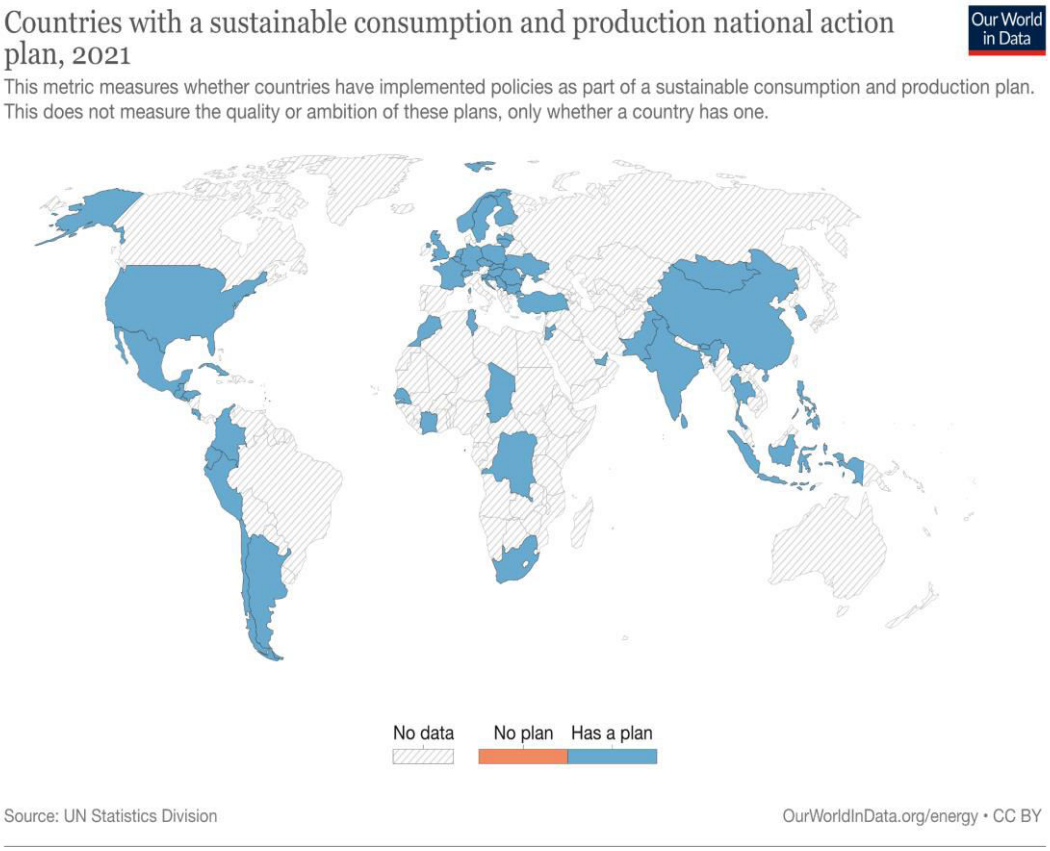
(ii) The data of some countries and regions are unavailable.

3. ANALYSIS OF INDIA'S PERFORMANCE IN THE SDG 12 INDICATORS

3.1 SDG Indicator 12.1: Implement the 10-year SCP framework.

The data shows that both developed and developing countries have taken cognisance of the situation and have taken the required measures, with developing countries acting as torch bearers. However, within the developing countries, as shown in Map 1, India is setting the pace with the formation of a National Action Plan under the "Ministry of Environment Forest and Climate Change"[6] by framing programmes for the conservation and preservation of the environment and ecology and thus showing guidance for other countries as well.

Map 1: India's position in the world to have National action plan (2021)



As shown in Map 1, the data of most of the countries is unavailable and this kind of negligent behaviour at this juncture surely has tremendous hazardous effect not only on that country but for the entire planet.

3.2 .1 SDG Indicator 12.2.1 Sustainable management and use of natural resources

It is defined as "material footprint, material footprint per capita, and material footprint per GDP. Material Footprint (MF) is the attribution of global material extraction to domestic final demand of a country. The total material footprint is the sum of the weight of the used biomass, fossil fuels, metal ores and non-metal ores. It is measured on the basis of *consumption*, which means that it is a country's domestic material footprint adjusted for trade[2]." India's plan to achieve this target is under development [6] .

3.2.2 SDG Indicator 12.2.2 Domestic material consumption

It is the "domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP. Domestic Material Consumption measures the total amount of material directly used in an economy. It measures material *production*, rather than consumption because it is not adjusted for trade. "Materials" include biomass, fossil fuels, metal ores and non-metallic minerals[2]."

Figure 1: India's Domestic material consumption per capita (2000-2019)

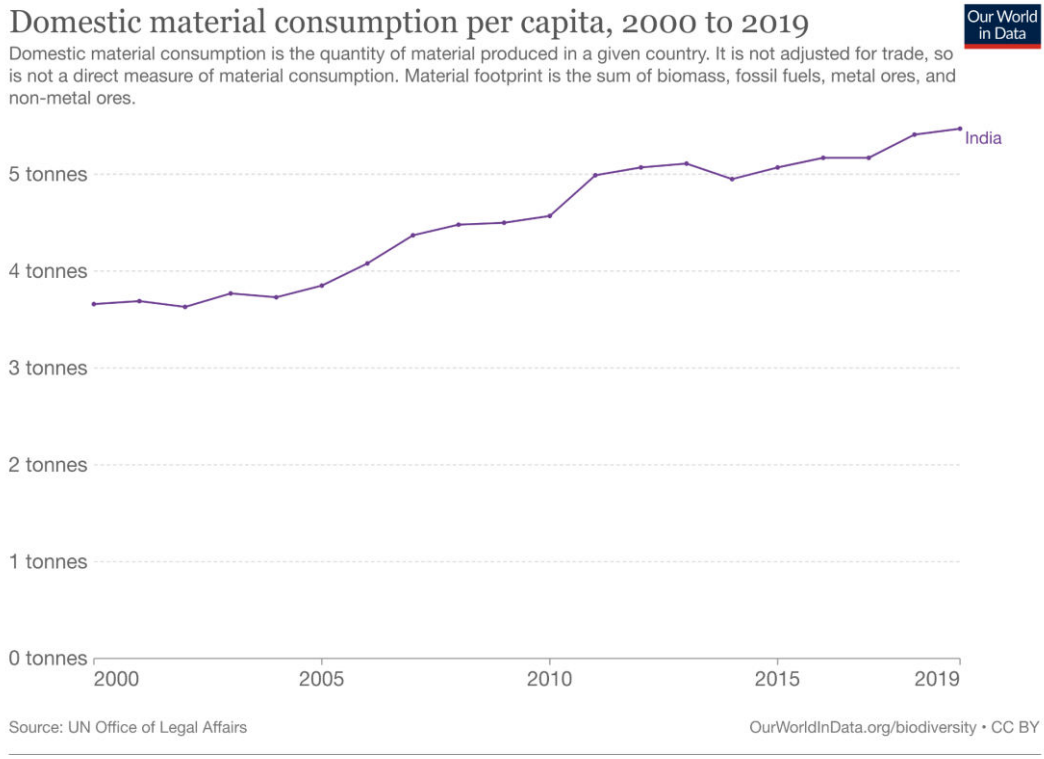


Figure 1 shows that domestic material consumption per capita of India has increased since 2000. The updated data is unavailable, that is why the figure shows the trend till 2019.

3.3 SDG Indicator 12.3 Halve Global Per Capita Food Waste.

It is defined as the "(a) global food loss index and (b) food waste index. The 'Food Loss Index' measures how losses in the food supply chain have changed relative to 2015. Food 'losses' are defined as the loss or wastage of food from the farm up to the retail level. Pre-harvest losses, and retail and consumer waste are not included. The Target to be achieved by 2030 is to halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses[2]."

In India, to reduce the food loss, plans are made under "FE, DAC&FW, Ministry of Agriculture and Farmers' Welfare" and For Post-harvest storage and distribution losses of central/states pool stocks of wheat and rice, plans are made by "Ministry of Consumer Affairs, Food and Public Distribution" [6]. Table 3 shows that India's food wastage is lowest in the South Asian Region.

Table 3: South Asia Data of food wastage

Country	Household food waste estimate (kg/capita/year)	Household food waste estimate (tonnes /year)
Afghanistan	82	3109153
Bangladesh	65	10618233

Bhutan	79	60000
India	**50**	**68760163**
Iran	71	58848842
Maldives	71	37688
Nepal	79	2249412
Pakistan	74	15947645
Sri Lanka	76	1617738

Source: United Nations Environment Programme (2021). Food Waste Index Report 2021. Nairobi. [6]

3.4 SDG Indicator 12.4 Responsible management of chemicals and waste

3.4.1 SDG Indicator 12.4.1 International Agreements on Hazardous waste

It is defined as the "number of parties to international multilateral environmental agreements on hazardous waste, and other chemicals that meet their commitments and obligations in transmitting information as required by each relevant agreement". "There are a number of international multilateral agreements on hazardous waste and other chemicals (including the Montreal Protocol, Basel Convention, Rotterdam Convention and Stockholm Convention). This metric shows the share of required information that has been submitted to international organisations as part of each agreement"[2]. "The Ministry of Environment Forest and Climate Change", India is taking active participation in this regard [6].

Figure 2: India's participation in international environmental agreements on hazardous waste and other chemicals (2020)

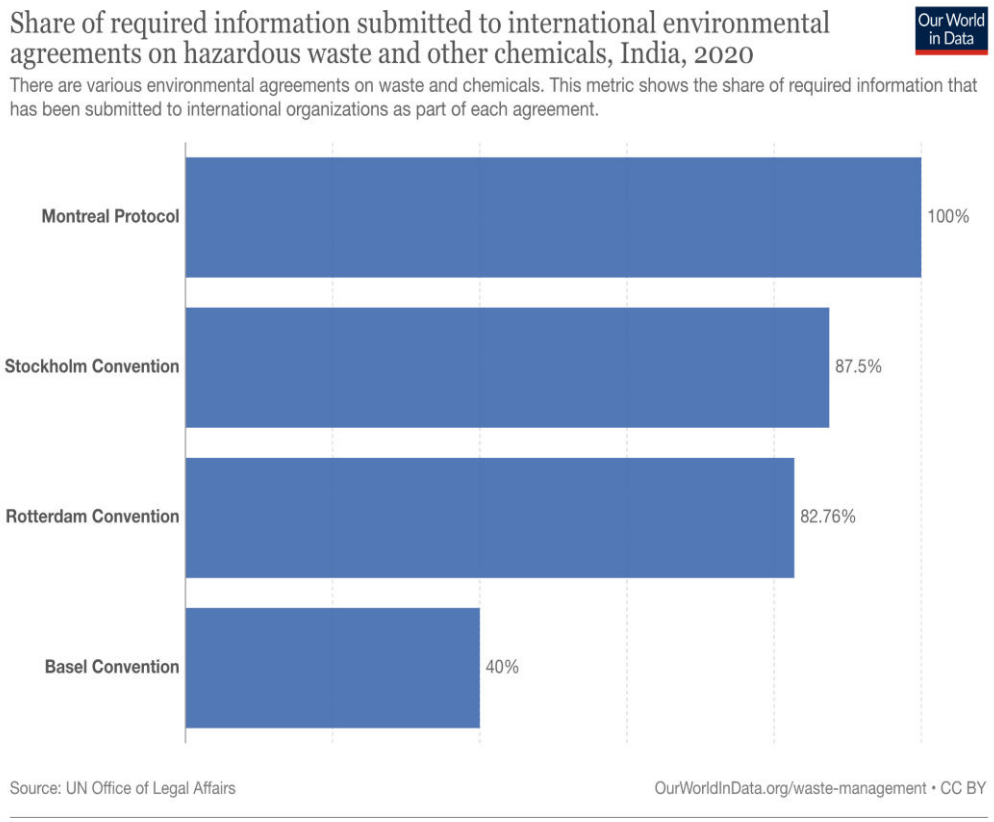


Figure 2 shows that India has actively participated on the international platforms and responsibly submitted all the required information associated with the hazardous waste. Thus, indicating that India is leaving no stone unturned to achieve the SDGs.

3.4.2. SDG Indicator 12.4 .2 Hazardous Waste Generation

This is defined as "(a) hazardous waste generated per capita; and (b) proportion of hazardous waste treated, by type of treatment. Hazardous waste is defined as waste that is harmful to human health, or the environment. This indicator captures how much hazardous waste is generated, and how it is treated or disposed of [2]." "The Ministry of Environment Forest and Climate Change", India is taking active participation in this regard [6].

As displayed in Map 2, India, being a developing country is producing significantly less hazardous waste compared to other developed and developing countries as per the data available in 2019.

Map 2: India's comparison with world in Hazardous waste generated per capita (2019)

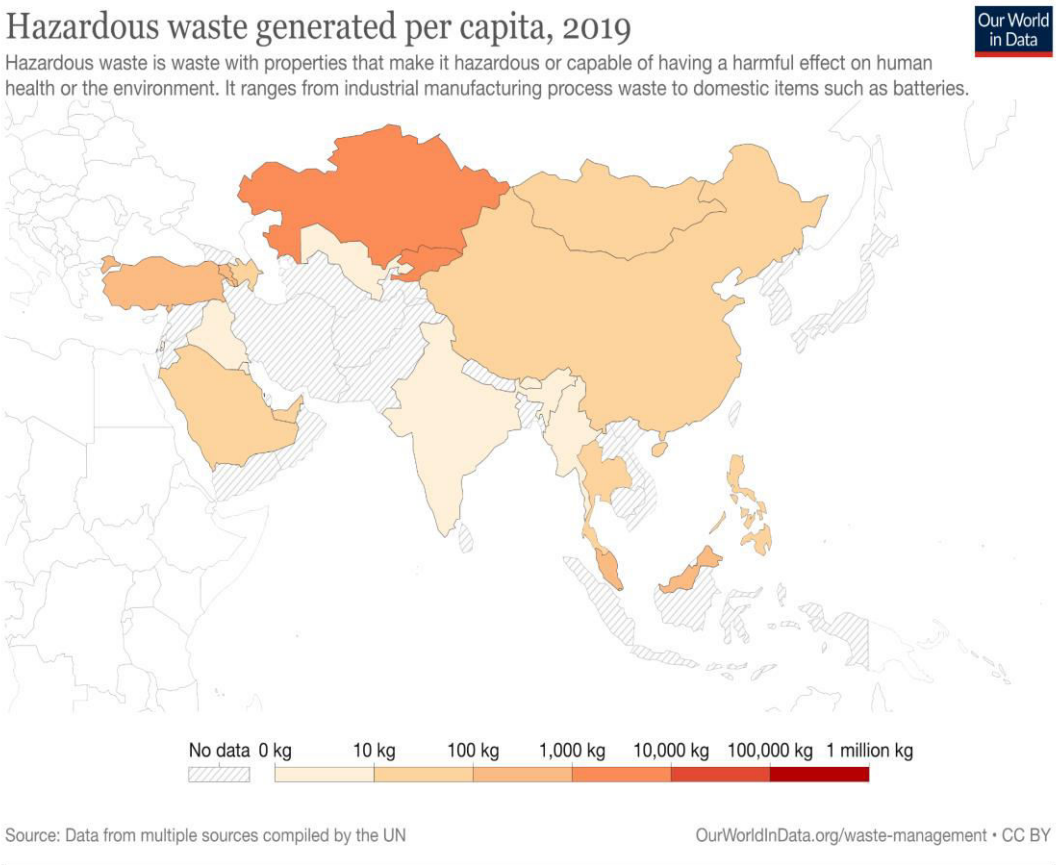
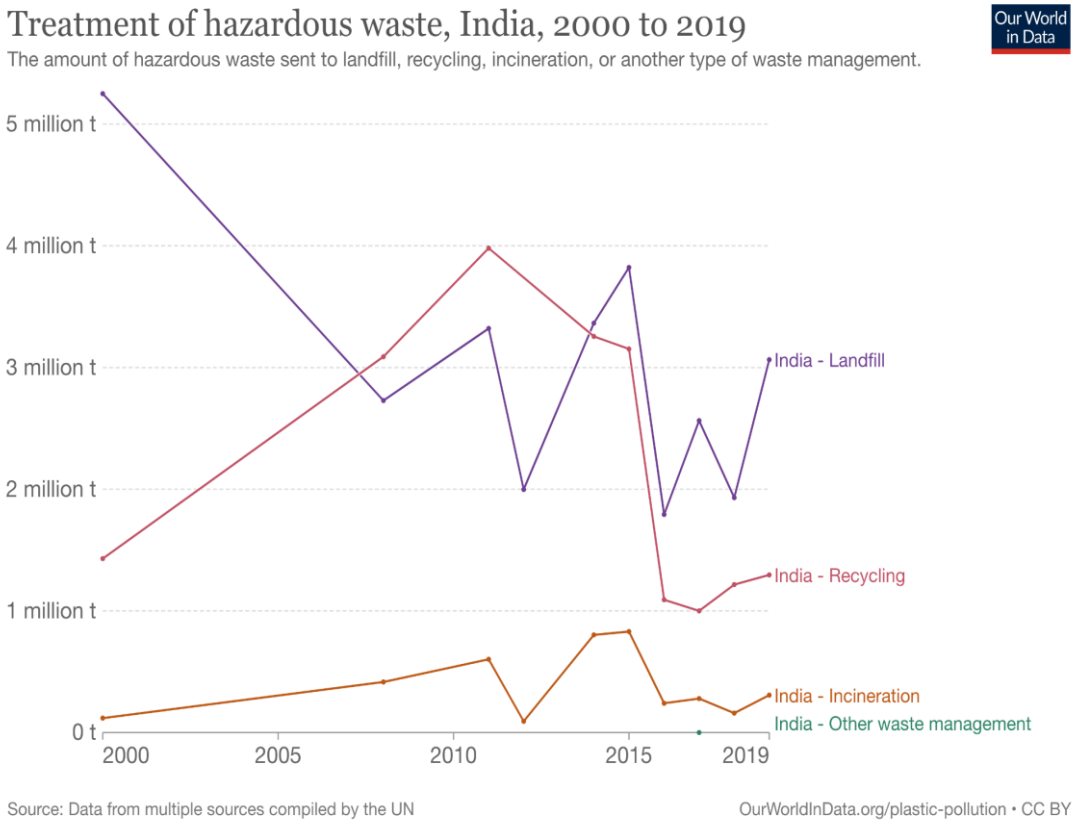


Figure 3 displays the hazardous waste treatment in India from 2000 - 2019. This figure shows where the hazardous waste was sent: Recycling, landfill, incineration or any other type of waste management procedure was adopted. India is surely leading the way for other developing countries on the effective solid waste treatment.

Figure 3: Treatment of Hazardous Waste in India (2000-2019)



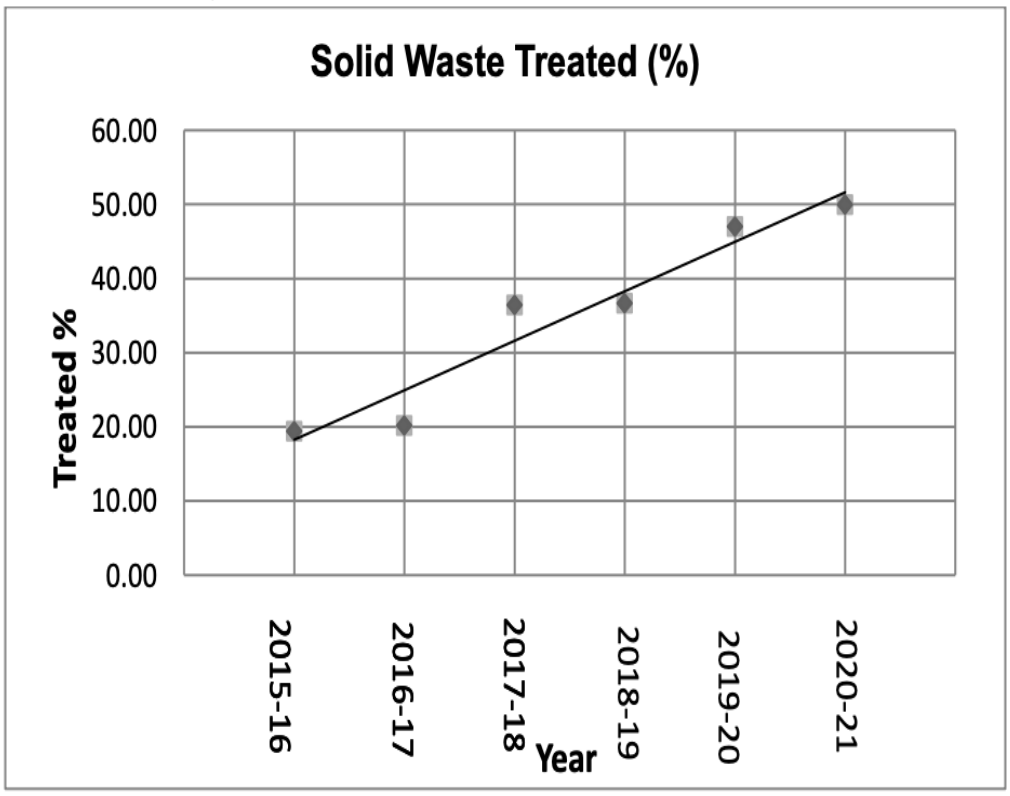
3.5 SDG Indicator 12.5 Recycling Rates

It is defined as "national recycling rate, tons of material recycled. This includes various types of material recycling such as municipal (household) waste and electronic waste"[2]. In India, the "Ministry of Housing and Urban Affairs" is installing waste recycling plants [6] . Globally Limited data is available for recycling rates.

Figure 4 displays that there is an increment in solid waste treatment to 49% (2021) from 19% (2016) in India. The local municipal authorities and urban local bodies have put in various policies such as banning single use plastic and using alternative material which can be reused, recycled, thereby promoting the optimum utilisation of the resources.

Although corporate awareness and policies have led to the increase in the recycling rates from the production aspect, more needs to be done to promote sustainable consumption and increase the recycling rates from the consumption side also. This is posing a real challenge for most of the countries as this requires major behavioural change for the consumers which can be done by making them realise the significant impact their actions can create on the SDGs.

Figure 4: Solid Waste Treatment in India (2016-2021)



Source: (CPCB, Delhi, 2021,7) [7]

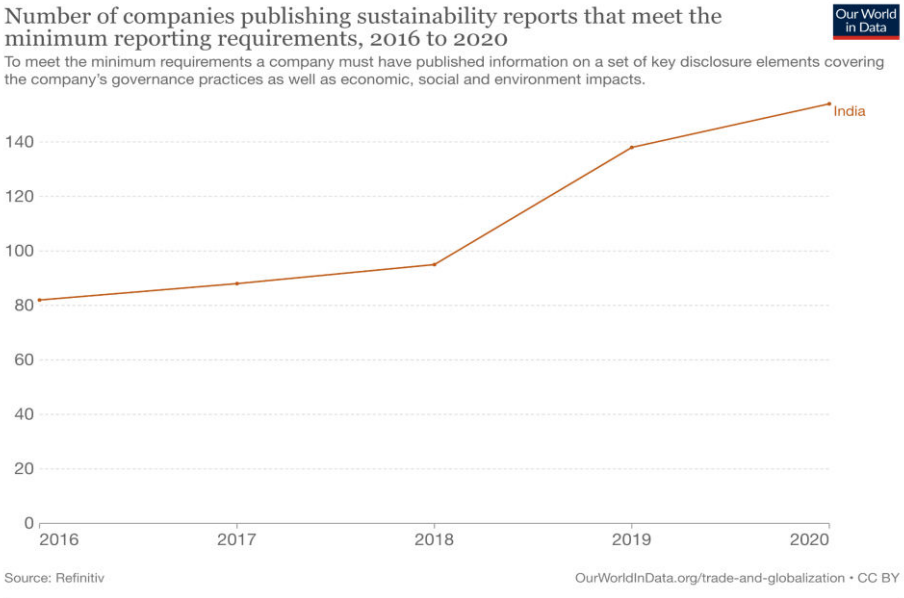
3.6 SDG Indicator 12.6 Companies publishing sustainability reports

It is defined as the "number of companies publishing sustainability reports [2]". In India, the Ministry of Corporate affairs holds accountability to achieve this goal [6]. Figure 5 shows there is a substantial upward trend in the total number of companies publishing sustainability reports. This is because the majority of the companies in India have started realising the threat and financial risk these companies have due to climate change and thus have started associating the profits and success of the business with the achievement of the SDGs.

It is a great trend in India be it small scale or large scale to link the corporate carbon footprints with the global climate goals. India has seen an increasing trend in the sustainability targets in all the companies in almost all the sectors.

However, the next step for the Indian companies is to also incorporate biodiversity in their plans and policies in the same efficient manner as they have linked the SDGs. This will ensure a holistic and comprehensive development of India as a country and as part of the Global community trying to protect the environment.

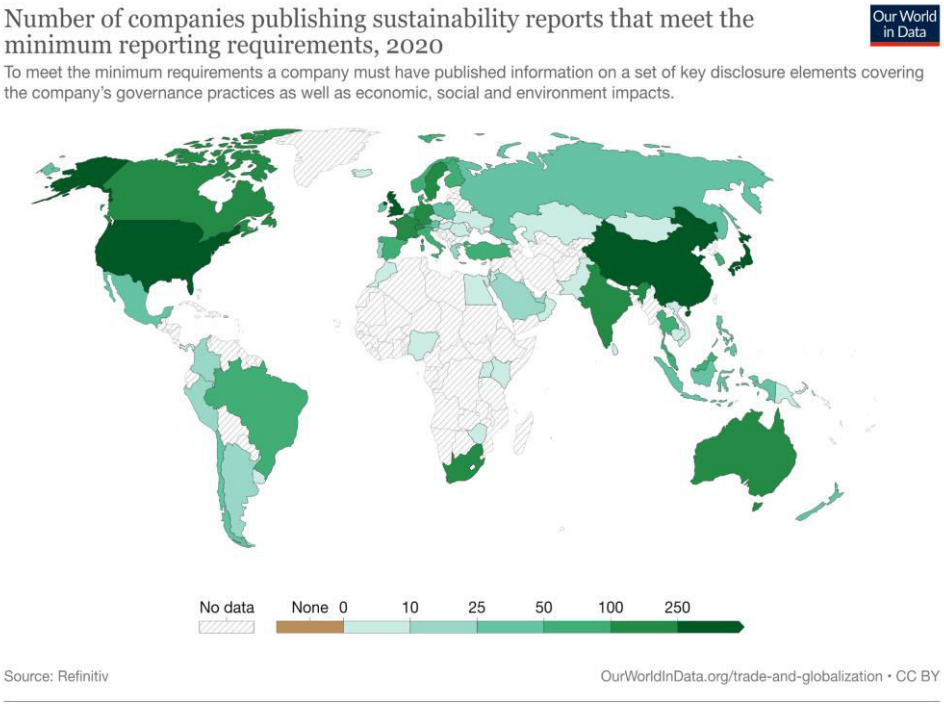
Figure 5: Indian companies publishing sustainability report (2016- 2020)



Map 3 shows that even though India has started increasing the publishing of sustainability reports, it surely needs to accelerate its pace as compared to the developed countries. This means that surely India is the torch bearer among the developing countries for sustainability reporting but there is a path ahead for its own improvement.

The Ministry of Corporate Affairs, India has framed various plans, policies and programmes with transparency, accountability, and sustainability to ensure that Indian companies should all function to achieve the SDGs in the time bound manner.

Map 3: Companies publishing Sustainability Reports worldwide (2020)



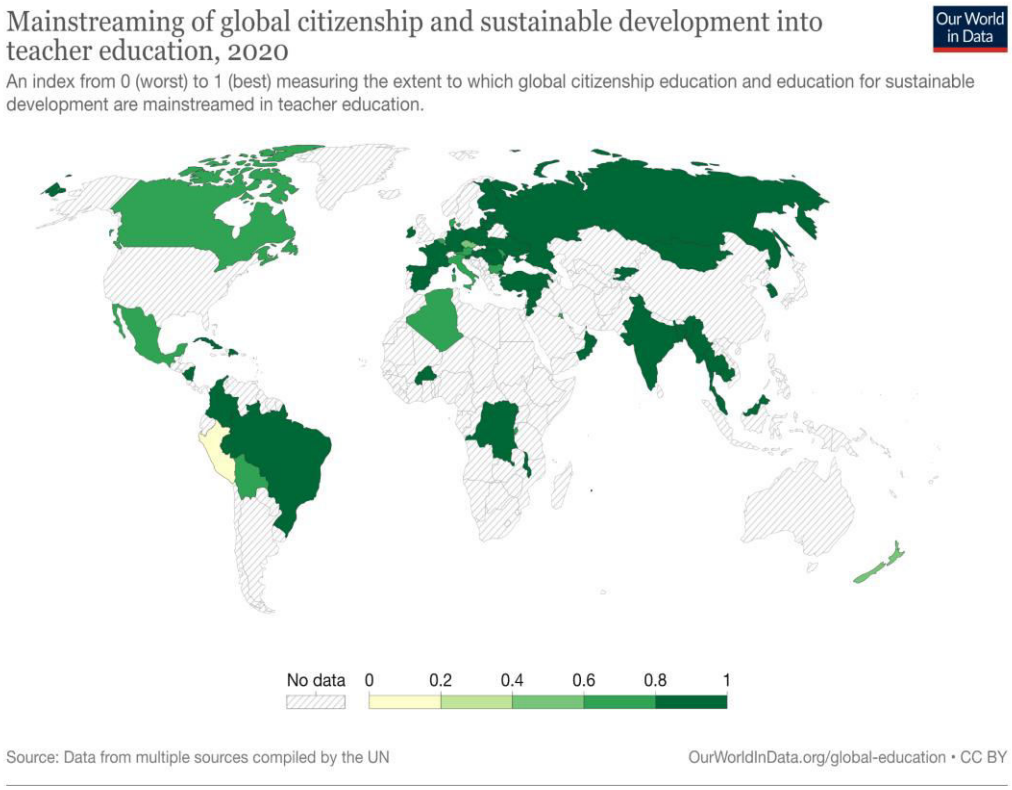
3.7 SDG Indicator 12.7 National sustainable procurement plans

It is defined as the "number of countries implementing sustainable public procurement policies and action plans [2]". In India, the Ministry of Finance has framed the policies for Green public procurement policy developed and adopted by the Central Ministries/States/UTs[6].

3.8 SDG Indicator 12.8 Understanding of sustainable lifestyles

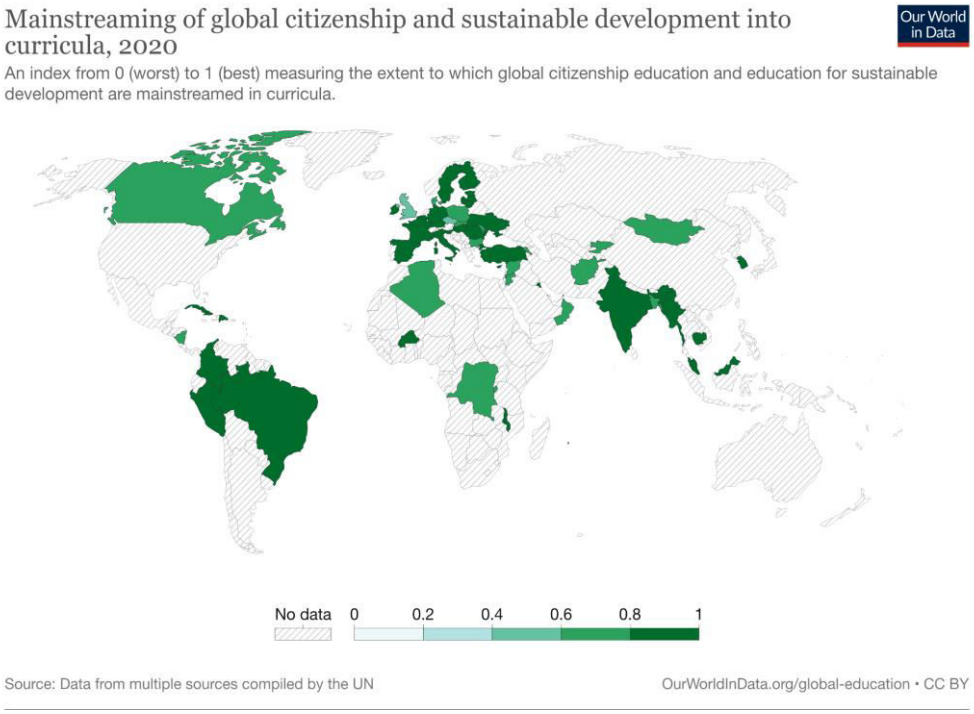
It is the "extent to which (i) global citizenship education and (ii) education for sustainable development are mainstreamed in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment [2]". Map 4 highlights that India has performed efficiently to include sustainable development in teacher education.

Map 4: World Map Showing Inclusion of Sustainable Development into Teacher Education (2020)



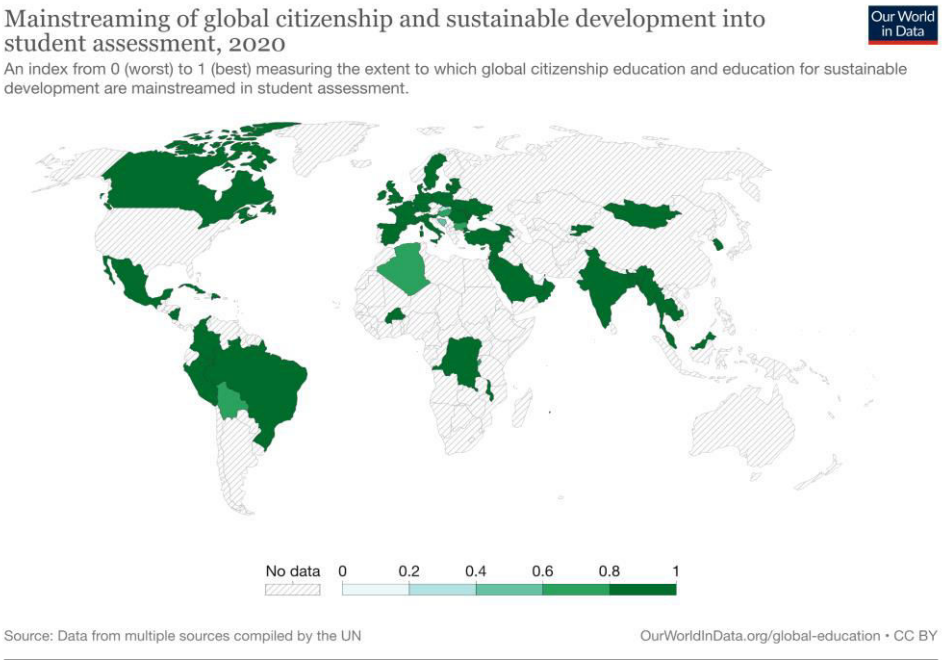
Map 5 highlights that India has performed efficiently to include sustainable development in curricula.

Map 5: World Map showing inclusion of sustainable development into curricula (2020)



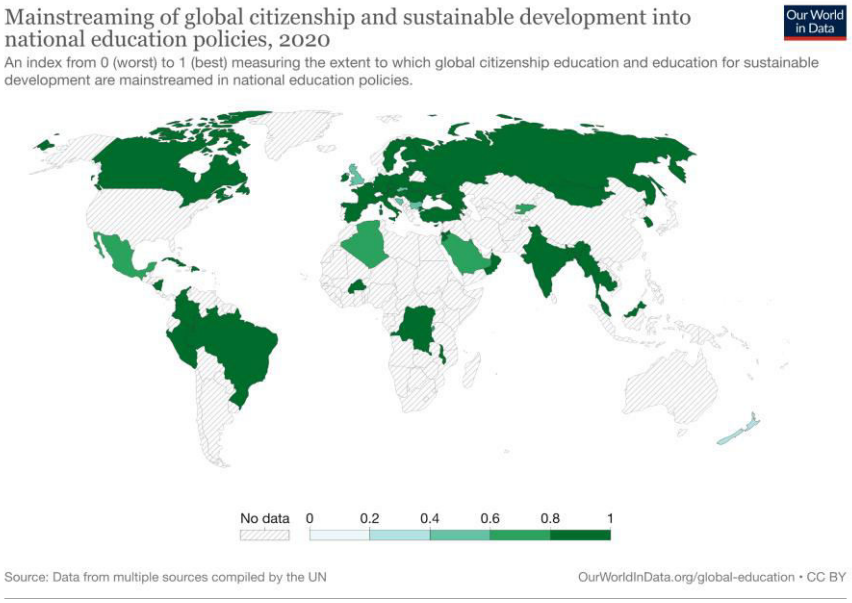
Map 6 highlights that India has performed efficiently to include the sustainable development in student assessment.

Map 6: World Map Showing Inclusion of Sustainable Development Into Student Assessment 2020



Map 7 highlights that India has performed efficiently to include the sustainable development in National Education Policies.

Map 7: World Map showing inclusion of sustainable development into National Education Policies (2020)



4. CONCLUSION AND OBSERVATIONS

After analysing India's performance in the various sub indicators of the sustainable production and consumption goal, it can be concluded that India is surely committed to decline its emissions and ecological and carbon footprint and it has made various sustainable consumption and production policies but there is a huge path ahead. Table 4 provides a summary of the Indian Ministers responsible for the achievement of the various sub targets.

Table 4: Summary of Indian Ministries responsible to achieve SDG 12

12.1	India has a National Action Plan under "Ministry of Environment Forest and Climate Change" [6]
12.2	Under development [6]
12.3	To reduce the food loss, plans are made under "FE, DAC&FW, Ministry of Agriculture and Farmers' Welfare" and For Post harvest storage and distribution losses of central/states pool stocks of wheat and rice, plans are made under "Ministry of Consumer Affairs, Food and Public Distribution" [6]
12.4	"Ministry of Environment Forest and Climate Change" [6]
12.5	"Ministry of Housing and Urban Affairs" [6]
12.6	"Ministry of Corporate Affairs"[6]
12.7	"Ministry of Finance" [6]
12.8	"Department of School Education and Literacy, Ministry of Education" [6]

The Government of India has launched a Resource Efficiency draft Policy that lays emphasis on the major sectors: construction and demolition, automobile sector, steel and aluminium section plastic packaging, solar photovoltaic sector, to adapt the resource efficiency strategy.

SCP is regarding the application of life cycle thinking and disassociating environmental degradation from economic growth. Practising sustainable consumption and production comes easy when there is exploration and awareness that there is ample environment- friendly techniques and green jobs. Thus, all the role-playing parties and the global community should come together and join hands with honesty to make the smooth transition to SCP and optimally use of the shared natural resources and the common planet.

India faces numerous challenges on its path to achieving the SDGs. To overcome the challenges and make progress towards a sustainable future, the country can adopt a multifaceted approach:

1. **Integrated Policy Framework:** Develop an integrated policy framework that aligns national, state, and local policies with the SDGs. This will ensure coordinated efforts across sectors and levels of government.
2. **Data-driven Decision-making:** Strengthen data collection, analysis, and reporting mechanisms to monitor progress and identify areas needing intervention. Evidence-based policymaking is essential for targeted actions.
3. **Inclusive Development:** Prioritise inclusivity by focusing on vulnerable populations, marginalised communities, and regions that have historically faced disparities. Ensure that development efforts leave no one behind.
4. **Capacity Building:** Investing in programs to improve the skills and knowledge of government officials, civil society organisations, and communities. This will facilitate effective implementation and monitoring.
5. **Private Sector Engagement:** Collaborate with the private sector to harness innovation, technology, and investments to promote sustainable lifestyles. Public-private partnerships lead to optimum utilisation of the resources.
6. **Green Infrastructure:** Develop sustainable and resilient infrastructure that promotes clean energy, efficient transport, waste management, and eco-friendly urban planning.
7. **Climate Action:** Intensify measures to reduce the carbon footprint. Implement renewable energy projects, enhance tree cover, and promote sustainable water management.
8. **Rural Empowerment:** Empower rural communities through comprehensive initiatives that combine agricultural innovation, access to markets, healthcare, education, and skill development.
9. **Digital Revolution:** Leverage digital technologies for better governance, e-governance services, and improved access to education, healthcare, and financial services, especially in remote areas.
10. **Education for All:** Strengthen educational systems to foster skilled knowledgeable skilled workforce.
11. **Healthcare Access:** Improve healthcare infrastructure and access, especially in underserved areas, to address health inequalities and achieve universal health coverage.
12. **Biodiversity Conservation:** Enhance conservation efforts by protecting critical ecosystems, promoting sustainable agriculture and forestry practices, and combating illegal wildlife trade.
13. **Responsible Consumption:** Promote SCP patterns to minimise waste generation and encourage environmentally friendly choices.
14. **Community Participation:** Involve local communities in decision-making processes, giving them a voice in shaping development initiatives that align with their needs and aspirations.
15. **Circular Economy:** Foster a circular economy approach by encouraging recycling, reusing, and reducing resource consumption.
16. **Global Partnerships:** Collaborate with international organisations, neighbouring countries, and global stakeholders to share knowledge, resources, and best practices.

17. **Awareness and Advocacy:** Raise public awareness about the SDGs and their importance. Mobilise citizens, youth, and civil society to actively participate in sustainable development efforts.

By addressing these challenges with a comprehensive and collaborative approach, India can pave the way for sustainable development, ensuring a sustainable and equitable future for its citizens while protecting and preserving the ecological balance of the planet for future generations. This study has contributed to the existing research by providing a comprehensive analysis of the updated data of SDGS and SCP.

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2

SUSTAINABLE GREEN FINANCE AND INVESTMENT

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ABSTRACT
Green finance and investment must be sustainable in order to promote environmentally friendly practices and combat climate change. Green finance, often known as green financial management, is gaining traction in modern economics. This is aided by the financialization of capital and the development of new liquid assets backed by green assets. This field's major purpose is to effectively allocate resources to green initiatives and to stimulate the development of products and services in places where there is a competitive advantage. Globalisation and financial market integration have made it simpler to finance green initiatives. Green assets have become more popular as a result of funds from Euromarkets and foreign markets. Furthermore, the availability and liquidity of green asset-backed securities have spurred global investment in sustainable initiatives.

The promotion of green finance and investment can contribute to the growth of societies that prioritize environmental awareness and understanding of global warming issues. Additionally, it can have a positive impact on various industries by encouraging investments in related sectors, ultimately leading to economic growth and a decrease in unemployment rates. However, there are challenges and complexities associated with green finance and investment. These include the lack of coordination in policies and standards, insufficient product innovation capacity, and the need for improved international cooperation. Financial innovation is essential in promoting green finance, but it can also lead to asset price bubbles and challenges in cost recovery. To address these challenges, it is important to establish and improve the green finance system, including the formulation of policies and standards related to green finance and clarifying the responsibility of financial institutions for green development. Deepening international cooperation, connecting with international standards, and strengthening international transactions can also contribute to the development of green finance.

Keywords: Sustainable Green Finance, Sustainable Green Investment, Environmentally Friendly Financial Practices, Benefits, Principles, Criteria, Investment Opportunities.

1. INTRODUCTION
Sustainable green finance and investment is a financial strategy that seeks to assist environmentally friendly efforts while still earning a profit. Transition finance is desperately needed to reduce greenhouse gas emissions and environmental damage by 2030, and it comprises funding private investments to reduce greenhouse gas emissions and transition to a more sustainable future. Companies that want to become sustainable but require time to do so in stages often require transition financing. Sustainable finance includes financing both green investments and transitioning to green investments. Green finance, on the other hand, refers to the mobilisation and direction of capital towards investments that promote the transition to a sustainable, low-carbon world. Sustainable green finance and investment aims to counteract the triple planetary crisis and requires very substantial capital. Estimates of the investment needed for the transition vary, but a figure of $6-7 trillion per year for the next 20 years is generally accepted. To achieve a sustainable environment, green finance plays a crucial role. Energy consumption and urbanization negatively affect environmental sustainability. Sustainable green

finance and investment can improve environmental sustainability by financing and investing in projects that have positive environmental impacts. Sustainable finance is relevant for key actors in the financial system such as investors, banks, and regulators. Incorporating environmental, social, and governance (ESG) considerations into financial decision-making is what sustainable finance entails. It has the potential to help achieve the Sustainable Development Goals and the Paris Agreement on Climate Change. Green finance in the future will entail evaluating and reporting the sustainability consequences of investments, as well as ensuring transparency and preventing greenwashing. The finance sector has a moral obligation to lead the transition towards a sustainable, low-carbon world. Green finance is a small part of the overall financial markets, but it is poised for rapid expansion due to incentives and the need to address climate change. Sustainable green finance and investment involves aligning with sustainable development goals, managing transition risks, and physical risks associated with climate change. Sustainable finance products include bonds and loans.

2. LITERATURE REVIEW

The literature explores the idea of sustainable green finance and investment in relation to promoting environmentally friendly practices and addressing climate change. It emphasizes the significance of green banking, which is a subset of sustainable banking that aims to minimize a bank's negative environmental effects. Green banking involves transforming a bank's internal operations by using renewable energy sources and implementing pollution prevention measures. It also involves environmentally responsible financing, which includes assessing environmental risks and supporting green initiatives and projects.

The adoption of green banking is considered a significant change in the culture of a bank, impacting every aspect of its operations. This includes its vision, strategic objectives, resource utilization, and business practices. However, there are challenges in implementing green banking in developing countries. These challenges include the absence of clear definitions and measurement standards, limited awareness among stakeholders, inadequate government support, and difficulties in attracting clients to green initiatives.

In terms of sustainable finance, the literature emphasizes the role of financial institutions in promoting environmentally friendly investments. Green bonds, for example, enable companies to access low-cost capital for funding green projects and attract investors focused on responsible investment. The transparency and reduced risk associated with green bonds can also lower the cost of debt for companies.

The literature also discusses the potential benefits of sustainable finance in enhancing a company's corporate image and reputation. Investors are increasingly interested in socially responsible investing and perceive responsible investing as a proactive form of investment that offers financial performance and positive secondary benefits. By adopting sustainable practices, companies can enhance their brand, increase performance, and attract investors focused on sustainability.

Securing financing for renewable energy projects is challenging due to the high initial costs and risks associated with commercializing them, especially when compared to conventional technology. This creates a barrier to obtaining funding for such initiatives. In a study by (Lam et al., 2016), the authors aim to explore the concept of crowdfunding and its potential use in funding renewable and sustainable energy projects. (Volz, 2018) emphasises the significance of greening the financial system and the role of financial governance in this process. In their study, (Tolliver et al., 2020) look at the influence of capital market growth factors and Nationally Determined Contributions to the Paris Agreement on the issuance of green bonds. Green bonds are used to gauge market growth. The researchers analyze a panel dataset consisting of more than $300 billion worth of green bonds issued in 49 countries from 2007 to 2017. Climate

mitigation finance, which involves investing in environmental sustainability, is a key component of this analysis. (Khan et al., 2021) investigate the changing role of green financing and its influence on the environmental footprint in 26 Asian nations. Finally, (Li et al., 2021) demonstrate that IRE, REEO, and GFi are more volatile than GDP and EIPP over a certain time period using the wavelet power spectrum technique.

(Zahoor et al., 2021) undertook research to investigate the effects of renewable energy investment and financial development on environmental sustainability and China's economic growth. They also included manufacturing value-added and urbanisation as potential influences on the connection.. The study utilized the stochastic impact by regression on the population, affluence, and technology (STIRPAT) model. Another study by (Ainou et al., 2022) focused on Morocco's energy security from 2000 to 2016, using the 4-As framework. Desalegn et al., 2022) employed an explanatory research design and quantitative research technique to examine a specific topic. (Sadiq et al., 2022) conducted a study on the contribution of green finance and financial development to green economic growth, with a particular emphasis on clean energy deployment in South Asia. They utilized ordinary least square (OLS) analysis to evaluate the long-term relationship between selected variables in South Asia from 1995 to 2018.

(Volz, 2018) discuss the need for greening the financial system and the role of financial governance. (Genberg, 2018) provides a review and appraisal of financial integration initiatives and outcomes in Asia. Other influential work includes (Komijani et. al., 2018), (Ray, 2018), (Hong et. al., 2018), (Jinjarak et. al., 2018).

The research by (Zografakis et al., 2010) aims to analyse and assess how the Cretan public accepts and is prepared to pay for Renewable Energy Sources (RES). They employ the green accounting methodology created by (Li et al., 2013) to assess the economic, environmental, and energy options of a typical wind generating project. (Ghaffarianhoseini et al., 2013) found that green buildings with sustainable energy performance are a realistic alternative for reducing CO2 emissions and energy consumption in the building industry. With a growing population, bioenergy generation from waste materials can play an important part in long-term waste management initiatives. (Hosseini et al., 2013) did a review of green energy potential in Iran, and this study attempts to analyse the renewable energy potential from diverse resources in Iran. Finally, (Manzetti et al., 2015) examine upcoming transportation technologies, concentrating on green chemistry as new energy sources for electric cars and portable devices.

(Hashemi et al., 2015) conducted a study to explore the influence of applying green roof solutions on runoff water quality and energy consumption reduction. (Seker et al., 2015) sought to investigate the impact of foreign direct investment (FDI), GDP, GDP squared, and energy consumption on carbon dioxide (CO2) emissions in Turkey from 1974 to 2010. (Komal et al., 2015) sought to investigate the relationship between finance, economic growth, and energy consumption in Pakistan from 1972 to 2012. However, because of the high initial costs and risks associated with commercialising renewable technology, funding renewable energy projects is difficult. (Lam et al., 2016) investigated crowdfunding's potential for funding renewable and sustainable energy projects. Finally, (Poudyal et al., 2019) sought to present an updated view on Nepal's current energy problem, taking into account the shifting energy scenario and advances in renewable energy technology.

Overall, the literature highlights the importance of sustainable green finance and investment in addressing environmental challenges and promoting a transition to a green economy. It emphasizes the need for regulatory frameworks, incentives, and international cooperation to support the adoption of sustainable practices and investments.

3. OBJECTIVES OF THE STUDY:

The objective of studying sustainable green finance and investment is to promote environmentally friendly practices in the banking and financial sectors, reduce carbon emissions, and contribute to the overall goal of sustainable development. It involves adopting green banking principles, such as evaluating the environmental risks of projects before approving financing and fostering green initiatives and projects. The aim is to shift towards a green economy, where economic growth is compatible with reduced emissions, improved resource efficiency, and protection of ecosystems. By studying sustainable green finance and investment, researchers and practitioners seek to understand the potential benefits, challenges, and barriers associated with adopting environmentally friendly practices in the financial industry. This knowledge can inform the development of strategies and policies that promote sustainable economic growth, enhance social inclusion, and improve environmental well-being.

4. WHY IS SUSTAINABLE GREEN FINANCE AND INVESTMENT IMPORTANT?

Sustainable green finance and investment is important for several reasons. Firstly, it can play a critical role in achieving sustainability goals, and policymakers worldwide have different motivations for promoting this type of finance and investment. Public policy is a significant factor in shaping sustainable finance and investment, and it can provide the necessary motivation to attract investment towards sustainability. Secondly, green finance has a negative correlation with carbon emissions and energy consumption, both of which are major contributors to environmental degradation. Green product financing means that less polluting products are utilised, resulting in less pollution. Green finance has the ability to rescue the environment by minimising environmental deterioration and contributing to the reduction of carbon dioxide emissions. Thirdly, sustainable green finance can help financial institutions, clients, and customers manage climate-related and other environmental risks, thereby promoting environmental performance.

Furthermore, green finance helps fund the development and deployment of green technologies, which can contribute to reducing emissions and enhancing climate resilience. Lastly, sustainable investments are needed for the transition to a climate-neutral, green, competitive and inclusive economy, as recognised in international agreements like the Paris Agreement and the Kunming-Montreal Global Biodiversity Framework. The European Green Deal Investment Plan and Just Transition Mechanism will mobilize at least €1 trillion of sustainable investments over the next decade, highlighting the importance of sustainable green finance and investment in shaping a sustainable future.

5. WHAT ARE THE BENEFITS OF SUSTAINABLE GREEN FINANCE AND INVESTMENT?

Sustainable green finance and investment has gained significant attention in recent years. Various online courses and e-learning platforms offer comprehensive knowledge of sustainable investments and effective financial valuation tools to assess risks and returns in this area. Sustainable finance considers environmental, social, and governance (ESG) factors when making investment decisions, promoting sustainable investments and risk management strategies that facilitate a shift to a low-carbon economy. Research shows that green finance is essential for creating a sustainable environment, and many leading countries are making significant investments in sustainable finance to reach their sustainability objectives. However, there are still challenges to overcome, and enabling conditions must be put in place for countries to benefit from the growing sustainable investment opportunities. To understand sustainable finance and investment better, it is crucial to comprehend the purpose of finance, the financial system's structure, asset classes, and finance professions. Overall, sustainable green finance and investment offer numerous benefits for achieving sustainability goals, mitigating environmental degradation and promoting inclusive economic growth.

6. THE ROLE OF PUBLIC SECTOR ACTIONS

The public sector has an important role to play in advancing sustainable green finance. Governments can help by creating a more transparent and accountable legal framework and setting clear targets for green investments. They can also influence firms' green investment behaviour through the use of regulatory instruments such as taxes, subsidies or incentives. Furthermore, by setting up specific funding mechanisms and facilitating matches between private and public sector parties, governments can play a key role in facilitating the development and scaling up of green finance.

In addition, governments can also support research activities to help advance green finance solutions and provide incentives or subsidies to encourage households, firms and investors to engage more actively in sustainable investments. The development of green finance indices and ratings can also help to measure and compare the performance of firms and investors in terms of their investments in green projects.

7. THE ROLE OF PRIVATE SECTOR ACTIONS

In addition to the role of the public sector, individual firms, households, and investors also have an important role to play in sustainable green finance. Many firms are now recognizing that sustainability has become an important determinant of financial performance. Therefore, they are increasingly shifting their investment strategy towards green investments, such as renewable energy projects or energy efficient technology.

Furthermore, households and investors are also increasingly recognizing the potential financial benefits of investing in green projects and are becoming increasingly involved in green finance activities. Through the development of an array of green financial products and services and the collaboration with government organizations, private parties can create the necessary conditions for the growth of a vibrant green finance sector.

8. PRINCIPLES AND CRITERIA FOR SUSTAINABLE GREEN FINANCE:

The following principles provide an overview of the core tenets of sustainable green finance:

1. Responsibility and accountability: Sustainable green finance initiatives seek to ensure those responsible for financial activities exercise sound stewardship and are held accountable for their actions. Responsible finance requires full disclosure of activities, costs and benefits to stakeholders, as well as proactive risk management and good corporate governance.
2. Investment in efficiency: Sustainability criteria for green finance can be applied to all types of investments to promote increased efficiency. This can include investments in energy efficiency, water conservation, waste management and the development of sustainable supply chains.
3. Sustainable development: Sustainable green finance seeks to promote sustainable development by funding resource-efficient projects that are compatible with local and global objectives. This includes projects that will contribute to poverty reduction, economic development and environmental protection.
4. Long-term perspective: A long-term perspective is essential for sustainable green finance. Activities should be designed for long-term success and carefully assessed over time to ensure risk management and total-cost-of-ownership objectives are met.

9. CRITERIA FOR SUSTAINABLE GREEN FINANCE

Different sustainable green finance initiatives have developed lengthy lists of criteria to use when assessing projects and investments. The following criteria are among the most commonly used:

1. Environmental sustainability: Projects should have a positive environmental impact and contribute to the reduction of negative environmental impacts. This includes considering the potential effect on environmental resources, biodiversity, air and water quality, climate change and waste.
2. Social sustainability: Projects should promote the wellbeing of people and take into consideration their values, needs and long-term interests. This includes considering health impacts, human rights, social justice and equitable distribution of benefits.
3. Economic sustainability: Projects should result in positive economic benefits and foster economic development. This includes considering economic viability and benefit to stakeholders, job creation and local development.
4. Risk assessment: Risk assessment must be performed on an ongoing basis and address potential risks related to environment, social, economic and financial impacts.

10. SUSTAINABLE GREEN INVESTMENT OPPORTUNITIES:

With an ever-increasing focus on renewable energy sources and the rise of green technology, there is an unprecedented level of interest in sustainable green investment opportunities. As the global population rises and resources become more scarce, green initiatives offer ways to reduce emissions and conserve energy. Sustainable green investment opportunities focus on a variety of technologies and infrastructure investments that support sustainability efforts. By investing in these initiatives, investors can reduce their environmental impact while also generating a financial return.

10.1 What Are Sustainable Green Investment Opportunities?

Sustainable green investments involve the purchase or investment in any type of green technology, product, or service that has the potential to reduce emissions or conserve energy. Some of the most common investments in this sector include green energy products, renewable energy sources, energy efficiency investments, and electric vehicles. By investing in these green initiatives, not only can investors reduce their environmental impact, but they can also realize a financial return from their investments.

10.2 Advantages of Sustainable Green Investment Opportunities

There are numerous benefits to investing in sustainable green opportunities. First and foremost, these investments help to reduce emissions and conserve energy. Green initiatives help to reduce our dependence on non-renewable energy sources and help us focus on renewable sources. They can also reduce our reliance on large-scale energy facilities, such as coal-fired power plants. This helps to reduce environmental pollution and lessen the effects of climate change. Additionally, green investments can generate a financial return for investors, providing them with a more diversified and sustainable portfolio.

10.3 Risks Associated with Sustainable Green Investment Opportunities

Although sustainable green investments can offer many advantages and generate a financial return, there are still risks associated with them. The green sector is a relatively new and emerging market, which means that investments can be volatile. Most green investments involve a high level of risk since they are not well understood or regulated. Moreover, these investments are often illiquid and require a longer investment horizon. Additionally, green initiatives may require a large upfront capital expenditure, which can be difficult to recoup.

11. CHALLENGES AND FUTURE OUTLOOK FOR SUSTAINABLE GREEN FINANCE:

The transition to a sustainable green financial system poses many challenges to its successful implementation and operation. One of the primary challenges relates to the issue of scale. To make the transition to a sustainable green financial system work, a large scale shift in capital

flow away from traditional investments and into green finance projects needs to take place. To attract such a shift in capital flow, green finance financial products need to be competitive with existing products.

Another major challenge facing green financing is the lack of standardization and transparency across different products. Green finance products must meet certain standards and criteria in order to be considered "green", but there is currently no set of globally accepted standards, making it difficult for investors to compare and analyze the environmental and financial performance of investments in green finance products.

Moreover, the complexity of green finance instruments presents another challenge. Green finance projects involve complex, long-term calculations and for investors, understanding exact financial performance and returns that are possible can be difficult. Investors therefore need access to tools and transparent information to understand and evaluate the potential risks and returns of green finance investment options.

12. FUTURE OUTLOOK OF SUSTAINABLE GREEN FINANCE

Despite the challenges of green finance introduction and adoption, the future outlook for this sector is a very positive one. Increasingly, investors, financial institutions, developmental banks, and governments are taking a more proactive role in promoting and financing green finance projects. The growth of green finance has been further aided by advancements in clean technologies, such as renewable energy sources, leading to a lower cost and greater feasibility of green finance projects.

Furthermore, the concept of climate finance is gaining traction in the world of finance. New initiatives are being developed to target climate-related investments. For instance, the Paris Agreement on Climate Change set out a roadmap for climate-related investments, with a goal of channelling at least US$100 billion into climate finance every year by 2020.

13. LIMITATIONS

Studying sustainable green finance and investment has several limitations. One limitation is the short-term nature of funding in the green sector. Financialization of capital, which is the shift of resources from production to finance, has led to a focus on short-term finance and investment rather than long-term sustainability. This can hinder the ability to implement and sustain green projects in the long run.

Another limitation is the potential crowding out of private sector participation in green financing due to donor funding. While governments and multilateral institutions have been spearheading green finance initiatives, the reliance on donor funding can discourage private sector involvement. This can limit the scale and impact of green projects, as private sector resources and expertise may not be fully utilized.

Additionally, there may be challenges in accurately measuring and evaluating the impact of sustainable green finance and investment. The effectiveness of green projects in reducing carbon emissions and promoting sustainability can be difficult to quantify and attribute solely to financial interventions. This makes it challenging to assess the overall success and impact of sustainable green finance initiatives.

Furthermore, there may be a lack of coordination and collaboration among stakeholders in the sustainable green finance ecosystem. This can result in fragmented efforts and limited synergies between different actors, such as governments, financial institutions, and businesses. Without effective collaboration and coordination, the potential for transformative change through sustainable green finance may be limited.

Overall, while studying sustainable green finance and investment is crucial for addressing climate change and promoting sustainability, it is important to recognize and address these limitations in order to maximize the effectiveness and impact of such initiatives.

14. CONCLUSION

In conclusion, sustainable green finance is an important concept that is gaining traction around the world. Through increased awareness of climate change risks, the emergence of the Paris Agreement on Climate Change in 2015, and a shift towards a more sustainable economic model, governments, firms, households, and investors are increasingly recognizing the importance of aligning finance with the principles of sustainability. The public and private sectors have an important role to play in advancing sustainable green finance, and through the development of green financial products and services, the financial sector can play an important role in supporting the transition to a more sustainable economy and achieving the United Nations' sustainable development goals.

This paper has examined the potential benefits, costs, and models of sustainable green finance and investments, as well as the associated economic performance, cost savings, and sustainability gains. Equally important, this paper has discussed the potential risks associated with these investments and the strategies for mitigating those risks. The results of this research suggest that sustainable green finance and investments can yield numerous economic, environmental and social benefits.

Sustainable green finance is becoming increasingly important for ensuring that financial activities reduce environmental impacts and adequately contribute to the sustainable development of global communities. This paper has provided an overview of the principles and criteria used by sustainable green finance initiatives, which can help guide decisions and ensure long-term success.

As the global population rises and resources become more scarce, sustainable green investments offer the potential to reduce emissions and conserve energy. These investments have numerous advantages, such as reducing our dependence on non-renewable energy sources and improving our reliance on more sustainable sources. Additionally, they can generate a financial return for investors, providing them with a more diversified and sustainable portfolio. However, there are risks associated with these investments and they may require a large upfront capital expenditure. Looking ahead, sustainable green investments have the potential to create a more sustainable and profitable future.

Given the rising public interest and demand for investments in green finance, the industry has tremendous potential for growth and impact. However, its successful development and implementation will depend on reducing the above-mentioned challenges and tackling the existing barriers to green finance adoption. It is imperative that governments, investors, and financial institutions create better and more efficient systems and products to increase the attractiveness of green finance investments. With coordinated efforts and commitment, green finance can become an essential element of the global financial system and a powerful force for achieving the global goal of sustainability.

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3

CRYPTOCURRENCY -AN ESG (ENVIRONMENTAL, SOCIAL AND GOVERNANCE) PERSPECTIVE

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ABSTRACT

Investors now face a new challenge as a result of the rising popularity of cryptocurrencies: how to weigh the upside of these investments against its unavoidable negative effects on society and the environment. Look at the argument from both perspectives.

For investors that include environmental, social, and governance (ESG) problems into their portfolios, the cryptocurrency business has recently experienced exponential development, but there are still many unanswered questions about this new asset class.

While the opportunity to "be your own bank" and financial inclusivity are two societal advantages that crypto can provide, there are also some potential drawbacks, including its carbon impact, high rate of hacker theft, and lack of centralized oversight.

Within the cryptocurrency community as well as by decision-makers, businesses, and other organisations around the world, these problems are the subject of intense discussion. Investors should take into account the specifics of various digital currencies and analyse the advantages and disadvantages in light of their own sustainability objectives.

Keywords: Cryptocurrency, ESG, Sustainability, Digitalisation.

1. INTRODUCTION

A cryptocurrency is a form of digital or virtual money that operates on a network spread over several computers. Notably, it is neither issued by, nor is it governed by, any government or central body, enabling less expensive and quicker money transactions. Investor protection is non-existent in the UK because the asset is still mainly unregulated, however this is not the situation in many other countries.

The volatility of the cryptocurrency market itself poses a significant governance risk, leaving market participants vulnerable to fraudulent conduct in the absence of a hierarchical structure, as well as the bankruptcy of individual currencies and exchanges due to a lack of transaction audit trails.

In the end, the core of running a sustainable, resilient organisation is taking into account the risks and opportunities that charities encounter as part of their strategic planning. Such an evaluation should take into account climatic variables as well as those related to cryptocurrencies.

Since there are no central organisations in each jurisdiction to offer monitoring of market operators, the lack of market regulation leaves a far higher risk on the shoulders of individual investors (Catchpool, 2023)

2. LITERATURE REVIEW

In recent years, a profusion of unique digital currencies known as cryptocurrencies have emerged. These currencies serve as mediums of trade and have monetary value. These, however, are unconnected to and autonomous from national boundaries, banks, or government, unlike conventional currencies. Cryptographic techniques are used by cryptocurrencies to assure unique and legal transactions, which rely on digital information . Bitcoin, created in 2009 by the

mysterious creator going by the identity Satoshi Nakamoto, is the first widely accepted decentralised cryptocurrency, even though the idea goes back to the late 1980s.

The process of mining a cryptocurrency is essentially the same: miners receive a new mathematical equation every 10 minutes, and whoever solves it the quickest wins new coins that are released into circulation if the rest of the network verifies that their solution is correct. A vast number of powerful computers must operate simultaneously in order to carry out the mining operation. The infrastructure necessary to validate the value of the currency will be weakened if the energy costs associated with mining are greater than the revenue from the currency. This means that a miner will require a more potent computer, quicker internet, and less expensive electricity in order to maximise the revenue from the mining operation (Rabbani, Whether Cryptocurrency is a threat or a revolution? An analysis from ESG perspective, 2021)

The anonymous nature of cryptocurrencies provides them excellent media for numerous criminal activities, including people trafficking, murder for hire, illegal narcotics, illegal weapons, terrorism, and identity theft. Ethicists have divergent opinions on whether or not certain behaviours are morally acceptable. For instance, some people contend that selling illicit narcotics is moral.

And it may be argued that using cryptocurrencies to see a film that has been outlawed by a government that oppresses you is not immoral. (Conklin, 2023)

The bulk of the computing power in the Bitcoin network is controlled by a small number of privately held mining pools, which puts competitive behaviour in danger.

Large players can create new points of control inside the blockchain infrastructure thanks to this concentration of power because these parties have the authority to accept or reject BIPs. Other players in the ecosystem, such exchanges, fiduciary fund managers, or influencers with large followings, have the ability to swiftly affect investor sentiment and behaviour, which might result in the misuse of market power. Such behaviours jeopardise the network's dependability and integrity and put the privacy of user data at risk (Vries, 2021)

Although there was a good correlation between the measures of real electricity consumption and computing power utilised, bitcoin power demand was left out of the research since it could not adequately explain the shift in the data. Since demand predictions do not yet have the same weight as they do in the traditional stock market, it may be believed that the cryptocurrency market is not yet sufficiently developed and estimates of real consumption manage to set the price.

Most of this demand can be hidden through "more anonymous" protocols, which implies that other protocols should be used instead, as regulatory restrictions on the circulation of digital assets are frequently inherent for countries where the use of cryptocurrencies is necessary for countries to access global cash flows (Nazarov, 2022).

Existing ESG criteria not only support adding bitcoin exclusions, but doing so also has the advantage of being simple to implement. It is simple to determine whether a publicly listed firm has cryptocurrency assets on its balance sheet and accepts cryptocurrencies as payment.

Additionally, it is a binary choice independent of the subjectivity of the individual. Another advantage of including bitcoin exclusions in ESG guidelines is that doing so would be quite simple, leading to greater compliance from businesses. Additionally, bitcoin divestiture is not merely a statement about good change—unlike other ESG criteria like corporate declarations on diversity and inclusion—it is the positive change (Conklin, 2023).

When adopting the blockchain-based LCA system for ESG reporting, privacy might be a significant issue. Therefore, it is crucial to choose whether data on the blockchain should be

available to the public or kept private. The adoption of the system may be hampered by some stakeholders' reluctance to divulge sensitive information, such as their suppliers and material consumption, to rivals or the general public. Blockchain technology can facilitate information sharing throughout the product life cycle. The blockchain-based LCA should be implemented on a so-called "permissioned blockchain," which only permits authorised users to access and manage data on the blockchain, in order to solve this issue. However, it is difficult to create a dependable system when several stakeholders are involved in complicated, reliant, or interdependent operations (Jiang, 2022).

We looked at the connections between Asian green stocks and bitcoin to discover prospects for diversification in risk-management investments and mitigating the environmental effects of bitcoin mining. Our wavelet analysis finds little correlations between Bitcoin and green financial assets, corroborating the findings of (Goodell et al. 2022). For the purpose of developing a workable risk management plan, we further computed the ideal Bitcoin allocation within the green portfolio. The findings show that owning a little amount of Bitcoin significantly lowers the volatility of green stock portfolios. Among our sample, ESG stocks in China gain the most from the Bitcoin allocation, which suggests a significant impact for sustainable investors in the nation where the bulk of global blockchain mining is carried out with significant energy consumption (Kakinuma, 2023).

Cryptocurrencies are the perfect medium for many criminal activities because of their anonymity, including human trafficking, murder for hire, the sale of illegal substances and weapons, terrorism, and identity theft. Ethicists have divergent opinions on whether or not certain behaviours are morally acceptable. For instance, some people contend that selling illicit narcotics is moral.

And it may be argued that using cryptocurrencies to see a film that has been outlawed by a government that oppresses you is not immoral. However, applying a utilitarian framework to examine the total effects of illicit transactions obtained through bitcoin payments yields a compelling case that these behaviours do much more harm than good (Conklin, 2023).

Blockchain technology has a lot of potential to improve the reliability and integrity of ESG data. Blockchain can increase data accuracy, expedite regulatory compliance, and promote confidence in ESG reporting by offering a decentralised, tamper-resistant approach. Critical thinking and well-informed decision-making will be essential as we explore this fascinating new territory if we are to realise blockchain's full promise for ESG. Although the route to accurate and trustworthy ESG data is a difficult one, we are well-equipped to travel it thanks to technology like blockchain (Salehi, 2023).

At its core, integrated reporting is a comprehensive reporting structure that reflects stakeholders' growing interest in learning how an organisation delivers outcomes as well as how these results are produced (Zhou et al. 2017). Integrated reporting may be summed up as a system for providing financial and operational data to external stakeholders without getting too deep into the technical weeds and specifics connected with it. The multiple capital model may be used to summarise and emphasise the essence of this reporting structure, which has been implemented by several organisations across industry lines on a worldwide scale. The multiple capital model's name alone seems to link the idea of more thorough reporting to the financial services industry (Smith S. S., 2019).

In many ways, it makes sense to regulate new, innovative, and sophisticated products and services through enforcement, and the crypto business in particular. The cryptocurrency industry is a cutting-edge one that has shown to not only be founded on highly technical notions but also to be incredibly volatile and financially dangerous.

Regulators frequently found themselves trying to apply already-existing law and enforce already-existing regulation, rather than announcing new, clear rules and guidelines, in an effort to understand how to address many of the issues it raises in legal fields ranging from securities regulation to tax law, among others. Some politicians have defended their actions by saying that it is critical to "be able to adapt quickly to innovation and to changes," even though they have been criticised for doing so (Packin, 2023).

The natural logarithm of a company's total assets (book value in each fiscal year) is included in the regression assumptions to control for the size effect and growth effect separately. Since Bitcoin is a network of computer nodes, there is sadly no overall asset value for it; as a result, a proxy variable must be used to calculate Bitcoin's book value. For ease of calculation, the average daily price of Bitcoin traded on the open market over the prior year is used as the book value of all assets for Bitcoin in each year. For instance, the average daily price in 2019 equals the book value in 2020. On the other hand, the market capitalization value is the daily price on December 31, 2020 times the quantity of Bitcoins (Dong, 2023).

Regulators and environmentalists have been increasingly discussing the high energy consumption of mining and its negative impacts on ecosystems and on climate change as cryptocurrency markets have grown and developed. Numerous studies have identified a growing degree of interdependence between cryptocurrencies, both within and between them, and between cryptocurrencies and financial assets. Our findings confirm those of other previous studies that focus on interdependence among cryptocurrency marketplaces.

By encouraging sustainable investments and embedding sustainable practices in their business models, crypto markets can play an important role in achieving ESG goals in the context of this integration, as well as the ESG sustainability challenges raised by the Paris Agreement in 2015 (Almeida, 2023).

3. OBJECTIVE OF THE STUDY

The purpose of this study is to address the gap in the literature regarding the ecological, social and governance (ESG) implications of cryptocurrencies. While acknowledging the advantages and disadvantages of cryptocurrencies and emphasizing the need for further ESG research, this study seeks to provide valuable insights on responsible growth and investment opportunities in the rapidly changing cryptocurrency landscape.

The proposed use of Bibliometric Analysis and visualization techniques adds a novel approach to develop a cohesive theoretical framework and provide quantitatively-based recommendations for future work.

This study seeks to help understand ESG implications and their implications on sustainability and long term viability, as ESG considerations are becoming increasingly important.

4. ENVIRONMENTAL IMPACT OF CRYPTOCURRENCY

Understanding the link between virtual money and the physical infrastructure and operational inputs it needs is the first step in comprehending how crypto affects the environment. In order to securely store and transmit ownership as a digital representation of value, cryptocurrencies employ distributed networks that are built on intricate computations (Davos, 2022).

5. POTENTIAL ESG ISSUES WITH CRYPTOCURRENCY

Some people bring out the accessibility of bitcoins as another possible problem. Because cryptocurrencies are decentralised and give underprivileged individuals access to financial services worldwide, supporters claim that they are beneficial from an ESG perspective.

However, the ESG argument in favour of cryptocurrencies is undermined by the fact that utilising them needs access to the internet, money, and the knowledge necessary to utilise them.

Others have noted that cryptocurrencies are a preferred means of exchange for criminals, such as the hackers who were paid bitcoin as ransom for interrupting the Colonial Pipeline.

Then there are the conceivable problems with cryptocurrency governance. Since the majority of them are by definition decentralised, some people can mistakenly assume that they lack governance (Zoldan, 2022).

6. CRYPTOCURRENCY AND ESG ARE CONTRADICTORY IN NATURE-

This worry relates to how criminals are exploiting cryptocurrency as a means of money laundering and carrying out financial transactions outside the reach of regulated banking institutions. This can involve enormous sums of money that corrupt governments steal from their citizens as well as illicit off-balance sheet transactions that enable double accounting and terrorists' shadow banking. According to Cipher Trace's 2020 Cryptocurrency Crime and Anti-Money Laundering Report 5, big cryptocurrency thefts, hacks, and scams cost USD1.9 billion in 2020. These estimates, however, are probably just a small part of the money that is actually being laundered through cryptocurrency. This is because the biggest, most experienced criminals are challenging to track down since they do not utilize addresses with a history of illicit activity to launder their money (Meloni, 2021).

Bitcoin seems to be one of the few industries, both domestically and internationally, that doesn't rely heavily on coal as an energy source. A recent study discovered that 52.2% of the Bitcoin network is powered by zero-emission energy since BTC mining depends so heavily on off-grid power sources. At least 29 mining businesses utilize energy that is 90% to 100% emission-free, while another 12 employ sources that produce no emissions.

The Bitcoin network is far more energy efficient than traditional banking systems, in addition to running mostly on clean energy. Less than 0.2% of the world's energy is used for bitcoin mining, and just 0.09% of carbon dioxide (CO2) emissions come from this activity. As a store of value, bitcoin is sometimes likened to gold. However, mining bitcoin requires less energy and produces no heavy metal pollution. The environment would greatly benefit from the simple substitution of bitcoin for gold or the current banking system. (Munster, 2023).

7. MAKING CRYPTOCURRENCIES MORE ENVIRONMENT FRIENDLY

Bitcoin uses a lot of energy because new currencies are produced through a process called "mining," which is simply the act of employing supercomputers to solve very difficult puzzles using a method called "proof of work" (PoW). This technique is built into Bitcoin and allows for transaction verification without the use of a centralised organisation like a bank. Unfortunately, these computers take a lot of power since the problem is so difficult. As more Bitcoin is mined, the problem grows more difficult, requiring more power to solve.

However, since a big portion of this power is produced using fossil fuels, mining for bitcoins directly causes significant quantities of carbon emissions. The carbon footprint of mining one bitcoin with non-renewable energy sources is now thought to be more than that of approximately two billion Visa transactions.

We must address cryptocurrencies' energy consumption and perception if we are to fully realise their potential. By encouraging innovation in financial services, cryptocurrencies can advance financial inclusion. The industry is aware that it has a problem with the environment and that there are ways to lessen its carbon footprint (Chinn, 2022)

8. CRYPTO GOVERNANCE

A loose network of unconnected business organisations that are only connected by shared rules, guidelines, and understandings of individual responsibilities in a cryptographic system might provide further difficulties. The Financial Stability Board has made proposals that include governance measures, specifically with regard to global stable coins .

Those participating in the crypto ecosystem will have to truly go above and beyond to demonstrate that crypto can deliver against strict ESG standards in order to become a viable asset class in an increasingly unfriendly regulatory climate (Saunders, 2023)

9. BLOCKCHAIN AND ESG

The broad use of blockchain technology might have several advantages for ESG investment. An example of one of these advantages is more supply chain transparency for businesses. Since the blockchain ledger is public, investors may access the whole transaction history of any company's supply chain and determine if resources are sourced in an ethical and sustainable manner. This would represent a considerable advance over the very constrained accessibility to supply chain data now in place. Blockchain offers uses for ethical corporate governance as well. A blockchain ledger may be used to transact and record shareholder meetings, making voting transparent to shareholders and impenetrable to tampering (Smith, 2023)

10.CARBON FOOTPRINT AND CRYPTOCURRENCY

Bitcoin mining has received unfavourable attention because of its significant environmental impact, and bitcoins appear to be completely at odds with the urgent need to move towards a greener and more sustainable economic model and future. In response, lawmakers and authorities prohibited bitcoin mining in China, which had previously been the largest bitcoin miner in the world. There may be worries for the countries' monetary systems in addition to energy-related grounds for this restriction .

In light of escalating energy costs and a major increase in anticipated shortages, it is reasonable to demand that limited electricity be utilised for the actual economy rather than for bitcoin mining. The excessive energy consumption of the bitcoin network is an issue from an ESG (environment, social, and governance) perspective as well. However, it is reasonable to expect that bitcoin is here to stay and that bitcoin mining won't be outlawed internationally because the cryptocurrency offers particular and well acknowledged advantages (Stolzenberg, 2021)

11.CRYPTOCURRENCY AS A THREAT FOR ESG

The aims of ESG investment cannot be met by cryptocurrency. The manufacture of cryptocurrencies, which is increasing, is also found to be bad for the environment and a significant danger to ESG investing objectives. The study's findings will aid potential and aspiring investors in better comprehending this virtual currency as a safe route for investment in the globalised economy. Even though cryptocurrency has experienced a boom in popularity over the past decade or so, academic study of the subject is still in its infancy, mostly due to the paucity of scholarly literature on financial technology. The current paper thus makes a sincere effort to bridge those differences and offer deep analysis of digitalisation in currency in terms of sustainable investment options (Rabbani, 2021)

12.MEASURES TOWARDS SUSTAINABILITY

A lot more renewable energy might be used in grids thanks to bitcoin miners, who could also assist reduce erratic ness and congestion. They are distinctive energy consumers in that they provide a very variable and readily interruptible load, pay out in a cryptocurrency that is widely liquid, and are totally location-independent. Apart from the mining machinery, the only infrastructure they require is an internet connection. Therefore, bitcoin miners might contribute significantly to the growth and development of renewable energy production: They consume power when there is a surplus and reduce their own consumption during peak hours since they have the necessary flexibility. Bitcoin gives renewable energy generating flexibility and dependability while also offering a market price floor .

Additionally, energy firms that construct renewable energy power plants (solar, wind, and water) and use the energy produced to mine bitcoins achieve a higher level of profitability than if they were to sell the electricity at market rates. The "green" power plant might use these

proceeds to fund other clean energy initiatives or other endeavours that adhere to ESG standards. Thus, bitcoin mining can assist in the transition to a more sustainable economy and promote climatic objectives (Stolzenberg, 2021)

13.CONCLUSION

For boards and investors alike, the governance of cryptocurrencies in particular, may provide some fresh issues. Most cryptocurrencies are decentralised by design; no one authority controls a cryptocurrency's policy and direction. But just because there isn't a typical governing framework doesn't imply there isn't governance. Informal and active communities of software developers, cryptocurrency miners, and other players support and promote decentralised currencies. Even though the problems these people debate are frequently technical, their choices can have a big impact on the bitcoin economy.

14.LIMITATIONS OF THE STUDY

The ability to arrive at definitive conclusions is hampered by the lack of quantitative research. Additionally, there was a concentration of writers and nationalities, which can change how representative the results are. The fact that this study was limited to a certain time period and currency may have prevented it from capturing the most current developments. Due to the restriction to a single language, there may be linguistic prejudice. Finally, the limitations of keyword-based approaches were a constraint on our investigation. Given these restrictions, further study is necessary to get beyond them and understand the topic of bitcoin research in greater detail. So further research can be carried out by focussing on the aforesaid parameters mentioned above.

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4

POPULATION HIKE RESULTING IN ENERGY CONSUMPTION: A STUDY

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ABSTRACT
The population has tremendously increased which leads to growth in all sectors especially in economic growth and the consumption of energy is also increasing. The more the people the more the consumption of energy. If the population increases at a rate of 20% then the usage of energy is almost doubled by approximately 43%. On the opposite, if the population got decreased by 20% then it leads to a decrease in the consumption of energy by 44%. There is a strong positive relation between the growth of population and energy consumption. The two most important factors for the increased use of energy are industrialization and urbanization. The trend changes result in more usage of energy in industries and the people who come to reside in urban areas. The rise in population affects the Earth a lot like the extraction of resources from the environment like the extraction of fossil fuels that are oil, coal, gas, minerals, trees, water, and wildlife. Around 2050 individuals on this Earth will need 50% more energy than earlier to sustain in that environment. Due to the change in the consumption pattern of energy, overpopulation, lack of good infrastructural facilities, not using renewable resources, wastage of sources of energy, worst distribution system, and natural calamities, all will lead to cause the crisis of Global energy. The increase in the population will need more amount of food which leads to more use of land, and water which causes deforestation, generation of trash, land degradation, loss of biodiversity, and depletion the natural resources, changing environmental conditions. According to IEA,2017, non-OECD countries like Asia used around 65%of 770 quadrillion Btu of the total energy consumption. The recent trend of A.C., heaters used much more energy that indirectly causes environmental pollution. Energy conservation is essential to achieve economies of scale and social development, and also, it's a basic necessity.

Keywords: Population, Energy Consumption pattern, Urbanization, Industrialization, Renewable resources, Biodiversity

1. INTRODUCTION
There is a strong link between growth in the population and the use of energy resources. The United Nations predicted a huge increment in population around 8 billion by 2050. There are two agencies of energy mainly The International Energy Agency (IEA) and The Energy Information Administration (EIA). As the wants are unlimited of humans but the resources are scarce so they need to be protected initially. (Carter and McCrea, 1983) energy is scarce so people can face deprivation which can cause a threat to the wellbeing of humans. It can increase the carrying capacity of the earth means that as the population continuously increases the capacity to carry that individual by Earth will also rise and the competition for that resource will also increase. But that carrying capacity can be identified with the availability of food materials, water supply, and land availability. (Bostrom, 1986) there is a complex relationship between population growth and the pattern of consumption of energy. As there is growth in the population level of consumption of energy will lead to an increase. The whole population depends on the amount of energy in various ways. At present there is very little space on land to be habitable on it and there is no nearby planet to Earth which have the capacity to release the pressure of increase in population growth tremendously. The rationale behind this paper is that

there are so many measures contributed towards the conservation of energy and also there are so many new energy projects implemented every year in India, but the plants can be set up in remote areas due to increased demand as the population demands more continuously. This paper can describe the interconnection with energy, population, and urbanization. It can tell how the energy sector has its working dynamics with population and urban development to sustain any system. As energy proves to be the key driver for the growth of the whole population. The government mainly focus on prices, securing the supply of energy, protect the environment while formulating strategies for energy so they can integrate the plans with the creation of job and with economic prosperity.

(Stocker et al., 2013) sees the impact of natural resources, energy consumption, and growth in population on ecological footprint and emissions from carbon dioxide. The commercialization of coal, oil, and natural gas will be done due to the growth in the population. It results in an increase in production and exploitation of natural resources. Earlier coal played a very important role but now it was replaced by crude oil. The pattern of consumption of energy differs from individual to individual and has different effects but if biomass is the only source of energy, then the population will not increase rapidly.

(Horner, 1961) the purchase of second-hand cars got on increasing as the population increases which can increase carbon dioxide emissions. The model of the pattern of consumption of energy by the population can be classified into four parts mainly that are biomass population, coal population, oil population, and natural gas population. Today there are so many areas where electricity is not available (IEA, 2017). So, they depend on biomass as the primary source of energy. Coal can have reduced the pressure of the usage of land. As now coal is being used for heating and fuel purposes, but earlier wood was used so now the land will grow that could serve a very important purpose. The standard of living decreases if the population increases rapidly, as there is more need of carrying capacity, and essential items become expensive. (Gold Blatt & Watson, 2012) with the help of technological advancements productivity can be increased and better sanitation and medical facilities reduce the mortality rate and increase in growth of the population, and this can increase the use of energy. The rise in the population can increase the consumption pattern which proves to be a driver in the concern of the environment. The commercialization of coal can raise the level of productivity by doing the appropriate use of steam engines. (Baum et al., 2013) determine the relationship between population and demand. The greater the size of the population the smaller the elasticity of demand. A huge quantity of fodder is needed for animals that were made redundant by coal and machines run from coal. Coal is the major component in producing electricity. The year 1850 will be marked as the year to feel the effects of coal. (Gott, 1993) renewable source of energy produces less carbon dioxide which reduces the negative impact produced on the environment. Use of more renewable sources of energy will increase the growth in population and lead to emitting more carbon dioxide as economic growth and renewable sources of energy carry substantial contributions to a change in the pattern of energy consumption. Renewable sources of energy provide many benefits such as sustainable economic growth and reduction in pollution. (Sherwood and Huber, 2010) Population can be identified by salary structure also. As everyone has different occupations and so do their salaries or wages. As compensation can change the way of consumption of food and energy also. The next source of energy after coal which will be commercialized was oil. Oil can be easily handled as compared to coal. As it is cheaper for transportation purposes and has cleaner burning and proved to be an efficient fuel. It can rapidly increase the level of productivity. The energy required to grow and distribute food and in increasing the nutritional content of agricultural products can be possible with the help of oil. Transportation can easily provide food. And that mortality rate will decline as every person has the necessary food items to sustain.

(Thomas Malthus,1789) humanity will lead to an increased level of subsistence in the future which results in increased population growth rapidly and that increase in population is set by the carrying capacity of the environment. Tremendous changes in technology will lead to an increase in the carrying capacity of humans. Natural gas is the fuel of mainly the richest countries. It causes less impact as compared to coal, oil as oil is an efficient fuel for transportation. (Basler, 1971) huge increase in the population can cause a barrier to the growth of the economy. As the population grows at a geometric rate but the supply of food increases at an arithmetic rate. Biomass results in slow growth and provides low-quality energy but coal results in the fastest growth and is a mediator between biomass and oil in providing quality. (Cirkovic, 2002) defines the different patterns of consumption of energy in industrialized and developing countries. The sum of energy level and growth in the population is considered a macro phenomenon which considers the aggregate of energy. Oil and natural gas result in low growth but they both provide high-quality energy. (Manton, 2003) the use of energy by fossil fuels has caused a huge impact on the Earth's climate and surface. There is the emission of various greenhouse gases from them, melting of the polar ice. There is continuous degradation of the environment by using more fossil fuels which can affect the health and well-being of the population. Due to the increased growth of the population, the demand also increases and so does their consumption pattern which can increase the emissions and adversely affects human health. By 2040 it is estimated that the use of energy will increase globally by around 28%. Improper planning and mismanagement of urban transport systems cause negative effects on the well-being of people.

2. REVIEW OF LITERATURE

(Jones,1989) stated that with an increase in the demand and consumption urbanization and consumption of energy and growth of the economy will also be there. There is a positive correlation between the consumption pattern and urbanization.

(Chen , 2002) analyzed the difference between short-term and long-term aspects of urbanization and industrialization on demand in the economy. The long-run aspect of urbanization decreases the demand for energy but in the case of industrialization, the demand can be increased.

(Kim, 2010) stated that the middle income-categorized countries cause huge pressure on the resources of the environment which are very scarce as they use more energy. (Liddle, 2013) proved that as demand for energy increases when the population rises. As the population of various age groups identified the age of working of the public and the effect on demand.

(Neil, 2014) analyzed that there are two main determinants that are income and emissions from the pollutants which leads to an increase in the consumption of renewable resources.

(Yang et al., 2015) stated the use of agriculture which helps humans to settle in one place as population and urbanization go hand in hand where people reside they want to fulfill their basic necessities and make efficient use of resources.

(Amri, 2017) stated that FDI also plays a major role in the case of renewable energy consumption as only a few changes in renewable sources of energy lead to an increase in FDI as a result of it. FDI helps in investing in renewable sources of energy, in the transfer of technology, and increase the efficiency of energy.

(Aneja, 2019) revealed the fact that from nonrenewable sources of energy, there is a unidirectional causality to GDP growth, and from renewable sources of energy there is a bidirectional causality. Emerging economies have that much potential to develop sustainable resources.

(Narayan, 2020) found that extraction of solar energy depends on the power of the sun as more population needs more energy. This is totally natural so everyone can use it easily and there is no wastage in the economy of any natural resources.

(Zakary, 2020) analyzed the proper use of land and land cover will affect the location of hydroelectric energy which is also a valuable energy source as more individuals need more land and also more use of energy and resources.

3. OBJECTIVES

1. To see the impact on the consumption of energy due to population growth

2. To study the reasons for the increase in the consumption pattern of energy

3. To study the strategies adopted to conserve energy.

4. RESEARCH METHODOLOGY

The method of research taken is based on secondary data as data is collected from so many websites and exploring online content. There are some points on which this paper throws light such as population growth, and energy consumption. The data is taken from articles, magazines, and famous national as well as international journals.

5. ANALYSIS

5.1 The objective is to see the impact on the energy of population growth will be described as follows: -

Impact

The innovation of energy has put great emphasis on population and growth in population increases the demand for energy as they both are correlated in some sense. They both share a balanced relationship with each other. From production to consumption of energy, the population plays a very great role. But it causes several indirect effects on the economy if the population uses more energy. The development of energy is a progressive step towards development of human society. The exploitation and proper utilization of energy strongly push the economy. The population accommodates both economic development as well as energy capacity. Due to the huge number of energy resource reserves the energy provides strong power for the development of the economy and also guards the development of the population. The huge number of labor and talented persons coming from a continuous rise in population scale can prove to be the biggest contributor to the foundation of firms in the economy and in the accumulation of wealth. The population is very much related to the scale of energy, level of income, and value of output. According to the growth limit theory, if the population, consumption of energy, wastage of resources, production of grain, and industrialization continue then economic growth will reach at some point in upcoming years, and population and industrial capacity happened suddenly and uncontrolled recession or decline. The growth in the population has caused a very serious impact on energy as the population is tremendously increasing at an amazing rate. Presently the population is growing by 60,000 persons every eight hours as there is a birth of two children every second somewhere in the whole world. The forecasters predict that if the population will continue to grow in that manner, then we will need almost 50% more energy to sustain humanity by 2050. And also more people means more food, water, shelter, and increased use of scarce natural resources. Due to this, a time came when our Earth was devoid of life. The sea color was changed to blue-green, and nothing will be grown on these rocky continents that are called Prebiotic Earth. But as far as we talk about technology then it provides a chance to safeguard life on Earth against cosmic threats. The Sun poses a threat to life as the sun will burn through the last of its fuel and swell into a red giant in around 7.5 billion years as the temperature increases too much very rapidly and will increase global warming too. This will emit greenhouse gases which cause a serious threat to the life of humans and this temperature

and gases are so much dangerous for humans as no one will be able to stand in the sunlight for only a few seconds as they are facing the problem of sunburn. Even the animals suffer a lot from that which can cause a major threat to the whole environment. There is a rapid change in the environment. The data states that around 5% of the total population will consume 26% of total energy. The growth in the population will affect the energy in the following ways: -

Unbalanced and Unfair Means

The consumption pattern of energy will differ from country to country and on population also. For instance, the USA has around only 5% of people on Earth and we have 19% of people on Earth but still, we consumed 20% of the world's total energy and caused a lot of greenhouse gases. Developing countries consume less energy as compared to underdeveloped nations. The perception of the people differs as there are many persons who understand that not to waste energy as it must save for the next generation also which is mainly called sustainable development. But on the opposite, there are many people who don't even understand how to make the best use of the energy, but they only can misuse it. So, there is a condition of unbalancing as nothing will be balanced. It is an unfair means that how people use energy and how they will cooperate with each other in a manner that saves energy. As the population continuously increases so automatically it leads to more use of energy, but it can result in poverty. As if more energy gets consumed then it proves dangerous for the economy as well. And no one, even the Government, has a plan on how to restore it. So, it's the moral duty of everyone that they understand the importance of energy and can be saved for a long time. They have to take some essential steps like the use of CNG vehicles or now E- vehicles, use of LPG instead of Chula's, planting more and more trees instead of deforestation, use of more public vehicles, etc. Population adopting all these measures can easily be able to save energy and it proves beneficial for everyone.

The Population Relies on Energy.

There is a strong correlation between population and energy. Developing countries grow at a much faster rate as compared to wealthier countries. As more humans are added to the Earth's surface the usage of resources, they are scarce. As everyone needs energy so it can be used in an efficient manner and not in an unbalanced or unfair manner. This can be possible if everyone understands that in the future, we have left with very little energy due to the oceans reaching up to the stage of dryness. If we have no water, then how do we save our Earth? It is an essential thing to sustain on that planet. People adopt the latest technology, and everyone uses the latest appliances which consume more energy, but no one thinks that the amount they used has to be returned to the environment in some way by adopting the essential steps. Like everyone does rainwater harvesting as the water can be stored in big drums and used for any purpose in their home or in the agriculture sector, or in any industry. To protect nature from the crisis one must save the Earth. The use of energy increases and so the use of natural resources also increases, and it can have decreased day by day. They are scarce and the wants of humans are unlimited so they can be saved by adopting the necessary steps. People must use renewable resources which can be recycled and used again. As nonrenewable resources are used less as they can't be recycled again and cause a threat to the environment. The use of plastic bags will be decreased by humans and the Government will also take timely action on it to save the earth's surface as it emits various gases and if eaten by animals can cause damage to their bodies or sometimes result in death.

Fixing the Crisis

The growth in population is a drastic problem and we have to fix it as soon as people otherwise it causes serious problems. This problem is resolved if we provide better education to the family population to decrease the population. But the reduction in population is not the only measure to reduce the consumption of energy, in fact, we have to find so many alternatives which

collectively resolve the issue of consumption of energy like the Government taking strict measures and implementing new schemes and policies, switching to natural resources, using more solar energy, etc. The crisis has to be resolved as early as possible otherwise it causes a serious threat to humans, animals, and the surface of Earth. It can be harmful to nature if the Earth is polluted. We have to take action and reduce pollution like air pollution, water pollution, and noise pollution. As the Government bans the use of vehicles which expired according to the date mentioned in their R.C. so it's the biggest contributor towards air pollution. As older vehicles require more fuel, they cause more pollution which ultimately produces a bad effect on the surface of the earth. Natural or manmade disasters will also cause a bad impact on the surface of the Earth and decrease energy.

5.2 The second objective is to see the reasons for the increase in the consumption pattern of energy due to the rapid growth of the population.

The pattern of energy changed since the 1950s. The growth of the population creates a demand for energy. There are a lot of reasons which increase energy consumption due to the growth of population which are as follows: -

Economic Development

This leads to an increase in demand for energy. The future of the energy market is not so good as energy is a very scarce resource. That's not a good sign for the development of the economy in fact it retards the growth of the economy. The evolution of energy over the long run and short time period will lead to trends going towards industrialization as this sector needs more energy. Due to the change in climatic conditions, the economy also suffers a lot. The standard of living is changing the population; this also leads to the consumption of more energy. Everyone wants to live a luxurious life. This leads to change in the development of the whole economy. According to the purchasing power parity theory, the purchasing power differs totally as compared to past times this can lead to growth in GDP which leads to structural transformation. The prices continuously increased. The pattern of production and consumption has also changed day by day. The level of consumption of energy is almost constant at the early stage of the development of the economy. The companies started giving incentives in return for more efficient use of energy by employees. For the sake of the economy, everyone has to use bicycles at least for one full day to save the consumption of energy. The pattern of changing lifestyles put a great significance on everyone's lives.

Industrial Shift

Rapid industrialization results in the development of more processing and manufacturing industries. By that, the global demands go on increasing. Today the trend is shifting from an agricultural economy to an industrialized economy, so it needs more energy, and more resources which also leads to more pollution. It can destroy the plants. As they get burnt in the presence of pollution and if not get watered daily. The industrialized economy will use more natural resources so that we can protect the atmosphere. There are various gases emitted from these industries which cause bad effects on the economy and use more energy and also, they can cause more pollution so industries are always set up in outside areas so that people can live easily. As there is so much noise coming from it which also can cause disturbance to the public.

Agricultural Economy

As the country will shift towards development so there is more need for food, which can lead to more intensive farming techniques. This requires additional energy for the power machinery, and provides lighting, and heating. The processing, manufacturing, and transportation of food also leads to increased use of energy. As now the agricultural economy shifts from subsistence to commercial farming so that also energy consumption has increased. The cultivation of crops requires more water and more usage of natural resources like air then they can produce oxygen by which humans survive. The agricultural sector will be the foremost sector in the economy

and the Government will also promote it by providing various subsidies, and incentives to protect the Earth and also reduce the consumption of energy. As industries produce carbon dioxide emissions which are harmful to the economy. So, everyone has to do afforestation so that the atmosphere remains fresh and easy to survive. The pattern of agriculture also changed as time changed as earlier there was more use of manpower which required less energy but now everything was replaced by technology, and everything will be performed by machines which require a huge amount of energy, but it is not available easily today. That's why nowadays people can shift towards salaried jobs as it will require less use of energy.

Transport Sector

There are a lot of innovations taking place around the world and the ownership of cars has continued to grow. Earlier there was the use of bullock carts, the more use of public transport there was. But now the use of personal vehicles will use more energy. This sector consumes huge amounts of energy as the vehicles are fuel efficient which is a very costly source today. So the Government today is promoting E- vehicles which can lead to a decrease in the amount of energy and save our natural resources.

Urbanization and Industrialization

The demand for energy increases because of Urbanization and Industrialization. As today people shift from rural to urban areas and from agriculture to industrial development. All that needs require more energy like for lighting, cooking, domestic appliances, heating, operations of machinery, etc. In urban areas, there is more use of fuel-efficient vehicles, and more use of domestic appliances all require huge amounts of energy. Industrialization is the process of converting raw material into finished goods which also requires more energy. So, both these concepts depend on each other as industries are set only in the urban areas where most people shifted today. So, both these factors are responsible for the increased use of energy and the rise in population growth.

Wealth

As the wealth increase with the people the demand for AC increases. With increased purchases of Domestic appliances, leisure, and recreational facilities the need for a supply of energy globally increases significantly. Today everyone wants to live a luxurious life and most of the youth or the persons and even women are self-employed or do jobs, so they use all the latest tools and techniques which require more energy. Everyone wants to satisfy their needs, but it is possible at the cost of more consumption of energy.

Technological Advancements

Technological changes cause positive as well as negative impacts on the supply and consumption pattern of energy. Technological changes lead to the exploitation of fossil fuels from that challenging environment deep below the ocean. Renewable sources of energy are more efficient and cost-effective. With the advancement of technology now the E-vehicles started running on the roads which somewhat decreases the energy. Earlier yellow bulbs were used that were totally replaced now with LED bulbs which also save energy. As India has fewer technological advancements, it imports technology. Technological changes play a very important role in the consumption of energy. As everyone wants to learn the latest changes that is only possible with the help of technique which obviously consumes more energy. But due to improvements taking place in the field of energy, there are new opportunities for the use of energy. A process called Fracking is defined as the extraction of shale gas. The USA has mainly followed this type of process. The latest technology can improve the level of productivity and hence the growth of the population takes place. When the new devices come then automatically energy gets increased. Today the trend of making videos or the live streaming of videos by the population also requires a huge amount of energy. As today every work is performed on computers, laptops which also results in more use of energy. The emission of greenhouse gases,

GDP, and population risen, have also increased the energy. Due to technology natural resources get depleted rapidly which also causes a negative impact on energy. The more the population, the more the use of technology. The technological decisions put the environmental and economic concerns in competition with each other, but others cause positive effects on both the economy and society. But on the other hand, technology can cause serious negative effects too on every age group of energy as from that there are various gasses emitted.

5.3 The third objective is to study the strategies adopted to conserve energy which are described as follows:

Conserving energy is the practice of using less energy at lower costs which can reduce the impact on the environment.

Use Smart Power Strips.

The laptops, the TV's when they are turned off or put in standby mode are a major contributor to energy waste. These are called advanced power strips which can eliminate the problem of phantom loads by shutting off the power to electronics when no one uses them. Smart power strips can be set up to a specific time period when they are inactive through remote switches, or based on the status of the master device. These are the devices that plug into the wall and provide a huge number of sockets to plug in the electronics. It can avoid overloading electrical outlets and can prevent any unnecessary energy. It can efficiently distribute energy to appliances. This can reduce the time to charge any kind of device and also reduce any wasted energy so less energy wasted lesser be the time to charge which is quite beneficial.

Install Smart Thermostat.

The thermostat can automatically turn off or reduce heating and cooling when we are asleep or away from the device. By installing a programmable thermostat one can eliminate wasteful energy use from heating and cooling without upgrading the HVAC system. They can be available in different models that can be set to fit your weekly schedule. It includes indicators in which one can replace the air filters or HVAC System Problems that can easily improve the efficiency of heating as well as cooling systems. It can be operated with our phones. There are smart thermostats present in the market also which use the artificial intelligence system and they can automatically adjust one's behavior and preferences without any requirement to do anything. This is a great step towards saving energy as it can automatically adjust according to the room temperature.

Purchase Appliances that are Energy Efficient

Home appliances consume almost 13% of the total household energy so while purchasing any appliance one must take care of two numbers that is the purchase price and its annual operating cost. As they have very high prices, and their operating costs will also be very high. When anyone purchases these appliances, one has to pay attention to the Energy Star level and logo on those appliances which is considered to be a guarantee that the appliance will consume less energy during its use and when it is put on any standby mode. As the pattern of energy saving will differ according to the appliances purchased. Because modern appliances will consume very less energy as compared to conventional sources of energy as they are occupied with modern technological developments.

Upgrade HVAC System

The HVAC system comprises heating, ventilation, and air conditioning equipment. Only heating can contribute to more than around 40% of the total home energy use. As in northern regions, the homes are colder during the winters as the temperature is too low so the Energy Star gas furnaces provide different specifications in northern and southern regions. The air conditioners are also the biggest contributor towards the high level of energy bills. If installed with an energy star central air conditioning system, then it proves to be more efficient than

conventional systems. The heating systems are integrated with the air conditioning systems that if we purchase a new furnace and air conditioner at the same time then we can analyze that the air conditioner can perform at its maximum rated energy efficiency. The most important step is the ventilation system as it can also improve the efficiency of energy. The ventilation system consists of a network of ducts that can distribute hot and cold air in the home. If the ducts are not properly sealed or insulated, then the wastage of energy can increase hundreds of dollars to total heating and cooling expenses. So one has to take care of the proper ventilation system as it can reduce the heating and cooling expenses by around 20%.

Take advantage of a home energy audit

It is an assessment that can analyze the best ways to improve energy efficiency inside our homes. It can identify easily which part of our house requires more energy and cooling and plays an important role in reducing the energy. Audits can be performed by anyone whether by any professional companies or by any owner of any house. It can properly identify the areas that have leaks that prove to be beneficial by the insulation and identify the room or the space which demands more electricity and by which one can reduce more energy which ultimately saves money. It provides a sound environment both for temperature as well as for energy inside our home.

Insulate the home.

Proper insulation can decrease the utility bill as it can retain the heat during the winter season and release the heat during the summer season. The level of resistance or R-value for proper insulation can rely on the residence of the individuals in which area one can sustain. In the winter season, the R-value is very less as compared to the buildings situated in the colder regions. The insulation capacity can mainly depend on the location of the residence. The areas where one can add insulation are walls, floors, basements, and crawlspace. It properly does the inspection and can find any damage. It also checks if there is any air leak in any window or indoors and can identify the areas which require weather stripping. It can identify the areas which require to be fixed or sealed and can release any unwanted air out and can control the temperature inside the home. Because of that one does not need to adjust the thermostat in compensation of leaking air and will save money. The best way to save energy is to use prepaid electricity. Doing recharge of low-cost energy plans suits both personal as well as business needs.

Install Energy-Efficient Windows.

The main source of conservation of energy is the windows. Windows can add around 25%of the total heating bill. In order to reduce the amount of bills one must take the initiative that they can replace single pane windows with double pane windows in every weather. In colder areas, in homes gas-filled windows with a low level of e-coatings will be installed in order to reduce the expense of heating. The interior and exterior storm windows will reduce unnecessary jet loss by around 20%. One has to use mostly the storm windows if there are frequent extreme weather events in our region. On the other hand, in the hot climate from windows, the heat can also cause a heating problem. In order to reduce the effect of heat loss there will be a low level of e-coatings on the window as it can reduce the heat gain by reflecting more light and can lower the amount of thermal energy that can enter one's home from the window. If we use energy star windows, then it can easily save the utility bills annually. The use of window shades, shutters, screens, and awnings can also provide an extra layer of insulation between one's home and the temperature outside the home which can lead to more conservation of energy.

6. RESULTS AND DISCUSSION

The pattern of usage of land relies on the energy life cycle. The energy life cycle includes resource exploration, mining, and the distance it travels to move to the next step until the end of

use. The development of energy can impact urbanization in several ways ranging from the supply of water, food, resources, etc. due to increased use of population.

6.1Population and Energy

Population is the key factor for innovation as innovation is the need of the hour which is possible by the population. There are numerous things needed by society as there is always a huge demand for energy. As the population increases the demand for electricity will also increase. Traditionally the need for electricity is fulfilled by fossil fuels which gives way to coal and gas-fired electricity generator plants worldwide. With the growth of population, the need for electricity shoots up but it should be used in an effective manner as the price will be reliable. There is a vast need for energy which can be met by adopting a good standard of living pattern. There are several other forms of energy needed by the population in the form of petroleum, which is used in vehicles, gas used for cooking, etc. which is the necessity today used by everyone. It leads to the establishment of big power plants or further expansion of existing ones which can increase the number of jobs and also increase the value of GDP. This shows a strong bond between population and reliable and cheaper sources of energy. The generation of energy serves as a catalytic approach to increasing and maintaining the standard of living of the population in the country. Resource management is also essential in the development of the nation whether it is natural or any human resource. Resources are scarce so they can be conserved for the population, and they can meet the needs of future generations.

6.2 Population and Urbanization

They both go hand in hand. Today almost the population has shifted to urban areas and hence the demand for energy got increased. The trends shifted towards a combination of industrial as well as technological advancements. The rate of using energy is increasing continuously, mostly in urban areas. As everything will be done by using energy like gas for cooking, and hot water from geysers, and on the reverse rural; areas consume much less energy as compared to them. This migration is there due to employment opportunities in urban areas as the development of new industries takes place.

6.3 Energy on Urbanization

Today the pattern of use of land is very much dependent on the pattern of how one uses energy. The development of energy can affect urbanization in many ways like deforestation, clearing of agricultural fields, etc. which cause the demand for the development of different plants of energy. The infrastructural facilities can be possible with the huge amount of energy like in railways, roads, refineries, etc. Urbanization can have increased continuously as compared to previous times which can lead to the result of usage of more energy. Energy-related activities increasing the use of land will be a step towards the urbanization of a population.

7. CONCLUSION

There is a positive relation between population growth and consumption of energy. As the pattern of consumption of energy is associated with emissions of carbon dioxide positively. The increase in population can cause a serious impact on the consumption pattern of energy. Energy consumption can prove to be an indispensable element in boosting and maintaining economic growth and increasing carbon emissions which can lead to the degradation of the environment. While making the economic conditions economic growth can be enhanced which exhibits a trade-off between the consumption pattern of energy and higher carbon emissions which lead to deterioration of environmental quality. There is a synergy between economic growth, carbon dioxide emissions, urbanization, and consumption pattern of energy and they share a bi-directional long and short-term relationship between them. The pattern of consumption of energy can vary and be used in various forms like thermal energy, solar energy, etc. The energy can be increased due to industrialization and urbanization in both developed as well as in developing countries. Energy today is more used in the development of the economy as well and

also the agricultural sector was transformed into a completely industrial sector. The more energy is used the more it will cause a lot of problems for future generations. So the ultimate aim of the economy is to control the population so that energy will be saved and hence proves beneficial for the economy. There are various measures adopted while conserving energy like adopting energy-efficient vehicles, proper insulation will be there, upgradation of HVAC systems, etc. all play a very important role as energy is very much essential for survival, and as the population continuously increases the usage of energy automatically get increased and hence it can be saved.

8. POLICY IMPLICATIONS

There is a synergy between economic growth, carbon dioxide emissions and urbanization, and consumption patterns of energy. The pattern of growth of energy was closely associated with carbon dioxide emissions and urbanization. There is a long-run and causal relationship between consumption of energy and population growth. To ensure sustainable urbanization and energy consumption there is an emergence of urban development that will accommodate the rate of urbanization.

9. LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

This paper shows that there exists an intertwining relationship between energy, population growth, and urbanization which requires it to be adjusted in a holistic manner. There are numerous integrated assessment tools that are already present and can be used to assess the relationship between all of them. Hence quantitative tools can be developed to estimate the relation between them. The use of opportunity cost must be considered while deciding where and whether to use the land for energy production or not, in agriculture, housing, or other usage, and if and when that to stop depending on the traditional source of energy or when shifted to renewable energy resources. Hence a transdisciplinary relation between all the components can be subjected to future study further. This paper can impart direction to the researchers in exploring the relationship between them depending on their area of study.

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5

GREEN BUILDING INFRASTRUCTURE TOWARDS ECO FRIENDLY SUSTAINABLE LIVABLE CITIES: A THEORETICAL RELATIONSHIP

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ABSTRACT
In economic theory, the Environmental Kuznets curve theory propounded by the famous economist Simon Kuznets during the 1950s and 1960s, explains the tradeoff between environment and economic development. The Kuznets hypothesis argues that underdeveloped and developing countries will have to forgo environmental quality for the sake of attaining a higher level of development. With this perspective, currently with increasing economic growth the environment is degrading day by day at a rapid rate. The key responsible factors behind the environmental degradation are industrial revolution, population explosion and high demand of luxury items in life. To maintain a balance between environment and economic development, green building is the mechanism to establish the reconciliation between economic growth and harmony of environment. Therefore, this is a need of today's time to provide a sustainable and livable community to our present as well as future generation so that they can breathe in the pure air and attain a pure quality of life. The present research work is an attempt to establish a theoretical relationship between green building infrastructure and livable cities. This paper has discussed the components of green building infrastructure that may lead to livable sustainable cities.

Keywords: Environmental Degradation, Green Building Infrastructure, Livable Cities, Sustainable Development.

1. INTRODUCTION
At present environmental degradation is an alarming and serious concern for all policy makers and thinkers. This is a well known fact that the economy and environment are highly interlinked together and as the economy grows the environment starts to degrade. (Please refer to figure 1). In economic theory, the Environmental Kuznets curve theory propounded by the famous economist Simon Kuznets during the 1950s and 1960s, explains the tradeoff between environment and economic development. The associated hypothesis with this curve has been put as "the environmental pressure tends to rise faster than economic growth in early stages, then slows down and reaches a turning point after which it tends to decline with further growth. The last phase is referred to as "delinking of environmental pressure from economic growth" (Grossman & Krueger, 1995). The Kuznets hypothesis argues that underdeveloped and developing countries will have to forgo environmental quality for the sake of attaining a higher level of development.

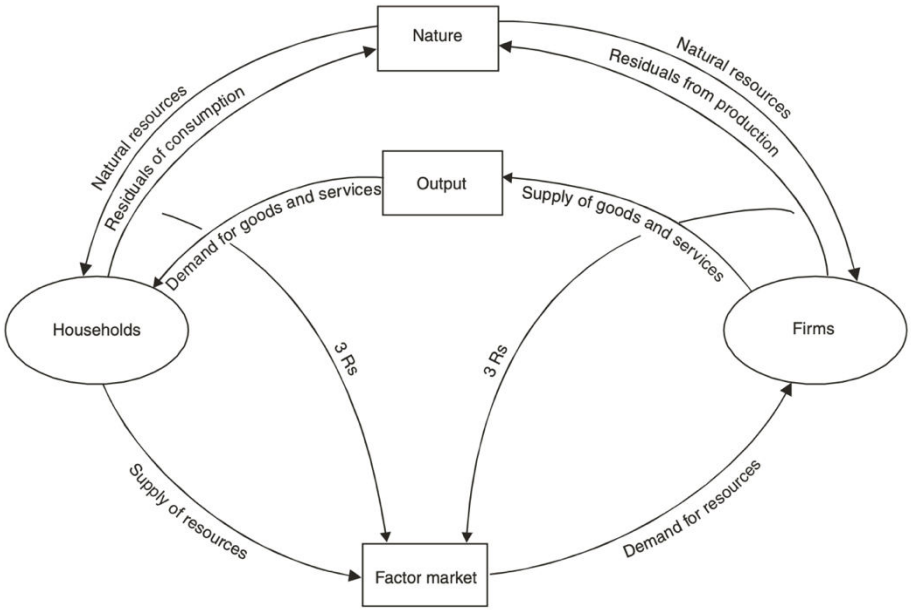
The key responsible factors behind the environmental degradation are industrial revolution, population explosion and high demand of luxury items in life. In India, the growing population is the major concern towards preservation of the environment. As per World Population Review, India ranked as 1 that consists of 17.85% of world population that leaves behind China with 17.81% of the world population. Population density of India in 2023 is 434.60 people per square kilometer. High population density in any area can decrease the quality of life and can

cause a huge adverse impact on the conditions of living. World Bank collection of development Indicators reported that India's Urban population was 35.87% of total population in 2022.

As the economy is growing, urbanization, industrial revolution, population explosion, lack of proper knowledge, approach, and awareness for preserving nature are the key factors behind degradation of the environment. Searching for good jobs, living quality life and to maintain standard results in a lot of pollution and greenhouse gasses and that can create an imbalance in living conditions. As per the data given by the UN 68% of humanity will live in cities in 2050 and they will consume 78% of the energy and will Produce 60% of greenhouse emission. This calls for a need to identify optimal solutions for minimizing the environmental impact.

Hence, the concept of green building is the mechanism to establish the reconciliation between economic growth and harmony of environment. Hence, it is the need of today's environment to provide a sustainable and livable community to our present as well as future generation so that they can breathe in the pure air and attain a pure quality of life.

Figure 1: Economy and Environment Interlinkages



Source: Callen and Thomas "Environmental Economics and Management—Theory, Policy, and Applications"—Irwin, USA, p. 6. A slight change in the Figure is incorporated.

2. REVIEW OF EXISTING LITERATURE

The review of the existing literature explores the studies related to green building infrastructure and livable communities. (Patel et al., 2020) expressed the concern on increasing industries and focuses to construct industries feasible to the Earth and Human well-being. The article examines the requirements of the green buildings and the benefits that come out of making Green Building. (Parashar & Parashar, 2012) discussed an important issue for discussing the consequently decrease in the green area to meet the need of growing population. Because of this, a lot of adverse changes are happening in the climate. For this they suggest green roof buildings, thermal insulation, eco-friendly walls and some other factors of green building or eco-friendly buildings. And they refer to rainwater harvesting with green buildings as a source of utilizing the natural energy to reduce temperature and increase ground water level. (Thakare et al., 2022) conversed about India's rapid Urbanization and its adverse or hazardous impact to the environment and human health, to lessen this negative environmental impact they suggest

developers to identify better and more sustainable methods of building design. Their paper includes a list of 5 green construction materials along with its benefits and drawbacks too, durability and cost effectiveness also.

(Mane, 2017) shows his concern on harmful effects of construction and its regular appearance in the newspaper headlines. He lightened up the Government of India initiative towards it and Proactive measures to promote the concept of green building for better environment and social protection. He also encourages developers and constructors to adopt sustainable construction practices in their future generation. (Ing & Wang, 2016) supported to protect the Ecological environment they promoted the green building and emphasized Architecture design which would inevitably require the presentation of its unique form and charm to reflect the ecological concept and ecological culture because of the unique nature of art and the particularity of the environment. According to them green building has few complementary roles such as-1. To alleviate the pressure on resources. 2. To speed up the ecocity planning design. 3. To realize the sustainable development of the city. 4. To protect the urban ecological environment.

(Sinha et al., 2013) researched on "Sustainable development and Green buildings". According to them, the global sustainability goals have led to the development of the green building movement. They explored sustainable development and green buildings are often used interchangeably but in fact they are not the same. This paper provides an overview on how green buildings related to sustainable development practices and governs divisions related to concerning building materials. They discussed the constituents of green building and renewable material like wood fare in the deciding criteria. They also focus on the green building rating system such as LEED (Leadership in Energy Environment Design) and LCA (Life Cycle Analysis).

(Hwang, 2012) examined Green Building in a more practical way and took Singapore as a prototype. According to their research, green building was earning a place in Singapore's construction industry with augmenting cognizance of environmental issues and growing concern over climate change. He did a survey of 31 industry experts to identify common obstacles i.e., project cost and he provided some solutions to deal with cost related problems such as the coverage of government incentives should widen the usage of green products and technologies and promote adoption of sustainable construction. (Katts, 2003) countered the widespread perception that green buildings are more costly than the conventional design. He wrote in it that this perception has been the single largest obstacle to more widespread adoption of green design.

(Yudelson, 2010) encourages the concept of green building by showing readers why and how to start thinking about designing buildings and operating high performance environmentally aware buildings on conventional budgets. According to Yudelson, this is just the beginning. The green building revolution describes the many revolutions that are taking place today i.e., in commercial buildings, School Universities, Public buildings, health care institutions, housing property management etc. (Elizabeth et al., 2018) investigates the benefit of green building via detailed Questionnaire in Johannesburg. In result it revealed that green building provides better health for building occupants due to the improved quality, development of more energy efficient products and the use of less natural resources for the satisfaction and welfare of building tenants, also to protect the ecosystem. As the outcome of their research, they encourage Clients, Consultants, and contractors to invest in green building by showing them the benefits of green buildings.

(Wang, 2015) discussed the concept of green building and analyzed the energy view, technical view, and design of the green building. The purpose of this paper is to strengthen the protection of the environment in the process of construction. (Lin, 2022) discussed how the concept of

green building has formed with the increase in public awareness of environmental protection. Green building is the fundamental platform of sustainable development. It provides solutions for multidimensional and balanced development of green building. They suggested the government should launch campaigns to encourage developers and tenants to embrace green building. In this paper they highlighted the current advancement in green building. (Ding, 2018) analyzed the significant adverse impact of construction on the environment promoting the development of green building concepts worldwide. They mainly focus on identifying the barriers preventing the certification of green building in their operational stages. They identified and analyzed the following green building rating tools: 1. International green building rating tools. 2. Chinese standard on green buildings.

3. NEED OF THE STUDY

Nowadays environmental degradation is a major concern for policy makers and thinkers. To develop green building infrastructure for livable cities is the urgent need for better standard and sustained life. After reviewing the existing literature this has been observed that very research is available on exploring the theoretical linkage between green building and between livable communities.

4. OBJECTIVES

1. To overview green building infrastructure and conditions of livable communities.
2. To explore the theoretical linkage between green building infrastructure and between livable communities.

5. GREEN BUILDING INFRASTRUCTURE

In India, green building implies a sustainably constructed building with the minimum harmful impact on the environment; green building is just synonymous with sustainable buildings or structures. Generally, green building is often defined as an energy saving, ecological, or sustainable building, but different people or institutes define it in different ways. For example, the United States Environmental Protection Agency (US EPA) says, "Green building is the practice of creating structures and using processes that are environmentally responsible and resource efficient throughout a building's life cycle, from sitting to design, construction, operation, maintenance, renovation, and deconstruction. This practice expands and complements the classical building design concerns of economy, utility, durability, and comfort. Green building is also known as sustainable or high-performance building."

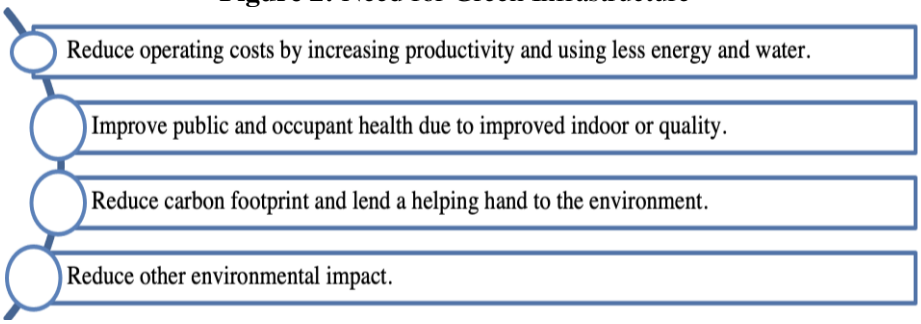
According to the Indian Green Building Council (IGBC), "A green building is one that uses less water, optimizes energy efficiency, conserves natural resources, generates less waste, and provides healthier space for occupants as compared to a conventional building."

In the year 2003, the IGBC started the green building movement with 20,000 sq. ft. of green built-up area in the country, while in February 2023, more than 21,00,000 green building projects with a footprint of over 7 billion sq. ft. were registered with the IGBC, out of which 3260 were certified and fully functional in India. The green building movement is a pan-India movement with a green footprint of over 10.26 billion square feet, making India the second country with the largest green building footprint in the world. The vision of the IGBC is to enable a sustainable built environment for all and facilitate India's becoming a global leader in the sustainable built environment by 2025. IGBC is part of the Confederation of Indian Industry, which was formed in 2001. The council offers a wide array of services, including developing new green building rating programmes. IGBC is India's premier certification body, headquartered in Hyderabad. It is also among the five countries that are on the board of the World Green Building Council, discussing global issues at COP and similar global platforms. These types of initiatives show the importance of green building infrastructure.

5.1Need for Green Infrastructure

The construction sector has substantial positive and negative environmental, economic, and social implications, and to lessen their negative environmental impact, developers must identify better and more sustainable methods of building design. Nowadays, the business of construction and the increasing population consume a significant amount of energy, which leads to the creation or release of more greenhouse gas emissions. As a result, this disturbs the balance of the environment. As a suggestion, the materials that are widely recognized as green materials can be employed in the construction, and these materials are reusable, recyclable, and help reduce energy waste in homes. Hence, by adopting green building strategies, we can minimize both economic and environmental performance. The related green building concepts of sustainable development and sustainability are integral to green building. Practitioners of green building concepts often seek to achieve not only ecological but also aesthetic harmony between a structure and its surroundings, both natural and built. Figure 3 portrays the need for green infrastructure.

Figure 2: Need for Green Infrastructure

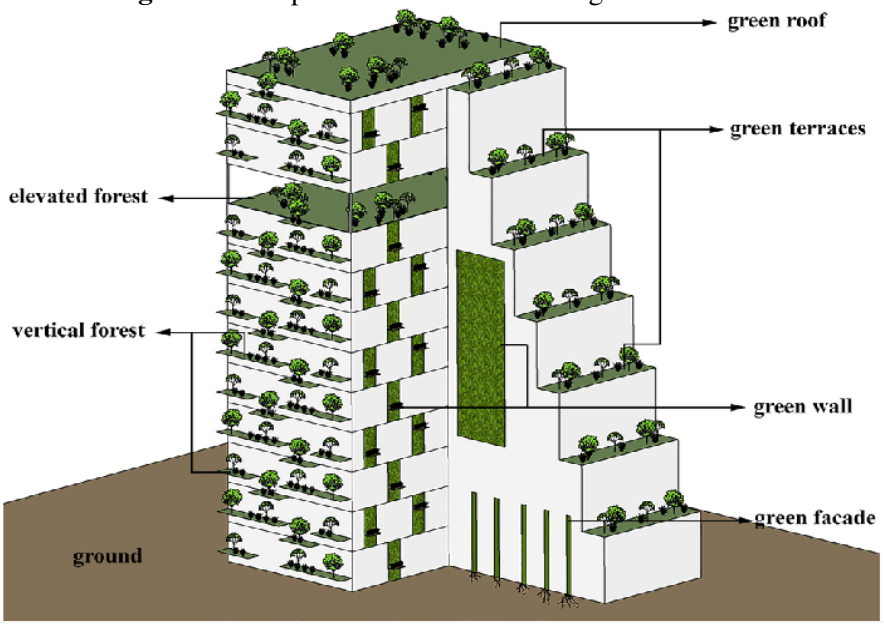


Source: Authors Compilation

5.2Components of Green Building Infrastructure

As more and more people are looking to build environmentally friendly homes and businesses. Hence, the concept of green building has become an increasingly popular topic in recent years. Figure 3 and Table 1 portray components of green building infrastructure.

Figure 2: Components of Green Building Infrastructure



Source: https://doi.org/10.1007/s00107-020-01583-0

Table 1: Detailed Classification of Green Building Infrastructure

Typologies	Plants	Characteristics
Green facade	Climbing plants	Plants rooted on the ground and climbing on the facades of the building by themselves or through the support of other structures
Green wall	Modular plants or plants with hanging-down branches	Supporting structures such as steel nets, modular rails and planter boxes that should be built on facades for hanging and placing plants
Green terraces	Short, medium and tall plants	Growing in the planting media which is located on horizontal terraces at different levels continuously along the facade
Elevated forest	Trees	Trees growing in sheltered horizontal (open) spaces
Vertical forest	Trees	Trees or groups of trees growing on cantilevering balconies

Source: https://doi.org/10.1007/s00107-020-01583-0

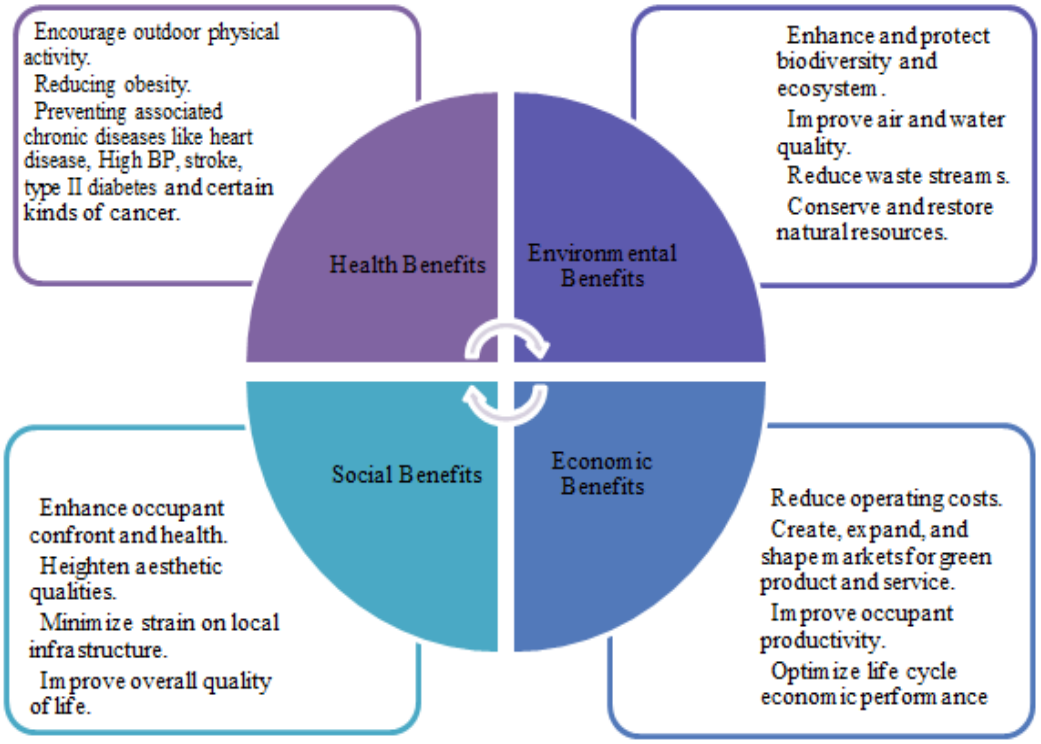
- Green Roof and Balcony: A green roof or balcony is the very first thing that comes to mind when we hear about green buildings. It is just a matter of planting trees on terraces, roofs, or balconies. Some of the people have used the terraces for the kitchen garden only and the balconies for other decorative plants.
- Solar power: Green building infrastructure is nothing but sustainable building infrastructure, and solar power, i.e., renewable energy sources, is just a component of sustainable building. It is a great way to reduce our carbon footprint.
- Recycling and waste management: Recycling is the best way to reuse materials that are already used and are on the verge of being thrown away. It also helps reduce the waste that is generated in homes, such as Vegetable peels, etc.
- Landscape Architecture: Landscape architecture involves the planning, design, management, and nurturing of built and natural environments. It includes public parks, gardens, playgrounds, residential green areas, and college green campuses. It can help reduce the amount of heat absorbed by a home; it allows the cooling of the air around a house. Trees and shrubs can provide shade and wind breaks, and they can also help filter pollutants.
- Water Conservation: As obvious, water conservation is a sustainable factor, but water conservation saves money beside water, i.e., it can reduce electricity consumption, its bill, and water consumption and its bill. Therefore, it can provide economic as well as sustainable benefits.

There are several ways for water conservation in our home that include collecting rainwater in barrels, reducing the number of shower heads and toilets, using waste impure RO water for watering the plants or other uses, etc.

5.3 Benefits of Green Infrastructure

Green building infrastructure benefits humans in different ways, such as environmentally, economically, and socially. According to the US EPA, green building infrastructure has some environmental, Economic, and social benefits (please refer to Figure 3).

Figure 3: Benefits of Green Infrastructure



Source: Authors Compilation

6. SUSTAINABLE LIVABLE CITIES

As we discussed earlier, due to the rising population, urbanization is increasing, which leads us to think about livable cities and their sustainable features so that urbanization can be seen as beneficial rather than a problem for the economy and human beings.

Lead Consultant, Rome Chiara Lissandrello defines a livable city as "a city founded on balancing society, environment, economy, and culture. It's the actual implementation of sustainability at the urban level. While the exact combination will always vary and economic elements are constant, a strategy for livable cities should always seek a sustainable balance of all these components." The Country Market Director of Singapore, Leonard Ng KeokPoh, defines livability as "A range of factors that make places livable. Livability is measured by quality-of-life factors, such as access to fresh water, food, housing, transport, health care, education, and a safe and stable built and natural environment, but the livability of a place is also based on social and psychological factors, like emotion and perception."

Similarly, different institutions give different parameters for livable cities in respect of economic development, i.e., nearby markets, ease of doing business, accessibility of public transport, Cleanliness, proper drainage systems, proper waste management, recycling facilities, nearby medical facilities, etc. But there is a slight change in this when we talk about sustainable, livable cities; then it becomes more environmental and more focused on green infrastructure. Hence, sustainable, livable cities must have the following features or components:

- **Making houses more Affordable-** Economic sustainability is also just a part of sustainability itself, which supports rationality, and according to a rational being, a house should be cheap and good so that most of the population, or the common man, can also afford the house if he shifted from or migrated from his or her hometown to an urban area.

- **More green Infrastructure-** As more green infrastructure is built, the environment will be cleaner. People can breathe comparatively pure air. Sustainable cities must contain more and more green infrastructure because a huge population needs more oxygen to breathe in, and more oxygen is needed to maintain it with other component gases in the air.
- **Renewable energy-** The use of renewable energy not only reduces the cost of energy, but it also saves resources for the future. Using renewable energy also brings efficiency to the common man's ability to generate energy for themselves.
- **Green open space-** Sustainable, livable cities must contain enough green open space. There are too many buildings in urban areas that resist air moving or wind blowing. If there is some open space in the city, then the resistance to air will be less. And moving air is part of the cooling process, so somehow, in this way, it can save expenses, i.e., energy consumption for cooling houses or other buildings.
- **Water Conservation-** To make a city sustainable and livable, there should be a system for conserving water. A lot of people need a lot of water, and it has several uses, which can create the problem of scarcity. The conservation of water and its use for several purposes like cleaning, watering plants, etc. can reduce the problem of scarcity, and it will be easier to make water available to all in sufficient or needed quantities.
- **Lifestyle-** Lifestyle plays an important role in attaining sustainability and livability. Nowadays, in the race for appearance, people waste their money and harm the environment, which is the worst thing. People should follow the concepts of simple living and high thinking. According to today's circumstances, it is very important to change the lifestyle towards sustainability. People should avoid the unnecessary use of cars, bikes, or other fuel-consuming personal vehicles (like for covering short distances). If it is possible, they should use public transport rather than private.
- **Waste management and proper waste dumping-** If the waste is thrown on roads, lanes, or streets, it will create a lot of problems and give rise to a bunch of diseases in society. It is necessary to manage or dump the waste properly. Spreading garbage in an open area in the middle of the city is not the right way to dump the waste. First, the waste should be segregated so that similar waste can be dumped together, and this process should be done away from the city where no one lives.

7. GREEN BUILDING INFRASTRUCTURE LEADS TO ECO FRIENDLY SUSTAINABLE LIVABLE CITY: A LINKAGE

It is natural for the population to increase with economic growth, which needs rapidly growing industries or factories to give rise to various serious environmental problems that should not be left unchecked. The environment also needed to be more focused along with the growth. We cannot stop the growth of the economy, nor can we ignore the problems caused by the increasing population and industries, including environmental problems such as Global Warming, Ozone layer depletion, Climate change, and extreme temperatures. So, we must pay attention to how to maintain a sustainable quality of life even with a growing population.

From the above discussion with green building infrastructure and sustainable livable cities, it is clearly visible that the green building infrastructure is there through which we can provide eco-friendly quality life to the large population with sustainability. Green building not only provides sustainable quality life and sustainable livable cities, but it can also protect the environment to a great extent because green building infrastructure is what can meet the need for eco-friendly, sustainable livable cities. In the further discussion, we can understand how an eco-friendly, sustainable, and livable city can be achieved with the help of green building infrastructure.

Affordable houses are a basic feature of sustainable, livable cities, while when we talk about green housing, it can have a high manufacturing cost as compared to traditional manufacturing, but green housing can reduce energy costs by using solar energy, water costs can be reduced by water conservation systems, green roofs, green building materials, and cross ventilation can reduce decoration costs, and green balconies can reduce decoration costs. On the other hand, this greenery will have a positive effect on the environment and will also contribute to increasing the amount of oxygen in the air.

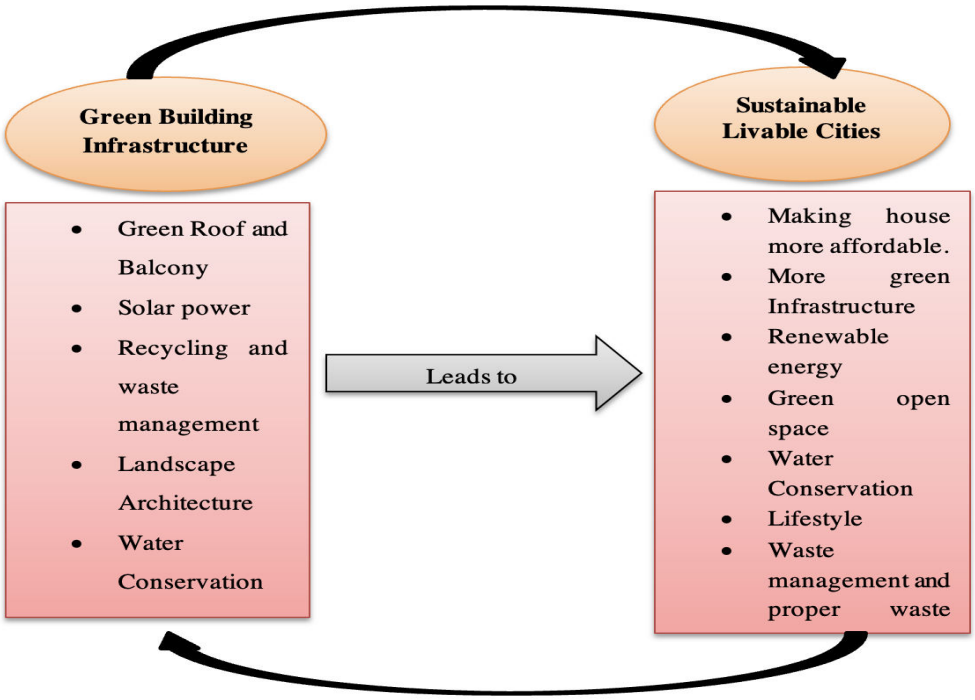
Large and congested buildings block the air's ability to move, so there should be a free and open space for the wind to blow. Under the influence of green building infrastructure, open space can be green open space. It can be in the form of parks, but these parks are not sufficient to provide green infrastructure to a highly dense city; these cities must have more green infrastructure, which can be provided to the city or community by planting roadside, lane side, and streetside plants, as well as plants in front of houses and even on highway dividers. These roadside plants and plants in front of houses will be beneficial for the durability of houses. More green infrastructure can also include green schools (plantation in schools), green apartments (green terrace), Green job places (like lawns, as decorative plants, etc.), Green factories (must have green lawns around the factories), and green markets (in the middle of the market as a divider), etc.

Renewable Energy is a famous aspect of sustainability. This renewable source of energy reduces the cost of energy and brings efficiency to an individual's ability to generate energy by themselves, i.e., solar energy can be generated and used by households, schools, hospitals, markets, and other buildings on their terrace, and a city with large open spaces can use a windmill to generate energy with it. While water conservation can also facilitate using water sustainably, systems such as rainwater harvesting systems installed in buildings including schools, houses, hospitals, etc. can use the collected water for cleaning purposes, watering plants, and other various purposes. Even the wastewater from a water purifier can be used for bathing.

In sustainable cities, waste should be managed and dumped properly, because it spreads out of garbage on the roadside or in space and releases a lot of polluted gases that are harmful to human health, like ammonia, sulphides, methane, carbon dioxide, etc., and these gases are mixed with air, which can cause bad odours and give birth to various bacteria, insects, and different forms of diseases. Hence, as per the green infrastructure, the garbage should be dumped in a deserted place out of the city, and plants for recycling should be there only, so that waste can be recycled and reused if possible. A sustainable city must have a proper drainage system as well. If there is no proper drainage system, then the water flows over the roads, which leads to problems like water logging, and long-term water logging will give birth to mosquitoes, which will further spread the mosquito-caused diseases. The sewer system must be installed, which should open on a pit outside the habitation rather than a river. This will again be discharged into groundwater, and as a result, the level of groundwater will be maintained. Figure 4 portrays the linkage between Green Building Infrastructure and an eco-friendly, sustainable, and livable city.

The linkage model between green building infrastructure and an eco-friendly, sustainable livable city depicts that if society focuses on developing and establishing green room balconies, solar plants, recycling waste, water conservation, and landscape architecture, it can lead to sustainable livable cities. People can live and breathe in fresh air and attain a pure quality of life. At first, green building infrastructure leads to sustainable livable cities, and after attainment of sustainable livable cities, green building infrastructure may develop to a greater extent. Both of these terms, green building infrastructure and sustainable livable city, are interdependent on each other.

Figure 4: A Linkage Model between Green Building Infrastructure and Eco Friendly Sustainable Livable City



Source: Authors Compilation

CONCLUSION

In an era of increasing global competition, the situation is getting worse due to the increasing population and mounting industrialization, which have negative impacts on society and health. The dilemma between environmental protection and economic development is universal. On the one hand, the world population is increasing at a very fast rate. Contrary to this, to feed this increasing population, economic development is also important. Henceforth, green building Infrastructure is a great initiative to get out of this dilemma because it can provide a good environment for humankind and will not hinder the growth prospects of an economy. Green building Infrastructure is not an end, but it is one of the best instruments that can provide a good and healthy lifestyle with sustainability.

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6

ROLE OF ARTIFICIAL INTELLIGENCE IN CIRCULAR ECONOMY: A STEP TOWARDS GREEN WORLD

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ABSTRACT

We all currently live in a linear economy, also referred to as a "take-make-dispose" economy. This model assumes that raw materials are extracted, transformed into products, eaten by people, and finally thrown away as trash after usage. This form of economy brought about numerous issues for the entire planet like: planned obsolescence, which promotes frequent repurchasing and causes the accelerated disposal of still-usable items, contributes to the depletion of natural resources; the vast amount of waste generation; linear production processes, which require significant amounts of energy that are primarily sourced from fossil fuels and thus contribute to greenhouse gas emissions and climate change; socially, it causes economic inequality. As a result, the convergence of the circular economy and artificial intelligence holds the key to solving these issues. This paper's primary goal is to examine the different ways AI may support the circular economy principle such as data-driven circular design and intelligent waste management. AI systems may improve material flows through real-time data analysis, allowing organizations to extend product life cycles and promote product reuse, refurbishing, and recycling. Solutions that use AI can help with waste reduction, product value enhancement, and secondary market identification. Additionally, AI-driven analytics can help with eco-design by optimizing product designs to cut down on resource usage while keeping performance and customer satisfaction high. Advanced recycling technologies that enable more effective material recovery, sorting, and separation can be developed with the help of AI. These developments can encourage the use of recycled materials in manufacturing and dramatically lower landfill waste.

Keywords: Artificial Intelligence, Circular Economy, Linear Economy, Environmental Impact, Economic Gains.

1. INTRODUCTION

Growth through environmental destruction is never a smart strategy, thus reusability is gaining ground quickly and fostering a circular economy. Throughout millennia of human history, the "Linear model" was created, used, and eventually discarded. Only virgin resources enter the system or value chain of a linear model or economy (LE) for value addition. The current annual production of municipal solid waste in the world is thought to be around 1.3 billion tonnes, and by 2025, that production is projected to rise to over 2.2 billion tonnes (Hoornweg D. & Bhada-Tata, P. 2012). The per capita trash generation rates will rise significantly over the following fifteen years, from 1.2 to 1.42 kg per person per day. The rapid depletion of natural resources, increased environmental effect and other social implications due to expanding global energy consumption have prompted governments and policymakers to re-evaluate the current socio-economic system. Thus, it becomes more and more obvious that the linear economy model is no longer viable due to excessive energy consumption, environmental deterioration, and increased waste production. In a circular economy, which is an alternative to the conventional linear economy (make, use, dispose), resources are used for as long as feasible, their maximum value is extracted while they are being used, and then goods and materials are recovered and renewed at the end of each useful life (D'Amato et al., 2017). "The "3Rs"—reduction, reuse (including

repair), and recycling—are commonly used in Circular Economy to reduce waste by using fewer goods, parts, and materials (Kirchherr et al., 2017).

The idea of a circular economy can be revolutionized and supported by artificial intelligence (AI). AI is a game-changer because it provides a wide range of creative ways to deal with the difficulties and complexities of making the shift to a circular economy. We can improve productivity, streamline procedures, and reach well-informed judgements that are consistent with the values of sustainability and environmental stewardship by utilizing the potential of AI. As with resource management and optimization, waste reduction and recycling, supply chain transparency, product design and lifecycle assessment, circular business models, energy management, and predictive maintenance, AI may play a revolutionary role in enabling the circular economy. But AI use in the Circular Economy comes with challenges, risks, and ethical issues.

2. LITERATURE REVIEW

In the study "Sustainable Economic Development," which emphasizes the interaction between several criteria connecting the environment and the economy, Turner and Pearce first used the term "Circular Economy" (Turner & Pearce, 1990). The circular economy's nature is to keep throughput flow to a minimum that our environment can easily handle (Korohen J et al. 2018). Another important feature of this economic structure is the elimination of carbon emissions while increasing energy efficiency. An intelligent economic system is constantly looking for new ways to reduce costs while improving the effectiveness and sustainability of actions across the board. In this situation, artificial intelligence-driven technologies are prepared to function in the new industrial paradigms (Gupta, 2017). The father of artificial intelligence is John McCarthy (McCarthy J. et al., 1955). He provided the following definition of artificial intelligence in 1990: "Artificial intelligence is the science and engineering of creating intelligent devices, particularly intelligent computer programmes. Different machine learning algorithms' cognitive capabilities have left a lasting influence on society, business, and the government (Oke, 2008). It has been demonstrated that AI significantly contributes to laying the foundation for achieving global sustainable development (Wilts H. et al., 2021; Płoszaj-Mazurek M. et al.,2020; Su D. & Chai Z., 2019). As a result, artificial intelligence may greatly assist in resolving important problems associated to an intelligent circular economic system (such as sustainable manufacturing systems (Khayyam H. et al., 2021), waste management (Nanez Alonso S.L. et al., 2021; Wilts H. et al., 2021), reverse logistics (Schluter M. et al., 2021), and energy source optimization, for example). With the aid of various algorithms, AI is one of the most important technologies that can offer a number of benefits for a seamless transition to Circular Economy. As an illustration, real-time data analysis(Awan U. et al., 2021) for supply chain management, cost and carbon footprint reduction(Wang D & Zhang Y, 2020; Ploszaj-Mazurek M. et al., 2020) for sustainable development, process automation (Schuluter M. et al., 2021), for reverse logistics, evaluation of the impact of waste generation (Rosecky M. et al., 2021; Magazzino C. et al., 2021) for waste management, sorting various materials (Nanez Alomso S.L. et al., 2021) for recycling purposes, etc.

AI can help in the creation, upkeep, and design of circular items. Two notable mechanisms exist for this to occur. For a product to comply with Circular Economy requirements, it must first be designed and built with the 3Rs in mind. Products should be made to ensure a long product life and in a way that makes it possible to separate parts that are part of a biological cycle (for example, cardboard) from those that are part of a technical cycle (for example, plastic), which would increase its ability to be recycled (Ellen MacArthur Foundation and Google 2019). According to (Acerbi et al., 2021; Gailhofer et al., 2022), AI can assist designers by making first suggestions for environmentally friendly products or modifying designs based on environmental factors and/or other actors in the circular value chain. Second, AI can be used to analyze data

gathered throughout the course of a product's lifecycle to make real-time changes to efficiency or to assess whether a returned product could be recycled, repurposed, or rebuilt (Blunck et al., 2019).

AI might assist circular business as well. At least three potential points of intervention in this situation show promise. First, by utilizing AI, creative circular business models can be created, such as dynamic pricing that is based on AI. Given the variety of factors affecting the price of a product, standardized pricing is unlikely to be applied when products are offered as services or recycled products are marketed. To accurately calibrate price points, dynamic pricing algorithms may be used to examine a variety of factors that should be considered while pricing, such as the age of the product, wear and tear, and market conditions. Similarly, matching algorithms can facilitate a more effective connection between buyers and vendors (Gailhofer P. et al., 2021). Second, AI might support the recycling infrastructure required for a successful circular economy, which would help circular firms. Because Circular Economy entails reusing, repairing, and recycling products, effective sorting is necessary. By identifying and differentiating trash, AI-powered image recognition helps reduce resource loss. To establish large-scale, closed-loop plastic recycling in China, for example, Unilever and Alibaba recently teamed together to test an AI-enabled sorting machine that can identify various forms of plastic (Moore D. 2021). Robots are also being included into disassembly lines in the electronic waste industry to recover and recycle valuable and hazardous elements at the end of a product's lifecycle (Renteria & Alvarezde-los-Mozos, 2019). Third, AI can assist with critical infrastructure components to guarantee that the resources supporting circular enterprises are sustainable in and of themselves. One significant example is the amount of energy required for data processing and storage. Energy use in data centers is high. According to some estimates, data centers will require 13% more electricity by 2030 than they did in 2010 (Andréa & Edler, 2015). Many of the circular economy's environmental ambitions may be compromised if data-intensive circular enterprises need to consume electricity at this level. For instance, in 2016 DeepMind created an AI system that adjusted the cooling systems at Google data centers based on the weather and other variables, cutting the cost of cooling by 40% (Jones, 2018).

There are many challenges of employing AI in Circular Economy ethically- Circular Economy is concerned with the interactions and procedures among several parties. Given the interconnectedness of supply networks, a single player cannot "close the loop"; circularity can barely be achieved without cooperation (Alexandris G et al., 2018; Larsson A & Lindfred L, 2019; Sankaran K 2019). Cooperative networks are urgently needed as a result, and data and interoperable systems are essential for achieving this (Ramadoss et al., 2018). By providing stakeholders with information about the many characteristics of the underlying assets, such as location, condition, and availability, data support these intra- and inter-organizational networks. However, without AI, it would be very difficult to interpret this data and use them to support circular enterprises, build and maintain goods, or achieve a high level of circularity in the economy. This data gathering and analysis, nevertheless, may also increase privacy risks. Data security and liability risks are increased in a highly interoperable ecosystem where one compromised node may have an impact on many others (Allam & Dhunny, 2019; Luthra & Mangla, 2018). Security breaches can have particularly detrimental effects in these intricate systems with many stakeholders. These dangers, if unaddressed, may affect the potential adoption of a connected circular economy or make its implementation more difficult than it needs to be by diminishing public confidence.

The realities of AI development and deployment now come with significant risks in terms of social and economic implications. Both nationally and internationally, this is true. Global South countries have fewer resources to push circular projects as several countries in Europe, North America, and Asia, including Asia, pilot them. A cyclic transformation driven by AI leading

nations might gain an additional 20–25% in net economic benefits from AI adoption, according to a McKinsey report. Comparatively speaking, the Global South may only take in 5–15% (Notes from the AI Frontier 2018). Therefore, rather than narrowing the digital divide across countries, AI applications could exacerbate it. Domestic inequality and exclusion may also manifest within Global North nations, which are now the focus of the majority of AI-driven Circular Economy programmes. The labour structure will shift from sustaining products-as-service to maintaining linear consumption because of the Circular Economy. This will translate into a greater focus on more skilled work in product design and maintenance and a decreased focus on factory-based product development. A polarization in the types of employment that are available because of the shift would result in wage disparity (Lawrence et al., 2017).

Risky epistemologies due to the inescapable complex trade-offs and balances involved, designing or optimizing for specific concepts of desirable environmental outcomes has a high ethical risk. Advanced machinery for the Circular Economy is being developed and manufactured quickly, which will result in a large-scale resource consumption that will produce emissions and pollutants (Blunck et al., 2019). For instance, many so-called "clean" technologies, like hybrid automobile engines, nevertheless rely on rare-earth metals that must be mined at great environmental expense (Tremblay, 2016). Since electrical and electronic equipment is one of the waste streams that is rising the quickest in the EU (New Circular Economy Action Plan 2020), improper disposal of these products could in fact be difficult. Like how data gathering, analysis, and storage operations in AI development demand a lot of computational power, which uses a lot of resources. Like how data collecting, processing, and storage operations in AI development demand a lot of computational power, which uses a ton of energy, as reported by Cowls et al. in 2021 and Kouhizadeh et al. in 2019. The creation of larger AI models is boosting energy consumption, and from 2012 to 2018, the computer power required to train cutting-edge models increased by almost 300,000 times. As a result, deploying AI to achieve a limited set of Circular Economy goals may come at the expense of other environmental considerations.

3. OBJECTIVES

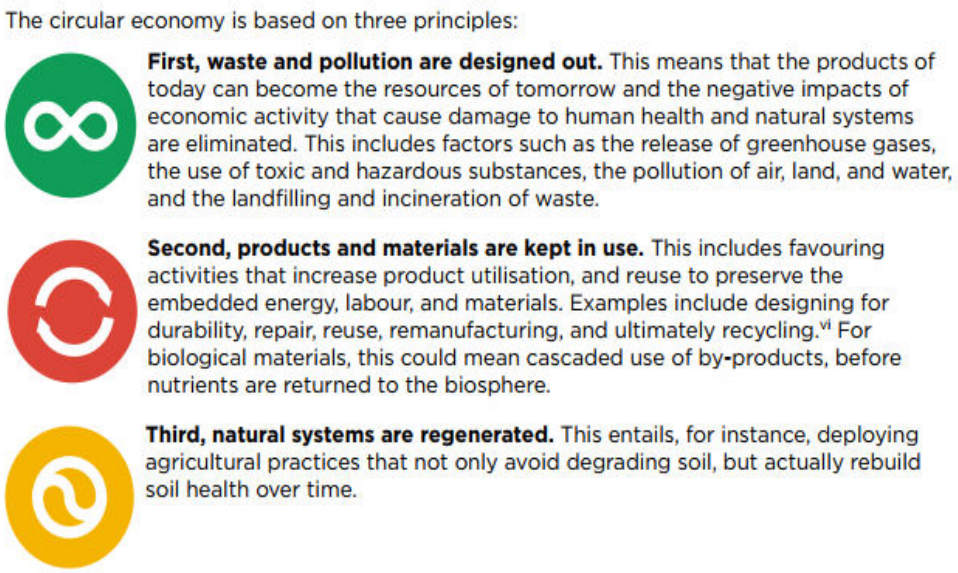
1. Learning about the circular economy
2. To determine which AI applications may be used into circular economy plans
3. To make sure that the use of AI in the circular economy does not lead to an increase in environmental burden, it is important to evaluate the environmental impact of AI technologies themselves.
4. Calculating economic gains from implementing AI technologies in circular economy practices
5. To uncover any challenges, risks or ethical issues that could arise from combining AI with the circular economy.

The first objective is to learn about circular economy, will be described as follows:

A more sustainable and regenerative approach to resource management is encouraged by the circular economy. It aims to decrease waste generation and extend the useful life of products, materials, and resources. Core principles of Circular Economy are: Design for endurance and durability: This guarantees a longer lifespan and the ability to use them for a longer amount of time before needing replacement; Reuse and renovation: In a circular economy, efforts are made to repair and enhance things rather than discarding worn-out or damaged ones; Recycling and remanufacturing: The circular economy encourages remanufacturing and recycling procedures to recover valuable materials and components when items reach the end of their useful lives. The need for virgin resources can be decreased by using these materials to make new products;

Resource efficiency and waste reduction: The circular economy aims to maximize resource utilization throughout the production and consumption lifecycle by utilizing resources more effectively and reducing waste output; Data-driven solutions and digitization: Technology is essential to the circular economy. A digital platform can improve resource tracking, streamline workflows, and offer insights into more sustainable practices; Eco-design and eco-innovation: Environmental factors should be incorporated into the design and innovation processes of businesses. This contributes to the development of products that are easier to recycle, repair, and use less resources. Reduced waste, lower resource consumption, increased economic resilience, and enhanced environmental sustainability are just a few advantages of the circular economy. It represents a change towards a more restorative and regenerative economic structure that can aid in addressing urgent global issues like resource scarcity and climate change.

Fig. 1 Principles of Circular Economy

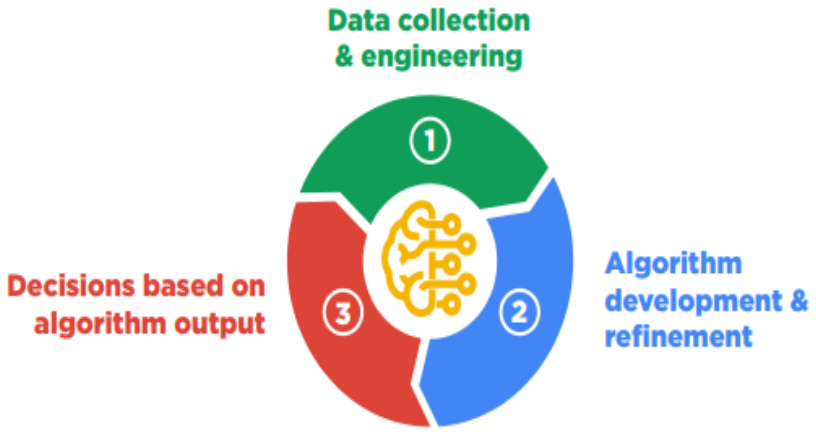


(***Source:*** Ellen Macarthur Foundation- Artificial Intelligence and Circular Economy)

The second objective is to determine which AI applications may be used into circular economy plans will be described as follows:

Recycling and waste separation: A robotic system powered by AI can efficiently separate recyclables from waste streams. Machine learning algorithms can recognize and classify many materials, including paper, metals, and plastics, to enhance the recycling process; AI can optimize supply chains by forecasting demand, spotting inefficiencies, and figuring out the best transit routes, which reduces overall waste in the production and distribution process; Product life cycle analysis: AI-powered systems can evaluate a product's environmental impact from raw material extraction through production, use, and disposal. Companies may build more sustainable goods and make better judgments with the help of this knowledge; Waste reduction and resource optimization: AI can be used to model and simulate various circular business models, evaluating their viability and possible effects before adoption. In order to promote circular practices, AI can help identify opportunities for waste reduction and optimize the use of resources in industrial processes; Energy management: AI programmes can track energy use, spot energy-saving opportunities, and optimize energy use across a range of businesses, helping to create a more circular economy that is more sustainable; Analysis of consumer behavior: AI-powered analytics can help companies better understand consumer behavior and preferences so they can create plans to increase product repair, reuse, and recycling.

Fig 2: Artificial Intelligence Cycle



(***Source:*** Ellen Macarthur Foundation- Artificial Intelligence and Circular Economy)

Third objective is to analyze the environmental impact of AI technologies will be described as follows:

Understanding and minimizing the potential negative environmental effects of AI technologies requires conducting an environmental impact assessment of those technologies.

The first effect was felt in terms of energy usage. AI applications frequently need a lot of computational power, which might result in high energy usage. Data centers and GPU-intensive computation may result in higher energy and carbon emissions. Analyzing the energy footprints of AI systems is crucial for optimization and finding environmentally friendly solutions. The second effect might be that when AI technology develops, outdated hardware must be updated. It is essential to properly dispose of outdated AI hardware to reduce electronic waste and its negative environmental effects. It is important to recycle and reuse materials responsibly. Locations of data centers could be a third impact. A data center's location may have varied environmental effects. Selecting sites for data centers that use renewable energy sources can greatly reduce the carbon footprint. As AI algorithms frequently rely on enormous amounts of data for training and operation, additional effects can be observed. Data transmission and storage can use a lot of energy. The environmental impact of data gathering, and storage can be reduced; evaluating the effectiveness of AI algorithms is crucial to improving their performance and lowering consumption. Less computational resources are required for activities to be completed using efficient algorithms, which have a positive influence on the environment.

Fourth objective is to calculate economic gains from implementing AI technologies in circular economic practices will be described as follows:

The circular economy can benefit from integrating AI technologies in several ways economically. It could first be viewed as better resource management. By anticipating demand, seeing patterns, and enhancing supply networks, artificial intelligence can improve resource utilization. As a result, waste is reduced, production costs are decreased, and circular economy enterprises are more profitable. Second, it might be viewed as more sophisticated recycling and repurposing. Robotics and devices with AI capabilities can improve recycling processes by more effectively sorting and segregating materials. This raises the value of recycled materials and motivates more companies to practice recycling, which boosts the economy and creates jobs in the recycling sector. New Business Opportunities are the third point. The circular economy can offer new economic prospects in industries like robotics, data analytics, automation, and AI

software development. This may result in the expansion of startups and businesses with an AI focus, which would help with job growth and economic diversification. The fourth is improved product design. AI may assist in the development of products that have longer lifespan, eliminating the need for continual replacement and promoting economic growth. Real-time Market Insights is the fifth one. AI can analyze consumer and market trends, giving circular economy enterprises access to up-to-date information. Cost savings is the sixth one. AI can assist companies in the circular economy to cut costs by streamlining operations, minimizing waste, and improving processes. In turn, this frees up money that may be used for research, development, and expansion, which promotes economic growth. Increased productivity is the seventh one. Employees can concentrate on more strategic and creative work by automating monotonous tasks with artificial intelligence (AI). Businesses can produce more output with the same or fewer resources as productivity increases, which generates economic advantage. The eighth is investment attraction. By incorporating AI into the circular economy, companies may become more appealing to venture capitalists and investors. AI-driven sustainable and effective practices may attract additional investment, resulting in business growth and economic prosperity.

Fifth objective is to uncover challenges, risks and ethical issues that could arise from combining AI with circular economy will be described as follow:

The circular economy and artificial intelligence have the potential to significantly improve society and the environment. However, the challenges, risks and ethical issues associated with its application must be carefully considered.

1. CHALLENGES

The security and privacy of data may present the first difficulty. In a circular economy, data on products and materials are crucial for tracking and optimizing resource flows. AI mainly relies on data. Concerns regarding privacy and security breaches are raised by the gathering, storing, and sharing of this data. The second reason can be a lack of standards. Several parties are involved in a circular economy, including producers, consumers, recyclers, and decision-makers. Interoperability issues may arise from the absence of standardized practices and procedures for AI integration. Workforce displacement is the third. Employees participating in manual procedures may lose their jobs because of the deployment of AI in the circular economy. Programmes for reskilling and up skilling workers should go hand in hand with the transition to AI-driven solutions to support impacted workers. The fourth is due to technological limits. Although AI technology is constantly improving, it is not without flaws. The resource management and recycling processes may be negatively affected by biases or errors in AI algorithms that result in less-than-ideal decisions for circular economy practices.

2. RISKS:

The first is relying too heavily on AI judgments. Without human oversight, relying only on AI algorithms to guide circular economy decisions can have unintended effects and may overlook some ethical issues. The second is how AI technologies affect the environment. Increased energy use and e-waste production are just two environmental effects that may result from the production and use of AI infrastructure and gadgets. Algorithmic bias is the third option. The historical data used to train AI algorithms may be biased. This bias may have an adverse effect on resource allocation, recycling priorities, and material selection in a circular economy, producing unfair results.

3. ETHICAL CONSIDERATIONS

Given their complexity and opacity, AI algorithms can make it challenging for stakeholders to comprehend how choices are made. Transparency and explain ability are essential in the context of a circular economy to foster confidence and guarantee accountability. Equity and inclusivity

is the second. It is crucial to make sure that AI-driven circular economy projects benefit all segments of society and do not worsen already-existing imbalances. Vulnerable groups and marginalized communities should be considered consciously. The third is the responsible usage of AI. Avoiding damaging AI applications in circular economy procedures, such as employing AI to greenwash or mislead consumers about the sustainability of goods or materials, is one ethical consideration.

4. CONCLUSION

Artificial intelligence has enormous potential to assist and promote the circular economy, promoting a future that is resource-efficient and sustainable. Utilizing its powers, AI can help solve major problems and speed up the switch to a circular model. Some of the ways AI aids the circular economy include enhanced resource management, smarter product design, supply chain optimization, improved recycling processes, consumer engagement and education, waste reduction and pollution mitigation, and circular business models. To make sure that AI-driven circular economy efforts are inclusive, transparent, and sustainable for all stakeholders, it is crucial to consider and address potential difficulties, such as data protection, ethical AI deployment, and the digital divide.

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7

SCENARIO OF SOCIAL ENTREPRENEURSHIP IN INDIA

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ABSTRACT
In India and around the world, everyone is talking about social business. People have found the idea of giving to be somewhat interesting. It has the best mix of doing good for others and being an entrepreneur. This mix is what makes it so attractive and special. Most of the time, entrepreneurship is associated with business activities that are ruthless about making money and don't care about social benefits or the well-being of society. In this time of heavy industrialization and economic growth, social gains have taken a back seat or even gone out of sight all over the world, including India. However, the rise of the idea of social entrepreneurship in India and around the world has helped people serve society in a more meaningful way than ever before while also living up to the spirit of entrepreneurship. The focus of economic entrepreneurship is on business needs, while social entrepreneurship is on social needs. In the past few years, social entrepreneurship has grown in scope and value. This paper covers both of those areas as well. This study paper also talks about how social entrepreneurship can change or affect the social structure and social fabric in India and other developed countries, especially at the bottom of the pyramid.

Keywords: Industrialization, Entrepreneurship, Pyramid, Economic growth.

1. INTRODUCTION
Social entrepreneurship has emerged as a powerful force driving positive change in India's social and economic landscape. It represents a unique blend of business acumen and a deep commitment to addressing pressing social and environmental challenges faced by the country. In recent years, this innovative approach to problem-solving has gained momentum and attracted individuals, organizations, and investors alike, all seeking to make a tangible impact on society while maintaining financial sustainability. Social entrepreneurship goes beyond traditional charity and philanthropy by leveraging the principles of entrepreneurship to create innovative, scalable, and sustainable solutions to social issues. It embodies a vision of empowering marginalized communities, uplifting the underprivileged, and building a more equitable society. These social entrepreneurs, also known as changemakers, are driven by a sense of purpose, guided by their values, and willing to take risks to achieve their mission. India, with its vast population and diverse challenges, offers both immense opportunities and formidable obstacles for social entrepreneurs. From poverty and lack of education to healthcare disparities and environmental degradation, the country presents an array of complex issues that demand creative and systemic solutions.

The rise of social entrepreneurship in India can be attributed to various factors. Firstly, a growing sense of social consciousness and an increasing desire among young individuals to contribute meaningfully to society have played a significant role. This shift is further fueled by technological advancements, which have enabled rapid communication, access to information, and the potential for disruptive innovation in previously neglected sectors. Government initiatives and policy support have also been instrumental in fostering an environment conducive to social entrepreneurship. Programs such as the Startup India initiative and the creation of dedicated funds and incubators have provided critical resources and financial backing for social enterprises to flourish. In addition to the grassroots level, the corporate sector

and established businesses have also recognized the importance of social responsibility. Many companies now integrate social impact strategies into their business models, either through their corporate social responsibility (CSR) initiatives or by partnering with social entrepreneurs to address specific challenges. One of the significant achievements of social entrepreneurship in India is the ability to create scalable and replicable models that can be adapted to different regions and contexts. By combining profit-making with purpose-driven motives, social entrepreneurs have demonstrated that financial viability and positive societal impact can go hand in hand.

2. LITERATURE REVIEW

(Christie & Honig, 2006) There are many opportunities and obstacles in the Indian scene. The country has a lot of smart people and has made a lot of progress in getting better at science and technology. Since 1991, when liberalizations started, the economy has been growing quickly. Unfortunately, the country's social and environmental problems are getting worse every year. This means that the social and environmental sectors need to use more multidisciplinary methods and entrepreneurial energy.

(Nichols, 2006) says that the essence of social entrepreneurship is innovation that improves the well-being of society and is backed by entrepreneurial organizations. In the same way, social entrepreneurs are people or groups of people who try to make big changes by coming up with new ways for governments, non-profits, and businesses to solve important social issues (Light, 2006) .

(Nielsen & Carranza, 2010) Businesses, governments, non-governmental organizations (NGOs), and other international donor agencies around the world are becoming more aware that their support of social entrepreneurship can bring big benefits to society as a whole. But the present research and policy debates aren't mature enough to give conclusive evidence about the best ways to get involved, the most important parts of the system, and other policy recommendations.

Several studies back up what (**McMullen, 2011**) found in his research: that social entrepreneurs have a good effect on society by meeting the social needs of people who aren't taken care of by other institutions.

(Muscat & Whitty, 2009) say that social entrepreneurship training is "a new paradigm for management education taking shape in the untapped market niche of serving real societal needs without making 'good' profit margins."

(Aaltio & Wang 2015) say that Social entrepreneurship education, which comes out of a useful session, needs to be looked at separately in studies about entrepreneurship education.

In **2016 André and Pache said that,** in some organizational cultures, a person's moral sense needs to be explained and/or judged by ethical standards. In fact, André and Pache's model from 2016 gives us a good example of how to make a connection between personal moral growth and organizational concerns.

(Howorth et al., 2012; Miller, Wesley II & Williams, 2012; Pache & Chowdhury, 2012; Smith & Woodworth, 2012) Still needs to be done to study social entrepreneurship education that is well-organized and calls for both deeper theoretical analysis and practical development.

3. HISTORY OF SOCIAL ENTREPRENEURSHIP IN INDIA

Social entrepreneurship in India has a rich and diverse history, marked by innovative approaches to addressing societal challenges while creating sustainable and impactful ventures. The roots of social entrepreneurship in India can be traced back to its ancient history, where principles of compassion and philanthropy were deeply ingrained in society. However, it was

during the 20th century, particularly post-independence, that social entrepreneurship gained momentum and evolved into a recognizable movement. Here are some key milestones in the history of social entrepreneurship in India:

1. **Pre-independence Era:** India has a long tradition of philanthropy and community service, with notable figures like Mahatma Gandhi, Rabindranath Tagore, and Jamsetji Tata advocating for social welfare and uplifting the marginalized. Their contributions laid the groundwork for social entrepreneurship in the country.
2. **The Founding of SEWA (Self-Employed Women's Association) - 1972:** SEWA was founded by Ela Bhatt in Gujarat, with the aim of empowering women in the informal sector by providing them with financial and social support. It became a pioneering example of grassroots-level social entrepreneurship, focusing on women's economic independence.
3. **Araku Coffee Initiative - 1985:** The Araku Coffee initiative was launched by the Naandi Foundation in the tribal region of Araku Valley, Andhra Pradesh. It aimed to uplift tribal farmers by training them in organic coffee cultivation and establishing a sustainable supply chain. This initiative became a successful model of social entrepreneurship in the agricultural sector.
4. **Drishtee - 2000:** Drishtee, founded by Satyan Mishra, aimed to provide access to technology and essential services to rural communities. It established a network of information kiosks in rural areas, enabling access to education, healthcare, and government services.
5. **SKS Microfinance - 1997:** Started by Vikram Akula, SKS Microfinance transformed the microfinance landscape in India. It provided financial services to women in rural areas, giving them access to credit and empowering them to start their own businesses.
6. **The Rise of Social Incubators and Impact Investors:** Over the years, India has witnessed the growth of social incubators and impact investors who provide mentoring, funding, and support to social entrepreneurs. Organizations like Villgro, Acumen, and Ashoka have played significant roles in nurturing social enterprises.
7. **Introduction of CSR (Corporate Social Responsibility) Law - 2014:** The Indian government mandated that companies meeting certain criteria must allocate a percentage of their profits towards CSR activities. This move encouraged corporations to engage in social entrepreneurship and invest in community development projects.
8. **Government Initiatives:** The Indian government has also launched various initiatives to promote social entrepreneurship, such as the National Rural Livelihoods Mission (NRLM) and the Startup India program. These initiatives provide support, funding, and recognition to social entrepreneurs across the country.
9. **COVID-19 Response:** During the COVID-19 pandemic, social entrepreneurs in India played a crucial role in providing relief and support to vulnerable communities. Many innovative solutions emerged to address the challenges posed by the pandemic, including healthcare, education, and livelihood support.

4. OBJECTIVES OF THE STUDY

1. To understand the working of social entrepreneurship in India
2. To examine the scope of social entrepreneurs

5. CLASSIFICATION OF SOCIAL ENTREPRENEURSHIP

1. Community Social Entrepreneur: People who work to make small-scale changes are community social entrepreneurs. They help with everything from cleanliness and sanitation to

job placement and food distribution, as well as plantation safety and giving jobs to people who need them. These kinds of social entrepreneurs are the ones who make changes right away and want to do more.

2. A Non-Profit Social Entrepreneur: believes that gains should be put back into the business. So, they put their gains into the cause along with the money they spent at first. For example, if the original project was to teach kids from poor families and they got more money than they needed to do that, they would use the extra money to educate women and grow their portfolio. This type of social entrepreneurship is liked by people who think like business owners.

3. Transformational Social Entrepreneurs: Focus on making a business that can do something that neither government nor other businesses can do. Transformational social entrepreneurs see the bigger picture as a group of businesses that work together to help society as a whole and on their own. Some examples of social business that change things for the better are CRY (Child Rights and You) and Goonj.

4. Global Social Entrepreneur: Global social entrepreneurs think on a bigger size and focus on changes that need to happen on a global level. They cared more about helping people than making money. They usually work with groups in certain regions or countries that are working on similar issues.

6. GOVERNMENT SUPPORT

The Indian government has recognized the potential of social entrepreneurs to drive inclusive development, create jobs, and positively impact society. Here are some key aspects of the government's support for social entrepreneurship in India:

1. **Policy Framework:** The Indian government has developed a supportive policy framework to encourage social entrepreneurship. Various ministries and departments have introduced schemes and programs targeted at social entrepreneurs, such as the Ministry of Skill Development and Entrepreneurship, the Ministry of Rural Development, and the NITI Aayog (National Institution for Transforming India).
2. **Financial Support:** The government offers financial support through grants, subsidies, and financial assistance programs to eligible social enterprises. These financial incentives help early-stage social entrepreneurs to set up their ventures and implement innovative solutions to social problems.
3. **Incubators and Accelerators:** The government supports and funds incubators and accelerators specifically designed to nurture social entrepreneurship. These programs provide mentoring, networking opportunities, access to resources, and technical assistance to social entrepreneurs, helping them refine their ideas and scale their impact.
4. **Skill Development and Training:** Initiatives like the National Skill Development Mission and various skill development programs aim to equip aspiring social entrepreneurs with the necessary skills and knowledge to build sustainable and impactful ventures.
5. **Startup India:** The Startup India initiative launched by the government provides several benefits to startups, including social enterprises. These benefits include tax exemptions, self-certification compliance, and fast-tracking patent approvals, among others.
6. **Impact Investment Support:** The government encourages impact investment by offering tax benefits to investors who fund social enterprises. This has led to the growth of a supportive ecosystem for impact investors and social entrepreneurs alike.
7. **Social Innovation Fund:** The government has established the India Inclusive Innovation Fund (IIIF) to support social enterprises and innovative startups working on social

challenges. The fund invests in startups that have the potential to create a significant social impact.

8. **Research and Data Collection:** The government invests in research and data collection related to social entrepreneurship to better understand the sector's needs and challenges. This data-driven approach helps in designing more effective policies and support mechanisms.
9. **Public Procurement:** The government has also taken steps to promote social entrepreneurship through public procurement policies. It encourages public agencies and corporations to procure goods and services from social enterprises, helping them gain market access and sustainability.
10. **Collaborative Initiatives:** The government collaborates with international organizations, non-profits, and private sector entities to create an enabling ecosystem for social entrepreneurs. These collaborations often result in capacity-building programs, knowledge sharing, and innovative funding models.

7. NOTABLE SOCIAL ENTREPRENEURS IN INDIA

India has seen the rise of several successful social entrepreneurs, such as:

1. **Anshu Gupta:** Founder of Goonj, an NGO that addresses basic needs like clothing for the less privileged and marginalized communities.
2. **Arunachalam Muruganantham:** Known as the "Padman of India," he created affordable sanitary napkins for rural women and founded Jayashree Industries.
3. **Dr. Devi Shetty:** Founder of Narayana Health, a chain of hospitals that offers affordable healthcare to the poor.
4. **Meera Devi:** Founder of the Barefoot College, which empowers women in rural areas by providing them with skills and training.
5. **Ritu Jhingon:** Co-founder of Ola's Electric Mobility arm, Ola Electric, which focuses on electric mobility solutions to combat climate change.
6. **Mansukhbhai Prajapati:** Founder of Mitticool, a social enterprise that manufactures eco-friendly clay products for everyday use.

a. EXAMPLES OF SOCIAL ENTREPRENEURSHIP INITIATIVES IN INDIA:

1. **SELCO India:** SELCO India is a social enterprise that provides solar energy solutions to underserved communities in rural and urban areas. They have brought renewable energy access to thousands of households, schools, and healthcare centers, positively impacting lives and reducing carbon emissions.
2. **Araku Coffee:** Araku Coffee is a farmer-owned coffee brand that empowers tribal farmers in the Araku Valley region of Andhra Pradesh. By helping them grow premium-quality coffee and connecting them directly to consumers, this initiative has improved farmers' livelihoods and revived the region's economy.
3. **Goonj:** Goonj is a non-profit organization that addresses basic needs like clothing, sanitary products, and educational materials for marginalized communities. They have implemented a unique "Cloth for Work" initiative, where people contribute old clothes in exchange for community development projects.
4. **Rang De:** Rang De is a peer-to-peer lending platform that connects individuals who want to lend with low-income entrepreneurs in need of microcredit. By enabling affordable credit access, Rang De empowers small businesses and individuals to achieve financial stability.

5. **Pollinate Group**: Pollinate Group trains and empowers women entrepreneurs, called "Pollinators," to distribute life-improving products like solar lights, clean cookstoves, and sanitary products in urban slums. This model not only addresses access to essential goods but also creates economic opportunities for women.

8. CHALLENGES

Social entrepreneurship in India faces several challenges that hinder its growth and impact. These challenges stem from various economic, social, and regulatory factors. Here are some of the key challenges:

1. **Limited Access to Funding:** Access to capital, especially at affordable rates, remains a significant challenge for many social entrepreneurs.
2. **Lack of Awareness and Understanding:** Many people in India are still unaware of the concept of social entrepreneurship and its potential benefits. Creating awareness and promoting understanding among stakeholders are crucial to foster support for social entrepreneurs.
3. **Bureaucratic Hurdles and Regulatory Complexities:** Social enterprises must navigate complex bureaucratic processes and regulatory frameworks, which can be time-consuming and financially draining. Simplified and supportive regulations would encourage more entrepreneurs to venture into the social sector.
4. **Scalability and Sustainability:** While some social enterprises may achieve success at a local level, scaling their impact nationally or internationally can be challenging. Achieving sustainability is also a concern for many, as they depend on external funding and may struggle to create revenue streams.
5. **Infrastructure and Connectivity:** In certain regions of India, especially rural areas, inadequate infrastructure, and connectivity can hamper social entrepreneurship efforts. Lack of reliable electricity, internet access, and transportation can limit the reach and efficiency of social ventures.
6. **Mindset and Cultural Factors:** India's society is diverse, and traditional cultural norms can sometimes hinder the acceptance of innovative solutions or social initiatives. Breaking through entrenched mindsets and practices requires patience and persistent efforts.

9. FUTURE PROSPECTS

1. **Growing Awareness and Support:** Social entrepreneurship has gained increased recognition in India due to its potential to address social and environmental challenges. As awareness continues to grow, more individuals, corporates, and government entities are likely to support and invest in social entrepreneurs and their ventures.
2. **Government Initiatives:** The Indian government has been actively promoting social entrepreneurship through various policies and programs. This trend is expected to continue, with additional funding opportunities, tax incentives, and regulatory support to create a conducive ecosystem for social enterprises.
3. **Technology and Innovation:** India's tech-savvy and rapidly digitizing landscape offer significant opportunities for social entrepreneurs. Technological innovations like artificial intelligence, blockchain, and the Internet of Things can be leveraged to scale social impact, improve efficiency, and reach underserved communities.
4. **Sustainable Development Goals (SDGs):** India is committed to achieving the United Nations' Sustainable Development Goals. Social entrepreneurship aligns well with these

objectives, providing opportunities for entrepreneurs to contribute to essential areas such as healthcare, education, poverty alleviation, and environmental conservation.

5. **Urbanization and Rural Development:** India's ongoing urbanization presents challenges and opportunities for social entrepreneurs. Addressing urban issues like waste management, clean energy, and affordable housing, as well as focusing on rural development and livelihood enhancement, can drive significant impact.
6. **Impact Investment:** The emergence of impact investors, who seek both financial returns and measurable social or environmental impact, is likely to boost social entrepreneurship in India. This influx of private capital can provide the necessary resources for scaling and sustaining social enterprises.
7. **Collaboration and Ecosystem Development:** Collaborative efforts between social entrepreneurs, NGOs, corporations, and the government can lead to more comprehensive and sustainable solutions. The development of a robust ecosystem that fosters knowledge sharing, mentorship, and networking can further propel the sector forward.
8. **Inclusive Finance:** Access to finance has been a significant challenge for many social entrepreneurs. However, innovative financial models, such as microfinance, crowdfunding, and impact investment funds, are expected to become more prevalent, enabling entrepreneurs to access the necessary capital.
9. **Women-led Social Entrepreneurship:** Women entrepreneurs are increasingly making significant contributions to the social entrepreneurship space in India. Encouraging and supporting more women to engage in this field can lead to more inclusive and diversified solutions to societal challenges.
10. **Global Recognition and Collaboration:** India's social entrepreneurs are gaining international recognition for their innovative approaches and impactful solutions. Cross-border collaborations and partnerships with international organizations can provide exposure and access to global markets and expertise.

10.CONCLUSION

Social entrepreneurship in India has emerged as a powerful force that seeks to address pressing social and environmental challenges while fostering economic development and social inclusion. The conclusion drawn from the growth and impact of social entrepreneurship in India is overwhelmingly positive and offers promising prospects for the future. Here are some key points that frame the conclusion of social entrepreneurship in India:

1. **Innovative Solutions:** Social entrepreneurs in India have shown remarkable creativity and innovation in developing solutions to address various social problems, such as poverty, healthcare, education, sanitation, and environmental sustainability. These initiatives have brought about tangible improvements in the lives of marginalized communities.
2. **Empowerment and Inclusivity:** Social entrepreneurship empowers marginalized and vulnerable sections of society by providing them with livelihood opportunities, access to education, and healthcare services. It has played a crucial role in promoting inclusivity and bridging the socio-economic gap.
3. **Job Creation:** Social enterprises have contributed significantly to job creation, particularly in rural areas where traditional employment opportunities are limited. By fostering sustainable livelihoods, social entrepreneurs have helped reduce unemployment and underemployment.

4. **Sustainable Development:** Social entrepreneurship in India aligns with the principles of sustainable development, promoting environmentally friendly practices and supporting communities' long-term well-being.
5. **Government Support:** Over time, the Indian government has recognized the importance of social entrepreneurship and has introduced various policies and initiatives to support and promote the sector. These include funding opportunities, capacity-building programs, and tax benefits.
6. **Technology and Digitalization**: The integration of technology and digitalization has played a pivotal role in scaling up the impact of social enterprises. It has enabled them to reach a broader audience, optimize operations, and gather data for evidence-based decision-making.
7. **Challenges and Opportunities:** While social entrepreneurship has made significant strides, it still faces challenges such as limited access to funding, bureaucratic hurdles, and scaling difficulties. However, these challenges also present opportunities for collaboration between social entrepreneurs, the government, and corporate entities to create a more enabling ecosystem.
8. **Youth Engagement:** Social entrepreneurship has captured the imagination of the youth in India. Many young individuals are actively involved in launching and leading social enterprises, fostering a culture of social innovation and responsibility.

In conclusion, social entrepreneurship in India has become a powerful agent of positive change, creating a substantial impact on society's most pressing problems. As the sector continues to grow, with increased support from both the public and private sectors, it has the potential to bring about transformative change and contribute significantly to India's sustainable development journey.

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8

EMPLOYEE RETENTION FOR SUSTAINABLE BUSINESS AND DEVELOPMENT: STRATEGIES AND BEST PRACTICES

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ABSTRACT
The retention of employees plays a vital role in facilitating sustainable business growth and overall development. This research paper explores the significance of employee retention and its impact on organizational success. The research paper explores various strategies and best practices for improving employee retention rates, highlighting the long-term advantages such as sustainability, enhanced productivity, and a competitive edge that organizations can achieve through effective retention initiatives. It highlights the obstacles and challenges faced by companies in retaining highly skilled personnel and presents strategies and exemplary practices that can be employed to augment retention rates. By cultivating a supportive work environment and implementing effective initiatives to retain employees, organizations can attain long-term sustainability, heightened productivity, and a competitive edge.

Keywords: sustainable growth, talented employees, work environment, retention initiatives.

1. INTRODUCTION
In today's competitive corporate environment, organizations faced many challenges in attracting, developing, and retaining talented employees. The retention of employees has become a key factor to ensure the sustainable growth and development of the company. When organizations effectively retain their employees, they can foster a loyal, skilled, and motivated workforce that increases productivity, customer satisfaction, and competitive advantage in the marketplace. Retaining employees refers to an organization's ability to retain its employees over a period. This includes various aspects like creating a positive work environment, offering competitive pay and benefits, providing growth opportunities, and promoting work-life balance. Retaining staff is essential not only for operational stability and continuity but also for long-term sustainability and success. The importance of employee retention lies in its multifaceted impact on organizational performance and development. High turnover can be detrimental to businesses, leading to increased recruitment costs, loss of valuable knowledge and expertise, lower employee morale, and potential disruption to workflow. On the other hand, organizations that give priority to employee retention can benefit from higher employee satisfaction, lower recruitment costs, better communication, and an improved organizational image.

2. OBJECTIVES
This study aims to find out the importance of employee retention in terms of sustainable operations and development. It aims to provide organizations with the knowledge, strategies, and best practices to effectively retain their employees and create an environment that fosters long-term growth and success. By identifying the challenges organizations face in retaining talented employees and analyzing successful employee engagements, this article aims to provide practical guidance to organizations seeking to increase their retention efforts.

1. Explore relationships between employee retention and sustainable business development.
2. Identify the challenges companies face in retaining talented employees.
3. Consider strategies and best practices to improve employee retention.

4. Provide recommendations for the organization to improve its maintenance efforts.

By addressing these goals, this research paper aims to contribute to a body of knowledge on employee retention and its role in sustainable business growth and development. The results and insights presented in this paper will help organizations develop effective retention strategies and implement practices that create an enabling and engaging work environment, which leads to improved personnel satisfaction, productivity, and overall organization success.

3. LITERATURE REVIEW

Turnover can adversely affect a company's performance and long-term sustainability. Studies (Smith et al., 2017; Johnson & Thompson, 2018) show that high turnover increases recruitment and training costs and wastes resources. Moreover, the constant influx of new hires can disrupt team dynamics, reduce overall productivity, and impact an organization's ability to meet its sustainability goals (Doe & Johnson, 2019)

Company culture plays an important role in employee retention. Studies (Brown & Jackson, 2016; Williams et al., 2018) show that organizations with positive cultures that prioritize employee well-being, inclusion, and purposeful work tend to have higher retention rates. When employees feel appreciated and connected to the organizational mission, they are more inclined to remain actively engaged (Smith & Martinez, 2020).

Employee retention contributes directly to achieving the Sustainable Development Goals. Retained employees invest more in an organization's social impact efforts, including B. Community Engagement and Responsible Business Practices (Johnson & White, 2019). Furthermore, long-term employment fosters a culture of innovation and adaptability (Garcia et al., 2021), which enables sustainable companies to respond effectively to environmental and social challenges.

Several strategies and best practices have been identified to improve employee retention in sustainable companies. These include providing competitive salaries and benefits packages (Davis & Lee, 2017), providing opportunities for career growth as well as skills development (Brown & Wilson, 2018), and flexible working arrangements that support work-life balance including the introduction of work arrangements (Gomez & Johnson, 2019). Promote employee engagement through regular feedback and assessments (Smith et al., 2021). Sustainable companies also value diversity and inclusion to create a positive work environment (Johnson & Adams, 2022).

Despite the importance of employee retention, sustainable companies face talent retention challenges, including increased competition in the labor market and generational differences in job expectations (Williams & Garcia, 2023). Going forward, new technology and remote work trends are expected to impact employee retention rates in sustainable organizations (Doe & White, 2023). To meet these challenges and capitalize on opportunities, organizations must continuously adapt their retention strategies as employee dynamics evolve.

4. RESEARCH METHODOLOGY

Collection of Data:

Data collecting may not involve empirical data because this is a conceptual research study. Instead, concentrate on acquiring theoretical data from the literature study and current ideas on the subject.

Identification of Strategies and Best Practises:

Organise and present a variety of strategies and best practices that organizations may use to increase employee retention for long-term, sustainable company success. These might include, among other things, efforts for work-life balance, recognition programs, and ethical conduct.

Build A Theoretical Framework:
Outlining the connections between organizational development, sustainable business practices, and staff retention. Describe how these components interact and contribute to the organization's overall performance. Create a thorough conceptual model that demonstrates how staff retention tactics and sustainable business practices may be combined for organizational growth based on the data analysis.

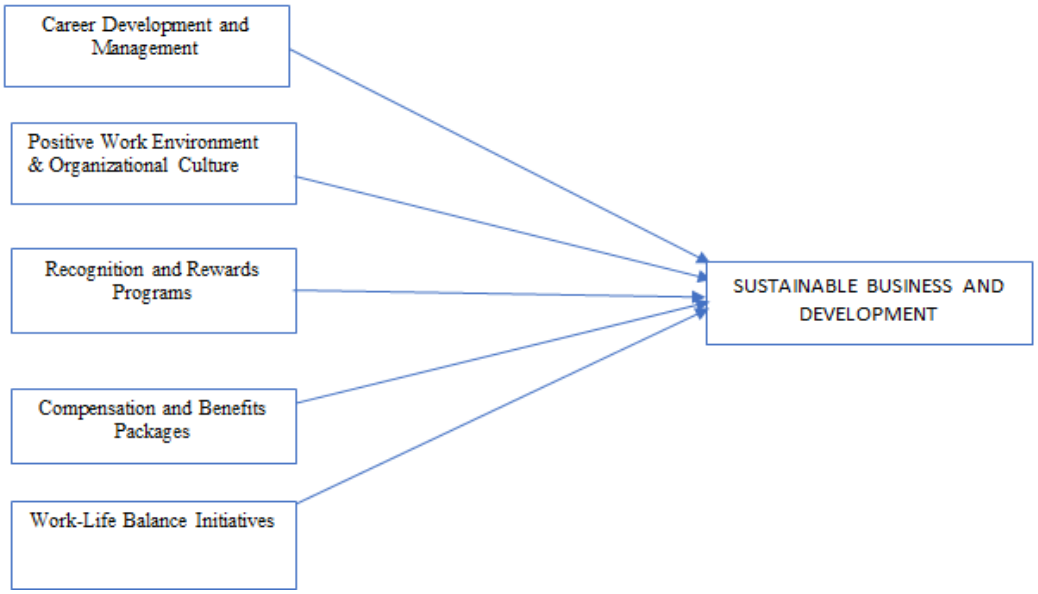

Figure: Conceptual model.

5. THE IMPORTANCE OF EMPLOYEE RETENTION IN SUSTAINABLE BUSINESS:

A. Influence of employee turnover on the organization's performance and sustainability

Employee turnover can significantly affect an organization's performance and sustainability.

High employee turnover can result in higher recruitment and training costs as well as loss of organizational knowledge and expertise.

Additionally, turnover rate can disrupt team dynamics, lead to low morale, and negatively impact the work environment.

By maintaining a skilled and motivated workforce, companies can maintain continuity, reduce waste, and improve overall performance.

B. Link between employee retention and organizational culture

Employees who feel connected with the organization are more likely to stay and contribute to the company's success.

Such a positive work environment reduces turnover and increases the company's ability to attract top talent.

On the other hand, a toxic or uncooperative corporate culture can lead to high turnover as employees seek healthier working conditions elsewhere.

C. Role of employee retention towards sustainable development goals

Sustainable Development Objectives (SDGs) set for the United Nations include a wide range of economic, social, and environmental goals. Long-term employee retention reinforces these commitments, as employees actively participate in social and environmental commitments.

Sustainable companies must adapt to changing market conditions and implement new practices to reduce their environmental impact.

Dedicated employees are more likely to contribute creative ideas and embrace sustainability-focused change. A sustainable company reduces overall resource consumption by retaining employees and promotes the responsible use of resources.

Employee retention is essential to ensure organizational stability and to ensure continued progress toward achieving long-term sustainable goals.

6. IDENTIFY THE ISSUES EMPLOYERS HAVE KEEPING SKILLED PEOPLE.

Employee retention is a major issue for businesses, particularly when it comes to retaining exceptional personnel. While each organization may face unique obstacles, some typical issues include:

- **Talent Competition:** In today's globalized market, exceptional people have several choices, making it difficult for businesses to compete for and keep top performance. To remain competitive, businesses must provide appealing salary packages and perks.
- Employees, particularly exceptional ones, desire chances for professional development and promotion. Employees may feel stagnate and seek chances elsewhere if a firm does not give clear professional growth pathways.
- **Lacking Work-Life Balance:** An imbalance between working and personal life can lead to employee burnout and discontent, causing them to seek employment that offers more flexibility.
- Employees frequently leave their employment due to problems with their direct superiors or bad leadership throughout the organization. Employee retention can be harmed by a lack of managerial support and recognition.
- **Ineffective Communication:** Maintaining a good work environment requires clear and open communication. Companies that fail to communicate effectively risk miscommunication and diminished employee engagement.
- Employees are more inclined to stay with a firm whose values and ideas are like their own. Employee discontent and greater turnover rates might result if the company's culture does not support their personal and professional objectives.
- **Employee Recognition Is Inadequate:** Recognising and recognizing employee efforts are critical for building morale and loyalty. Talented employees who are not properly recognized may feel devalued and seek validation elsewhere.
- **Inadequate Training and Development:** A lack of possibilities for skill development and ongoing learning can be disheartening for talented personnel looking to expand their knowledge and capacities.
- Employees who believe their thoughts and ideas are not recognized or considered may get disenchanted and eventually leave the organization.
- **Workplace Environment and Facilities:** Employee satisfaction may be influenced by the physical work environment. Companies that fail to provide a welcoming and friendly work environment may struggle to retain competent staff.

Sustainable development and employee retention are indeed interconnected, creating a positive feedback loop within organizations. Let's explore this relationship further:

Employee Satisfaction and Purpose: Sustainable development initiatives often align with social and environmental values, which can create a feeling of purpose among employees. When employees feel that their work contributes to meaningful and positive impacts on society and the environment, they are more likely to be happy with their jobs and feel a greater sense of commitment to the organization.

Positive Work Environment: Organizations that prioritize sustainable development tend to foster a positive work environment. Emphasizing ethical business practices, social responsibility, and environmentally friendly policies can improve workplace culture and employee morale. In turn, a positive working environment enhances contentment and retention.

Attracting and Retaining Top Talent: Companies known for their commitment to sustainable development can attract top talent, especially among younger generations who prioritize social and environmental concerns. As these talented individuals are drawn to the organization, the overall quality of the workforce improves, contributing to the retention of high-performing employees.

Employee Engagement and Innovation: Sustainable development initiatives often involve employee engagement in eco-friendly practices, community involvement, and socially responsible projects. Engaged employees are more likely to be innovative and contribute valuable ideas to the organization, leading to improved business outcomes. This, in turn, fosters a positive environment for employees and encourages them to stay with the company.

Long-Term Vision: Sustainable development is inherently focused on the long-term well-being of the organization, society, and the environment. Such a long-term perspective can influence HR policies and practices that prioritize employee well-being, growth, and development. When employees perceive the organization's commitment to their long-term success, they are more likely to remain loyal and committed in return.

Reducing Turnover Costs: Employee turnover may be expensive for organizations in terms of recruitment, training, and productivity losses. By implementing sustainable practices that improve employee retention, organizations can reduce these turnover costs, resulting in financial savings that can be reinvested in further employee development and well-being initiatives.

Employee Advocacy and Brand Ambassadors: Satisfied and engaged employees who believe in the company's sustainability efforts can become advocates for the organization. They may speak positively about their workplace, attracting more talent and customers, further enhancing the company's reputation and competitiveness.

In conclusion, sustainable development and employee retention create a cyclic phenomenon in which one aspect reinforces the other. Organizations that prioritize sustainable practices tend to create a more positive work environment, leading to increased employee satisfaction and engagement. In turn, engaged and satisfied employees are more likely to stay with the organization, contributing to its long-term success and commitment to sustainable development.

7. BEST PRACTICES AND STRATEGIES FOR EMPLOYEE RETENTION

- **Competitive Compensation and Benefits Packages**

Competitive pay and benefits are critical in attracting and maintaining skilled individuals (Gómez-Meja, Balkin, & Cardy, 2020). Offering a competitive salary and complete benefits packages, such as sickness insurance, retirement plans, and other incentives, can increase employee satisfaction and loyalty to the organization (Dreher & Dougherty, 2001).

- **Work-Life Balance Programs**

Flexible working arrangements, telecommuting possibilities, and paid vacation policies all contribute to employee well-being and retention (Allen, Johnson, Kiburz, & Shockley, 2013). Organizations express their commitment to workers' personal lives by supporting a good work-life balance, which leads to higher job satisfaction and reduced burnout (Greenhaus & Powell, 2006).

- **Career Development and Growth Opportunities**

Employee loyalty and engagement may be increased by providing clear career routes, training programs, and chances for skill development (Noe, Hollenbeck, Gerhart, & Wright, 2017). Employees are more likely to stay with a company that invests in their professional development and provides opportunities for progress (Taris & Feij, 2004).

- **Employee Recognition and Rewards Programs**

Employee engagement and commitment are increased when recognition and incentives programs recognise and recognize their efforts and successes (Lawler, 2003). Implementing these programs may help to foster a pleasant work environment that promotes productivity and job satisfaction (Eisenberger, 1999).

- **Creating a Positive Work Environment and Organizational Culture**

Employee retention requires a healthy work environment and organizational culture (Cameron & Quinn, 2006). Fostering a culture of trust, respect, and open communication can result in increased employee morale and lower turnover (Denison, 1990). Promoting a culture of work-life balance, diversity, and inclusion can also help with retention (Christensen, 2019).

8. CONCLUSION

Employee retention plays an important role in sustainable business and development. Successful organizations such as Google, Zappos, Marriott International, and Southwest Airlines have demonstrated the effectiveness of various strategies and efforts to achieve high customer retention rates. These companies value employee well-being, professional development, recognition, and positive work culture. To improve employee retention, companies should consider implementing strategies such as promoting a supportive work environment, providing growth opportunities and development, recognizing, and rewarding employee contributions, and promoting open communications and inclusion. By prioritizing employee retention, organizations can create a loyal, engaged, and skilled workforce that drives long-term sustainability and success. Recommendations for companies to improve employee retention include conducting regular employee satisfaction surveys, analyzing employee turnover trends, implementing mentoring and coaching programs, competitive compensation and This includes providing benefits and promoting work-life balance. Organizations need to tailor their retention strategies to their unique corporate culture, industry, and employee demographics.

9. LIMITATIONS OF THE STUDY

- This research study is conceptual in nature, which means that it relies heavily on theoretical data from the literature review rather than empirical data from real-world observations. This limits the ability to provide concrete and specific insights into the actual effectiveness of the strategies and best practices proposed.
- As mentioned, the study does not involve the collection and analysis of empirical data, such as surveys, interviews, or observations. This absence of primary data limits the depth of analysis and the ability to draw direct correlations between strategies and actual employee retention outcomes.
- The research may not take into account the diverse range of industries, organizational sizes, and cultural contexts. Strategies and best practices that work well in one type of organization

or industry might not be directly applicable to another, which limits the generalizability of the findings.

- The research paper might be limited by time constraints, especially if it is based on existing literature available up to a certain date. This might exclude recent developments or trends that could influence employee retention strategies and practices.

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9

THE FUTURE OF DIGITAL ECONOMY: CBDC AND ITS IMPLICATIONS

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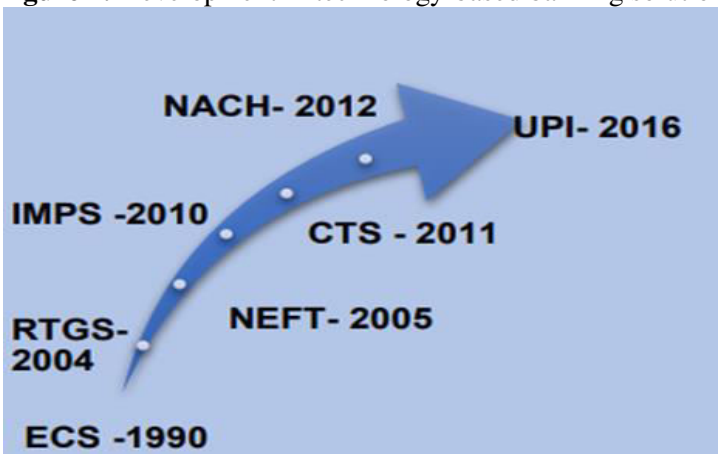
ABSTRACT
The technical advancement and rise of private digital currencies had stimulated the central authority reserve banks of many countries to envisage to issue their own Central Bank Digital Currency (CBDC). The Bank for International Settlements initiative has been running the pilot programs to deploy central bank digital money. The Reserve Bank of India (RBI), following the trend, has also disclosed similar plans, with an Indian CBDC anticipated soon. In this study, a conceptual framework that demonstrates how CBDC issuance and access might be governed is developed. This article explains how CBDCs fit within the diverse range of digital currencies and payments, evaluates their potential advantages and disadvantages, and examines design considerations from the viewpoint of India. While CBDCs may improve payment efficiency and financial inclusion, they also pose dangers to data security, financial intermediation, financial integrity, and currency replacement due to poor design and implementation. In the article theoretical CBDC concepts are addressed. We examine the strengths, weaknesses, opportunities and threats of introducing CBDC with the standpoint of India. The paper further discusses the monetary, financial, privacy and legal implications of the CBDC in the context of digitalization occurring in India.

Keywords: Central bank digital currency, digital payments, financial inclusion, policy implications, data security

1. INTRODUCTION
Payment methods are developing swiftly with new technologies. As a result of the digitalization and simplicity of other aspects of life, users increasingly anticipate faster, simpler payments (Bech et al., 2017). Systems that allow for extremely rapid retail payments between people are becoming more and more common. Over the last few decades the RBI in India has made conscientious efforts in the field of payment and settlement systems. The innovation and advancement in technology has evolved a plethora of payment choices, all to the benefit of the average citizen. The Reserve Bank of India has made several attempts to implement technologically based banking system solutions from the middle of the 1980s. (Figure 1)

Figure 1: Development in technology-based banking solution



India’s consistent technological and innovation advancement has changed the payments landscape. India's adoption of specific payment and settlement system legislation has allowed the country's payment ecosystem to grow in a controlled manner. Modern, cutting-edge payment options that are available 24/7, affordable, practical, efficient, and safe are a source of national pride. The change in payment preferences can be attributed to the emergence of dependable round the clock electronic payment systems like RTGS and NEFT, which have made nearly real-time seamless fund transfers possible. Other pivotal events that altered the country's payments ecosystem and attracted international attention include the introduction of mobile-based payment systems like Bharat Bill Payment System (BBPS), Immediate Payment Service (IMPS) and Unified Payments Interface (UPI) for instant payment settlement and the introduction of the National Electronic Toll Collection (NETC) to enable electronic toll payments. These payment options provided customers with an alternative to utilizing cash and paper, and the practicality ensured their rapid uptake. The emphasis on development of Fintech and emergence of several non-bank Fintech firms has sped up the expansion of digital payments in the country. These developments have fostered the government's public policy goal of building and promoting a payment system that is efficient, dependable, secure, and interoperable.

In recent years, private crypto currencies have swiftly become extremely popular, challenging the fundamental concept of money as we currently understand it. They are neither commodities nor claims on commodities because they lack an inherent value. Crypto currencies were built from the ground up to escape the established, regulated intermediation and control mechanisms. Contrarily these mechanisms are critical to safeguarding the integrity and stability of the monetary and financial ecosystem. The constantly changing landscape of digital payments and mounting banknote bills is compelling authorities to digitize and consider the introduction of fiat digital currency.

In October 2020 the Reserve Bank established a Working Group (WG) to do research on the best execution and design architecture for CBDC implementation in India. This was accomplished in appreciation of the development of CBDC on a global scale. A number of central banks—over 60 in total—have expressed interest in CBDC, and several have even launched experimental programs in the retail and wholesale sectors. More others are also creating, experimenting with, or introducing their own CBDC frameworks. 95% of the world's Gross Domestic Product (GDP) or 105 countries were actively looking into CBDC.

The RBI has taken its time considering the benefits and drawbacks of CBDC adoption, just like other central banks have. A number of benefits are predicted with the introduction of CBDC in India, including a reduction in the demand for cash, lower overall currency management costs, and reduced settlement risk. A few of the risks that CBDC might pose include a threat to monetary policy, the structure of the financial markets, lending availability and cost, and financial stability. They must be carefully compared against the potential benefits.

In the Union Budget delivered to Parliament on February 1, 2022, the finance minister proposed the launch of the Digital Rupee, a Central Bank Digital Currency (CBDC). According to the budget statement, the establishment of CBDC in the ensuing financial year will significantly promote the digital economy. The budget also listed the broad objectives that would be accomplished by putting CBDC into use as a "more effective and affordable currency management system" that makes use of block chain and other technology.

Currency management is one of the Reserve Bank's fundamental central banking duties, for which it has statutory authority under Section 22 of the RBI Act of 1934. The central bank in partnership with the central government ensures the design, printing and adequate supply of physical currency throughout the economy. The Reserve Bank of India Act, 1934 was revised in

accordance with a gazette notification dated March 30, 2022, allowing the pilot program and further CBDC issues.

1.1CBDC – Conceptual Framework

What is CBDC?

According to 2018 research by the CPMI-MC, digital currency is digitally issued by a central bank and is therefore a legal tender. It performs the same duties as a sovereign currency and is interchangeable 1:1 with fiat money. However other features of CBDC make it distinct from physical currency. Despite the fact that money in digital form is the norm in India, for instance in bank accounts recorded as book entries on commercial bank ledgers, a CBDC would differ from existing digital currency that is available to the general public in that it would be a liability of the Reserve Bank rather than a commercial bank. CBDCs, as an electronic version of sovereign currency, should have all of the properties of real cash. The functions of a CBDC define its design and the design has profound influence on the payment systems. It also bears reflection on the structure and stability of the monetary policies and the entire financial system. One critical consideration is that CBDC design elements be as unobtrusive as possible. The key design decisions for issuing CBDCs are (i) token-based or account-based CBDCs, (ii) Direct, Indirect, or Hybrid models for issuing and managing CBDCs, (iii) the type of CBDC to be issued (Wholesale CBDC and/or Retail CBDC), (iv) the instrument of choice design (Remunerated or Non-remunerated), and (v) the level of anonymity.

1.2 **Features of CBDC**

The following are some of CBDC's characteristics:

- It is issued as a sovereign currency in agreement with the monetary and fiscal policies
- It is a direct liability of the Central Bank as issued and maintained by it.
- It requires it to be acknowledged by everyone, including individuals, companies, and governmental organizations, as a reliable medium of exchange and a safe place to store value.
- Readily convertible into both cash and fiat currencies of commercial banks

It is anticipated that holders of fungible legal tender who are not required to keep a bank account will lower the cost of creating currency and performing transactions.

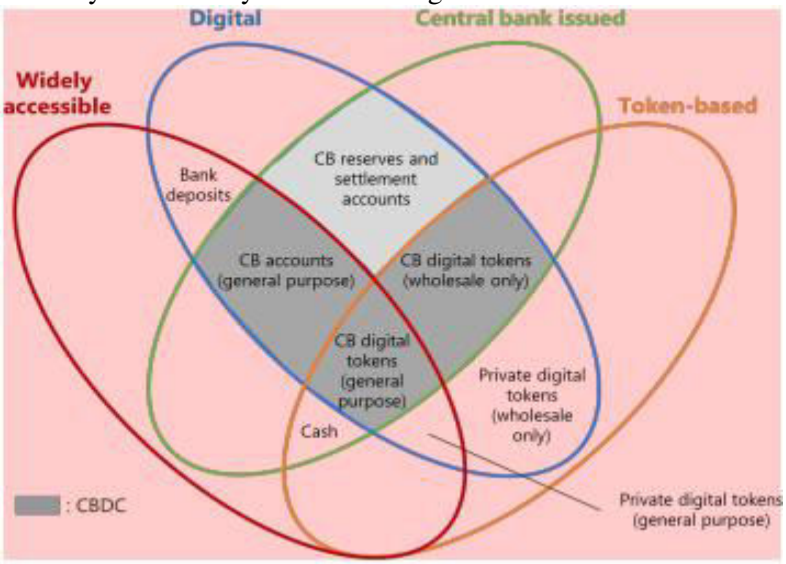
2. LITERATURE REVIEW

According to Kumhof and Noone (2018), CBDC, an electronic form of money , will be managed by the central banks of the country to facilitate payments of people and organizations . F. Panetta (2018) discusses the adoption of CBDC considering extended opportunity to the Government as a digital cash which may have to be managed to maintain the monetary and financial stability. Past research has examined the potential for wholesale CBDCs to increase market liquidity and function as a form of payment. Barker, J., Dyson, B., and Clayton, E. (2018) highlighted that retail CBDC would be adopted by a central bank with the goal of assisting people and businesses with their payment needs. The decision must be taken whether the CBDC will extend beyond the realms of traditional payment of the existing banking system. According to Auer and R. Bohme (2020) a CBDC would be valued in native country's currency and would have similar worth as any denomination, say 10, 20 or 50 of banknotes or coins. Though the similarity feature of digital cash note with physical cash notes will greatly depend on the final design.

Bech and Garratt (2017) provided a taxonomy of money in a flower diagram for analysis. They broadly classified money into four different categories based on following parameters : (i) Whether issued by central bank or not; (ii) whether in physical form or virtual form ; (iii)

whether the reach and accessibility is universal or kept restricted; and (iv) whether the technology used keep it peer-to-peer tokens, or account based. It sets apart general purpose and wholesale as the two main CBDC categories.

Figure 2: Analysis of Money as Flower Diagram Source: Bech and Garratt , 2017



3. SWOT ANALYSIS:

Figure: 3 SWOT Analysis of CBDC.

Strengths	**Weakness**
• Helps in buying things electronically	• Issues related to online security and customer privacy
• Can reduce cyber risks by offering transactions through a decentralized ledger	• Regulations by Central Authority
• Transparent financial transactions	• Lack of understanding on usage of currency
• Reduction in the cost of printing and designing new physical currency	• Access to ICT infrastructure
• Auditability	• Financial errors
• Increases financial inclusion	
• Cost effective due to removal of third parties and intermediaries from financial transactions	
• Provides control to the Government	
• Due to traceability will prevent Money Laundering	
Opportunities	**Threats**
• Supported by fintech companies	• Disruption of existing models and system
• Increase in cross border capital flows	• Lack of IT infrastructure to support the technology involved
• Creates new industry opportunities by disrupting the existing technology and processes	• Counter party risk in the transaction process
• Improve flexibility of domestic and international transactions	• Role of banks and financial institutions become redundant
• Will strengthen import and export	• Stringent implementation of cyber

	laws
• Control by Central Bank will imply strong guarantee to all financial institutions and customers	• Act as surveillance mechanism
• Tax benefits and tax compliance regulations	• Support illicit transactions and activities
	• Deliver more power to designers and developers of decentralized ledgers

Motivations for Issuance of CBDCs

Several nations have defended the implementation of CBDC for the grounds listed below:

A. Reduction in the cost of handling actual currency

CBDC increases the overall value of the money-issuing function in so far as it reduces operating costs like those related to creating, storing, transporting, and replacing banknotes as well as costs associated with delays in reconciliation and settlement. Although initial fixed infrastructure expenditures for a CBDC creation or issuance may be substantial, ongoing marginal operating costs must be relatively low.

B. To promote digitization in order to move away from an economy centered on cash.

Since they are a sovereign currency, CBDCs have some advantages over conventional digital payment methods. The financial system's settlement risk is reduced as a result. Furthermore, CBDCs might make it less expensive and more seamless to integrate cross-border payments in real-time. Any uncertain situation, like the one brought on by the COVID-19 epidemic, can make CBDC a preferred way to hold central bank funds as opposed to cash.

The Reserve Bank of India has measured the depth and acceptance of digital payments in India and released the Digital Payment Index (RBI-DPI). The index in Table 1 demonstrates the accelerated growth of digital payments since their inception.

Table 1: Promoting payments competitiveness, efficiency, and innovation

Period	RBI-DPI Index
March 2018 (Base)	100
March(2019)	153.47
September (2019)	173.47
March (2020)	207.84
September (2020)	217.74
March (2021)	270.59
September (2021)	304.06
March (2022)	349.3

Source: RBI – Digital Payment Index

CBDC might enhance payment resilience even more and can merit worthy payment services outside the existing commercial banking structure. It could increase the number of accessible options and introduce a new payment mechanism, particularly for e-commerce. CBDC will boost the options available when it is adopted, as has been the case with many payment systems, and robust competition will help to reduce costs and turnaround times.

(D) To look into how CBDC might improve cross-border transactions.

Cross-border payments are a field that is extremely adaptable and could benefit from new technologies. India was the world's top recipient in 2021, receiving $87 billion in remittances, according to the World Bank. The greatest contributor overall, the United States, provided nearly 20% of these contributions. The price of sending remittances to India subsequently

assumes crucial significance given the huge Indian diaspora distributed throughout the world and the potential (mis)use of informal / criminal routes.

(E) Increasing financial inclusion

To meet the general public's various transaction needs, the CBDC may provide a safe sovereign digital currency. The populace that are under-banked and unbanked will have more access to financial services as a result. CBDCs will be able to be transacted without the use of the internet by offering offline capabilities as an alternative, enabling access in locations with sluggish or nonexistent internet connectivity. The unbanked will also leave digital footprints in the financial system, making it easier for them to receive loans.

A CBDC's universal access capabilities, such as offline functionality, the availability of universal access devices, and compatibility across various platforms, will prove to be a game changer for reasons of resilience, reach, and financial inclusion.

(F) Prevent the growth of crypto currencies by preserving public faith in the national currency.

The rise of crypto currency assets poses significant risks for the financing of terrorism and money laundering. The prolonged use of crypto assets also puts the objectives of monetary policy at risk by propelling the emergence of a parallel economy, which would probably challenge the transmission of monetary policy and jeopardize the stability of the domestic currency. It will also have a detrimental effect on how foreign exchange controls are IMPLEMENTED, PARTICULARLY IN TERMS OF HOW SIMPLE IT IS TO GET AROUND RESTRICTIONS ON CAPITAL FLOW.

4. TYPES OF CBDC

CBDCs can be broadly divided into two sorts based on the uses and functions they perform as well as differing degrees of accessibility.

Use of CBDC-R is open to all non-financial customers and companies in the private sector. Conversely, wholesale CBDCs are designed for financial organizations with restricted access. As seen in Project Jasper (Canada) and Ubin (Singapore), CBDC-W may be used to increase the efficiency of securities settlement or interbank payments. It is expected that in order to address the issue of financial inclusion, central banks will consider issuing CBDC-R.

Additionally, by enhancing the security and effectiveness of the settlement systems for the Institutional financial markets the wholesale CBDC can be utilized to lower costs of operation for Government securities, Stock Markets, and Interbank transfers. The liquidity management will be strengthened. The demand for settlement assurances and collateral requirements will weaken, reducing the infrastructure cost.

CBDC can be set up as an Account-based, Token-based, or hybrid structure.

As a digital currency that could be electronically transferred from one holder to another. It involved a specific kind of digital token that the central bank issued and served as a representation of a claim against it. The digital token serves as a bearer instrument which implies that the owner entitlement is whoever "holds" the token at any given moment.

Transactions in token based CBDC may just require the ability to authenticate the token (to avoid counterfeits, much like with paper money), not the account holder's identity.

With an account based CBDC, it would be necessary to maintain track of all transactions and balances made by CBDC holders as well as determine who is in possession of the available funds. Transactions in an account-based system should warrant a system to establish amount balance sufficiency and authenticity of the payer. It would also stipulate transferring CBDC balances across accounts.

CBDC-R is primarily intended for use by the general public and shares properties with real money, such as anonymity, a distinctive serial number, etc.

A token-based system would be based on identifying through digital signature. The system guarantees widespread access and offers good privacy by default.

CBDC in account-based nature aims to enable speedy transactions, quick settlement and has a recognized and distinguished legal position.

A token based CBDC may be created with a predetermined denomination or with a minimum value equal to the cost of present-day actual money. It is believed that the CBDC will be more widely accepted and used as a result of its similarities to present currency.

Resources needed for granting CBDC, planning for company continuity, consumer protection, and resolving complaints in dealing with various risk components are some additional factors to take into account. The CBDC problem includes privacy danger, technological and security risk, and accountability problem. Before granting CBDC, RBI takes into account all of the aforementioned factors.

In the beginning, RBI will need to choose the technology or infrastructure that will be used, as well as the design and architecture of a "digital rupee". The following primary dimensions will need to be taken into account when designing:

- Whether the digital rupee would be issued for retail or wholesale transactions, or whether it will be a CBDC that serves both functions.
- Whether the digital rupee system will use a direct approach, in which the RBI will handle every step of the transactional process, from issuance through administration and settlement. Or, whether the direct model's drawbacks (such as expanded central bank mandates and powers and disintermediation of the banking industry) will be addressed by maintaining the current two-tier architecture of the monetary and payments system.
- The digital rupee's account- or token-based structure, as each will likely have different technological and ethical implications.

Furthermore, constructing CBDCs to complement rather than replace the existing and anticipated future payment infrastructure will lead to relatively quicker success for the digital rupee. CBDCs may be useful in several ways, including possibly reducing the digital divide, if the designs are successful.

5. CBDC AND ITS POLICY IMPLICATIONS

Monetary Policy Implications:
The effect of CBDC implementation on monetary policy is one of the main causes for worry. Due to their greater direct control over the money supply and capacity to enact negative interest rates, CBDCs have the potential to alter how central banks conduct monetary policy. A CBDC may improve the efficacy of monetary policy by giving more precise information on the movement of money in the economy, claim Kumhof et al. (2020). However, there is a chance that CBDCs could destabilize monetary policy by opening new paths for shocks to spread, including bank runs.

Influence on Financial Stability:
The influence of the CBDC on financial stability is another crucial factor to take into account while implementing the law. By lowering the possibility of bank runs and offering a safer and more secure method of payment, CBDCs may be able to improve financial stability. However, they can also bring about other threats to the stability of the financial system, like an upsurge in cyber-attacks and systemic risks brought on by the concentration of deposits in central banks. A

CBDC, in accordance with Yermack (2019), may also result in banks being disintermediated, diminishing their function as financial system intermediates, and possibly introducing new dangers.

Impact on Payment Systems:
CBDCs may also significantly affect payment systems. CBDCs may provide quicker, more affordable, and secure payment options, which would lessen the need for cash and conventional payment methods. Individuals who are currently underbanked or without access to financial services may be able to do so with the help of CBDCs. The use of CBDCs, however, could also result in the exclusion of those people who do not have access to digital technology, expanding the digital divide.

Impact on Privacy:
The privacy implications of CBDC deployment are another crucial factor. Due to their potential for being more anonymously constructed, CBDCs may be able to provide better privacy than conventional payment systems. However, because central banks would have access to comprehensive data on people's financial transactions, they might also raise fresh privacy issues. The design of CBDCs will be crucial in ensuring that they strike the proper balance between privacy and transparency, according to Bohme et al. (2020).

Legal Implications:
Current legislation including the Foreign Exchange Management Act (FEMA), the Payment and Settlement Systems Act, and the Income Tax Act may be significantly affected by the CBDC's implementation in India. Singh and Agarwal (2021) claim that whether CBDC is categorized as a currency or a financial instrument would determine its legal position in India. CBDC would fall under the control of the RBI and be governed by the FEMA if it were to be classified as a currency. CBDC would be subject to regulation by the Securities and Exchange Board of India (SEBI) if it were designated as a financial instrument.

Potential Obstacles:
The adoption of CBDC in India may encounter a number of obstacles, including worries about privacy, the danger of cyberattacks, and possible effects on the banking industry. Jain (2021) asserts that a strong legislative framework would be necessary for India to implement CBDC in order to guarantee the security and privacy of user data. Banks' position as financial system intermediaries may be diminished as a result of CBDC, thereby introducing new risks.

6. CONCLUSION

Finally, the adoption of CBDCs may have major effects on a number of economic factors, such as monetary policy, financial stability, payment systems, and privacy. CBDCs may be able to provide a number of advantages, such as more efficient monetary policy, quicker and less expensive payment methods, and more financial inclusion. However, the introduction of CBDCs might also bring forth other dangers and difficulties, like an uptick in cyber-attacks, systemic hazards, and privacy issues. To guarantee that CBDCs provide the greatest benefit while posing the fewest hazards, substantial thought should be paid to their design and execution.

The RBI's thorough examination of the technical, legal, and practical challenges is a positive step toward the introduction of CBDC in India. This institutional transformation in India has a long road ahead of us, and we must make sure that it advances rather than stalls our development.

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10

SUSTAINABLE MARKETING AND CONSUMER BEHAVIOR

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ABSTRACT
Sustainable marketing and consumer behavior are crucial elements in building a more environmentally and socially conscious society. Sustainable marketing involves promoting those products and services that have a positive effect on the environment and society while meeting consumers' needs. Consumer behavior, on the other hand, plays a vital role in influencing the demand for sustainable goods and services and driving businesses to adopt eco-friendly practices. This chapter explores the interaction between sustainable marketing and consumer behavior, aiming to shed light on how these two forces interact and contribute to a more sustainable future. This chapter explains multiple factors which influence consumers behavior with respect to sustainable marketing and highlights the marketing strategies which drive consumer behavior.

Further this chapter identifies key drivers that influence individuals to support sustainable choices. These drivers include product innovation and eco-design, green messaging and transparency, social responsibility, and cause marketing, educating consumers and promoting behavior change, sustainable packaging, price incentive and loyalty program change. The impact of green certifications and product labeling on consumers perceptions and decision-making is also discussed.

At last, this chapter advocates for a synergistic relationship between sustainable marketing and consumer behavior to foster a greener world. After understanding the motivations and barriers that shape consumer choices, businesses can customize their marketing efforts to encourage sustainable consumption patterns and drive positive environmental and social impacts. Ultimately, collaboration between businesses and consumers can play a vital role in attaining a more sustainable and responsible global ecosystem.

Keywords: Sustainable marketing, Consumer behavior, Societal Marketing, Green messaging, Corporate social responsibility, Renewable energy solution.

1. INTRODUCTION
Sustainable marketing and consumer behavior are two interconnected pillars that have reshaped the landscape of business and consumption. In an era of heightened environmental awareness and social consciousness, sustainable marketing has emerged as a strategic approach that not only drives business success but also addresses pressing global challenges. This approach involves crafting and promoting products and services that prioritize ecological and societal well-being. Understanding and influencing consumer behavior towards more sustainable choices is a pivotal factor in fostering positive societal change and creating a harmonious balance between economic growth and environmental stewardship. This symbiotic relationship between sustainable marketing and consumer behavior forms the cornerstone of a more responsible and equitable commercial landscape.

2. LITERATURE REVIEW
Charter et.al (2006) Argued that enterprises must be ready to operate for a longer time and re-consider environmental and social implications for their marketing approaches. Additional attributes that people assess when buying an item include advantages of product, their price, impact of their relatives and friends, efficiency of product and prestige all of them were

associated with sustainability (Emergy, 2012). Masocha (2018) Said that in an attempt to improve sustainability consumption marketers must consider the buying decision of customers. Moravcikova et. al (2017) Indicated that consumer knowledge toward sustainability issues and sustainability marketing activities were related to sustainable action. Beckea (2004) Believed that while consumers might be familiar with sustainable products, their purchasing decisions were influenced by factors such as price of product, impact of their relatives and friends, efficiency of product.

3. OBJECTIVES

1. To study Sustainable Marketing Strategies which drive consumer Behavior
2. To explore the interaction between sustainable marketing and consumer behavior.

4. RESEARCH METHODOLOGY

Research Design: In this chapter descriptive research design is used and it is based on secondary data. Information gathered through various research papers and websites. The reviewed paper aims to provide a well-rounded evidence-based exploration of sustainable marketing and consumer behavior.

Objective: To explore the interaction between sustainable marketing and consumer behavior.

5. Sustainable Marketing

Sustainable marketing is a combination of two words: Sustainable and Marketing

Sustainable means involving the use of natural products and energy in a way that does not harm the environment.

Marketing involves those activities which a company performs to promote buying and selling of their product and services.

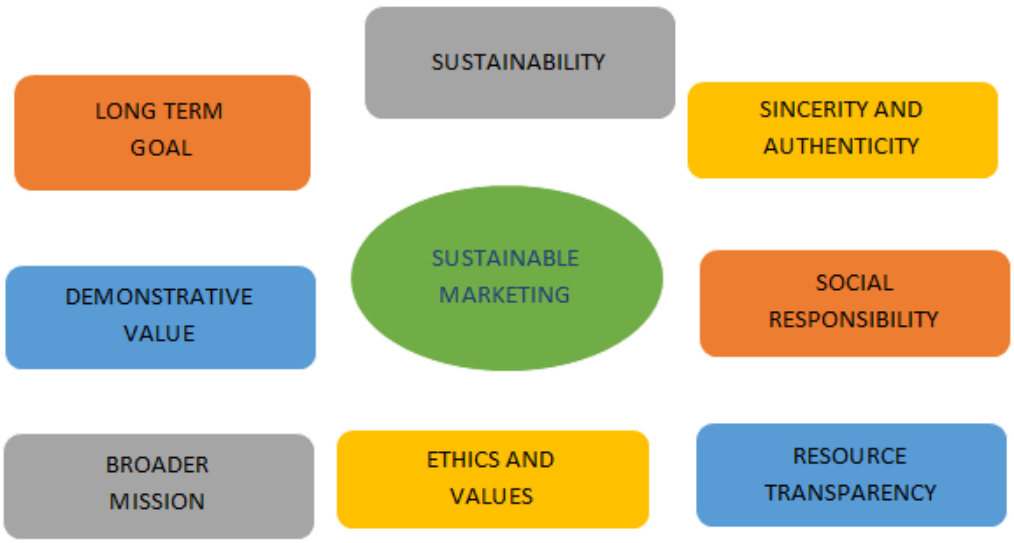


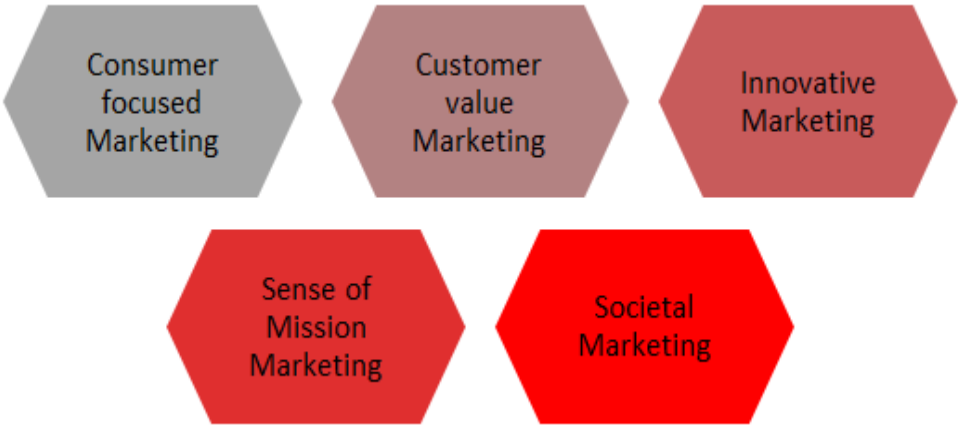
Figure 1: source(https://controlhippo.com/blog/sustianable-marketing)

Sustainable marketing means use and promotion of socially responsible product, brand value to the environment or to the society. Businesses implement Sustainable marketing as a long term concept instead of short term. Sustainable marketing is somehow different from green marketing because sustainable marketing is broader than green marketing.

Nowadays, Customers are the king of the market. They prefer good quality products. It is important for every company to follow ethics whether it is small or big. So, it is needed to bring sustainable marketing in practice.

5.1 Principles of Sustainable Marketing

Principles of Sustainable Marketing are as follows:



Fig**ure2** source (businessjargons.com)

- **Consumer focused marketing**

Each company/organization should give priority to their customers and organize its activities toward the need and want of their customers. Company tries to make a product which satisfies their customer demand rather than create a need for their already manufactured product. Company focuses on pull marketing instead of push marketing. If a company makes a product according to customer demand then the company makes long term relationships with their customers.

- **Customer Value Marketing**

Customer value marketing means creating value for the company & product to their customers. Companies not only focus on giving products at low price but also try to create value in their product which they offer to their customers.

- **Innovative Marketing**

Companies should try to make improvements in their product and always try to search for innovative ideas to satisfy the needs of customers. Continuous innovation is the reason for successful sustainable marketing. Customers require innovation in products. It is not necessary to always innovate in a product, if a company changes packaging, size, type, flavor it can also be treated as innovation.

- **Sense of Mission Marketing**

Instead of utilizing specialized language for products, the corporation should express the mission in broad social terms. Additionally, it will enable greater staff service. Customers perceive a seriousness from the organization when they consider a sense of mission in their marketing strategies.

Additionally, it gives a message that while organizations earn profit from the market, ital. their duty to give something back to their community. Having a higher profit margin is less significant than having this sense. This promotes the organization's sustainable growth for a longer period.

- **Societal Marketing**

This principle focuses on organization, customers and social interest. Societal Marketing is considered important as it builds organization presence among society and tries to establish a company as a solution provider instead of money maker.

5.2 Component OF Sustainable Marketing

Following are the components of Sustainable Marketing:

1.Eco-friendly Products and Services:

Eco-friendly products and services are the heart of sustainable marketing. These products are designed to reduce their environmental effect, preserve resources, and support a circular economy. Here are some key aspects:

i. **Renewable Energy Solutions**: Companies engaged in sustainable marketing may use renewable energy solutions such as solar panels, hydroelectric power and wind turbines, systems.

ii. **Sustainable Fashion**: Sustainable marketing in the fashion industry promotes clothing and accessories made from eco-friendly materials like organic cotton, bamboo, hemp, or recycled fabrics. It also encourages companies to adopt ethical manufacturing practices and fair labor standards to ensure the well-being of garment workers.

iii. **Green Building Materials**: Sustainable marketing promotes the use of green building materials that have less environmental impacts, such as recycled steel, energy-efficient insulation, reclaimed wood, and non-toxic paints.

iv. **Life Cycle Assessment (LCA)**: Sustainable marketing includes doing life cycle assessments to know the environmental impact of products at each stage of their life – from raw material to finished goods, product distribution, product use, and its disposal. This evaluation helps to recognize chances for upgradation and notify consumers about overall sustainability of a product.

2.) Ethical Sourcing and Supply Chain:

Ethical sourcing and responsible supply chain management are vital elements of sustainable marketing. These practices confirm that products are produced for social welfare and environmental considerations. Key aspects include:

i. **Fair Labor Practices**: Companies engaged in sustainable marketing give priority to fair labor practices through their supply chain. This involves safeguarding working conditions, fair wages rates and following labor laws and international labor standards.

ii. **Responsible Raw Material Procurement**: Sustainable marketing inspires companies to source raw materials from distributors that follow sustainable practices, such as responsible mining, sustainable agriculture methods and ethical logging. This helps prevent deforestation, resource depletion and habitat destruction.

iii. **Supplier Audits and Transparency**: Companies that involve in sustainable marketing practices often conduct supplier audits to evaluate their social and environmental functioning. Transparency about supply chain practices is vital in developing trust with stakeholders and consumers.

3.) **Green Packaging and Design**:

Product design and green packaging always play an important role in eliminating wastage, reducing carbon emissions, and encouraging overall sustainability of a product. Key aspects include:

i. **Biodegradable and Recyclable Materials**: Sustainable marketing inspires the companies to use packaging materials that are biodegradable, and easily recyclable. This eliminates the burden on landfills and promotes responsible waste management.

ii. **Sustainable Packaging:** Sustainable packaging design mainly focuses on using necessary materials for packaging, if only necessary material is used it will reduce unnecessary waste and material consumption.

iii. **Innovative Packaging Solutions**: Companies practicing sustainable marketing invest in innovative packaging solutions, such as reusable containers, plant-based material to eliminate environmental impact.

iv. **Life Cycle Considerations**: Sustainable marketing takes into consideration the whole life cycle of packaging materials, from its sourcing and production to its use and end-of-life management. This ensures that the packaging's not harm the environment at any stage.

These components of sustainable marketing which are related to eco-friendly products and services, ethical sourcing and supply chain, and green packaging and design are interrelated and play a significant role in building and maintaining a more sustainable and responsible business ecosystem. By adopting these practices, companies will be able contribute positively towards environmental conservation, welfare of society, and economic stability while meeting the growing need of environmentally conscious consumers. Sustainable marketing benefits businesses both business and society. It benefits businesses by enhancing their brand reputation and competitiveness and bringing up a better future for our planet and society.

5.3 Strategies for Sustainable Marketing

Following are the Strategies for implementing Sustainable Marketing successfully:

1. Make Sustainable Marketing Strategies Part of Everything You Do

Green marketing begins by presenting the whole concept. So, a company is required to explain everything about their brand which it wants to deliver to their customers. It means giving the entire information, starting from the beginning how the business is performing their operations, from where company brings its spare parts and components, which types of material is used for packaging the product and how to solve a problem that is focused on being green. Companies really damage their brand reputation if they do not practice according to their commitment.

2. Begin from Product and Services

At the time when company's sustainable marketing strategies keep their focus on the complicated issue, it's necessary to confirm that their goods and services will win over consumers. Make sure that quality of product is similar to their competitors, along with quality price should be comparable, and product is easy to use.

3. Story Talking About Your Brand

Telling a story is one of the best strategies to implement sustainable marketing in an effective way. Several green brands utilize their own websites for expressing their story, uploading interesting videos on YouTube, working social media platforms, sponsoring such events which promote their brand. By implementing it through a story viewpoint, it is easy for consumers to understand the company's brand.

4. Emphasis on Consumers Education

Company thinks it is sufficient to inform consumers about their green alternative. Companies should inform everything about the category in which the company is dealing. For example, if a company is dealing with a product which is not a harmful biodegradable product, inform customers about the fact that their old product is harmful for the environment. Focus on informing how your company's product is a better option than other products. The more effectively companies educate their consumers through their sustainable marketing strategy, more probable consumers will change their mind and support your company and brand.

6. Consumer Behavior

Consumer behavior includes all the decisions and actions which a person takes when they are going to select, purchase, use, and discard a good or service. Psychological variables, sociological variables and cultural variables are important in consumer engagement in the market.

To know about the behavior of consumers is vital for all businesses. If a company is aware about their consumers' needs and wants then it is easy to plan their activities according to them and satisfy their need and want. It is important for every business to see trends and patterns, forecast demand, build product design, price, promotion, and distribution strategy before manufacturing a product.

Consumer Behavior in Marketing

Consumer behavior in marketing refers to the study of how individuals and groups make decisions to spend their available resources (such as time, money, and effort) on various goods, services, and experiences. Understanding consumer behavior is essential for marketers as it helps them design effective marketing strategies and tailor their offerings to meet the needs and desires of their target audience

6.1 Importance-of-Consumer-Behavior

- **Effective Marketing Strategy**: Understanding consumer behavior helps marketers to tailor their strategies to meet the needs, preferences, and desires of their target audience. This leads to more effective and relevant marketing campaigns, resulting in higher engagement and conversion rates.
- **Product Development:** Consumer insights guide the development of products and services that align with customer demands and expectations. By understanding consumer behavior, businesses can create offerings that provide genuine value and solve real problems, leading to greater customer satisfaction and loyalty.
- **Segmentation and Targeting:** Consumer behavior insights enable businesses to segment the market based on shared characteristics, behaviors, and preferences. This allows for more precise targeting, ensuring that marketing efforts reach the right audience with messages that resonate.
- **Customer Satisfaction and Loyalty**: When businesses understand what drives consumer satisfaction and loyalty, they can focus on delivering exceptional customer experiences. Happy and loyal customers are more likely to repeat purchases, refer others, and become brand advocates.
- **Competitive Advantage:** A deep understanding of consumer behavior gives businesses a competitive edge by allowing them to differentiate their products and services in ways that appeal to consumers. This can lead to higher market share and better positioning against competitors.
- **Informed Decision-Making**: Consumer behavior insights inform strategic decision-making across various aspects of a business, including pricing, distribution, branding, and communication. Data-driven decisions are more likely to lead to positive outcomes.
- **Adaptation to Changing Trends**: Consumer behavior is not static; it evolves over time due to societal, cultural, and technological changes. Businesses that stay attuned to shifting consumer preferences can adapt their strategies and offerings to stay relevant in the market.
- **Risk Management:** Understanding consumer behavior can help businesses anticipate potential challenges and mitigate risks. For example, by identifying shifts in consumer

preferences early on, companies can make necessary adjustments to minimize negative impacts.

- **Effective Communication**: Knowing how consumers perceive and interpret messages helps marketers craft communication that resonates with their audience. This ensures that marketing messages are clear, relevant, and persuasive.
- **Maximized Marketing Budget**: By focusing marketing efforts on consumer segments most likely to respond positively, businesses can optimize their marketing budgets and resources for better returns on investment.

6.2 Consumer Decision Making Process

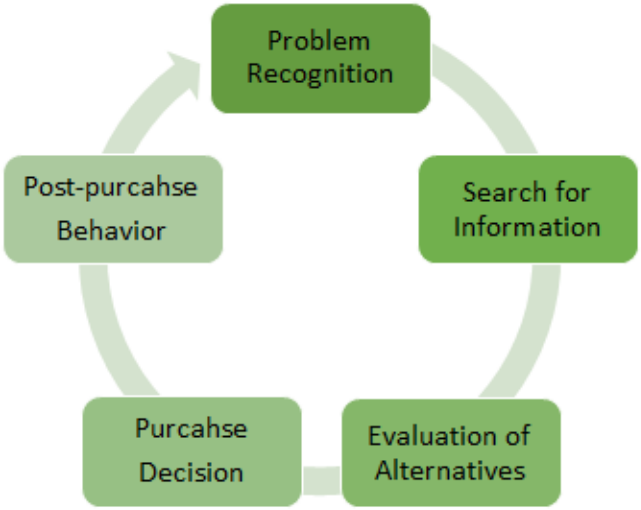


Figure3 source (www.slideteam.net)

1. Problem Recognition:
This is the initial stage where a consumer perceives a need or a problem that requires a solution.

Needs can be triggered by internal factors (e.g., hunger, thirst) or external factors (e.g., advertisements, recommendations).

The consumer becomes aware of a gap between their current state and a desired state.

2. Search for Information:
After recognizing the problem, the consumer seeks information to understand the available options for addressing the need. Information can be gathered from various sources, including personal experiences, friends and family, online reviews, advertisements, and expert opinions. The extent of information search depends on the consumer's level of involvement and the complexity of the decision.

3. Evaluation of Alternatives
At this stage prospective consumers are well aware of what they want in their product. Now they make selections from various alternatives. Alternative may be in the form of low price, product having additional benefit, availability of product, or something personal such as color, size, style etc.

4. Purchase Decision
After evaluating available alternatives, customers arrive at the conclusion which alternative is best and suitable according to their need. If a company does their job properly, consumers identify their product as the best option and decide to buy it.

5. Post-purchase behavior

Consumers evaluate the use of products to know whether they made the right decision or not. This evaluation can affect their loyalty toward a specific brand, future purchase decisions and even recommendations and reviews to their family and friends.

6.3 Factors Influencing Sustainable Consumer Behavior

 Environmental Awareness and Concerns:

Environmental awareness is an important key element of sustainable customer behavior. When consumers are aware about the environmental challenges facing our planet, such as deforestation, climate change, pollution and resource depletion, they understand the impact of their consumption choices. Due to Media, increased public discussions and educational campaigns about environmental issues, consumer awareness increased.

 Personal Values and Beliefs:

Personal values and beliefs play an important role in making sustainable consumer behavior. Some individuals integrally give priority to environmental protection, ethical practices and social justice when they make decisions for products. For example, if a person is concerned about the environment, he gives preference to eco-friendly products.

 Social Influence and Norms:

A person is always influenced by society. Influencers may be family, peers, friends and social media which affect their behavior while purchasing products. People frequently follow that behavior and choices of their social circles. When sustainable practices are accepted world-wide and have positive response within a community or social group, consumers try to implement such behavior.

 Access to Sustainable Products:

The availability of sustainable goods impacts consumer choices while they make purchases. If sustainable alternatives are available in the market at competitive prices, consumers are more likely to select them. On the other hand, if they are available in limited quantities and at higher costs it may hinder sustainable consumption.

 Product Labeling and Certifications:

Certifications and eco-labels on products provide valuable information to the customers about product's environmental and social attributes. Recognized labels such as Fair Trade, Energy Star, Organic, and Forest Stewardship Council (FSC) give confidence to consumers that they are making sustainable selection. Well-defined and transparent labeling assists consumers to identify products affiliation and their values.

 Marketing and Advertising:

Effective marketing and advertising strategies affect consumer behavior while buying products. Sustainable marketing campaigns that highlight a product's eco-friendly attributes and its positive impact on the environment or society can attract conscious consumers. However, it is crucial for businesses to practice transparency and avoid greenwashing to maintain consumer faith.

 Financial Incentives and Pricing:

Price is one of the important factors in the consumer decision-making process. Sustainable products may be costly because these products have additional cost of eco- friendly material and ethical manufacturing process. Financial incentives, such as tax credits, govt. subsidy and discount for sustainable products, can inspire consumers to select these options despite the higher price.

 Education and Awareness Campaigns:
Education and awareness campaigns play a significant role in shaping consumer behavior. Informative campaigns which highlight the benefit of sustainability and its effect on the environment and our society can create a sense of responsibility and encourage consumers to make their choices more conscious.

 Convenience and Habit:
Convenience often drives consumer behavior. Sustainable selection needs changes in habits of customers and encourages them to make additional effort. Making sustainable options more suitable and integrating them into daily routines may help to overcome this barrier.

 Corporate Social Responsibility (CSR) Initiatives:
Companies that give priority to sustainability and involve in CSR initiatives often pull conscious consumers towards the company. Consumers are likely to support such brands which demonstrate their commitment towards environment and social issues, including growth of community/society and fair labor practices.

6.4 Sustainable Marketing Strategies to Drive consumer Behavior

❖ **Product Innovation and Eco-Design:**
Manufacturing sustainable goods with the help of eco-design principles is a powerful approach to pull conscious consumers toward company. Eco-design needs to consider a product's entire lifecycle, from raw material sourcing to its discard. Its emphasis on eliminating environmental impact, by using eco-friendly materials, increasing product durability, and conforming ease of recyclability or biodegradability. By offering innovative and eco-friendly products, companies can appeal to environmentally aware consumers to seek sustainable options.

❖ **Green Messaging and Transparency:**
Clear communication about a company's sustainability efforts is essential for building trust and integrity with consumers. Green messaging in advertising, on company websites and with product packaging helps consumers to know a brand's obligation towards sustainability. Businesses should be honest about their social and environmental initiatives, eliminate greenwashing—a misleading marketing practice that wrongly interprets a product or company as environmentally friendly. Rather than this, companies should give proof of their sustainable practices and back up that their claims are true and have verifiable data.

❖ **Social Responsibility and Cause Marketing:**
Incorporating social responsibility initiatives into marketing strategies can reverberate with deliberate consumers. Cause marketing involves supporting the environment and society through promotional movements. For example, a company might give a specific percentage of sales to a non-profit organization or launch a campaign to increase consumer awareness about a particular issue. Consumers feel pleasure when their purchases contribute to a greater cause, it leads to increased brand loyalty and positive consumer behavior.

❖ **Educating Consumers and Promoting Behavior Change**:
Education always plays a significant role in promoting sustainable buyer behavior. Sustainable marketing programs should focus on educating consumers about the social and environmental effect of their choices. Information about the advantages of sustainable goods and the consequences of their unsustainable practices leads to change in consumer behavior. Moreover, interactive campaigns, online platforms and workshops can involve consumers actively, inspire them to accept sustainable habits in their daily lives.

❖ **Circular Economy Initiatives:**
Implementation of the circular economy model in marketing makes appeal to conscious consumers. The circular economy mainly focuses on reducing waste, product recycling and

reusing materials, to develop a closed-loop system. Companies can communicate their efforts to design products for durability, recycling and easy repair of products, this reduces overall environmental impact. Promoting circular economy practices promote a sense of responsibility with consumers to support businesses that give priority to sustainability.

❖ **Sustainable Packaging:**
Sustainable packaging is a vital consideration for those businesses who want to appeal to conscious consumers. Using eco-friendly materials, by eliminating packaging waste, and adopting recycling programs can validate commitment towards sustainable practices. Companies can also educate consumers how to discard and recycle packaging to promote responsible consumption.

❖ **Engaging Consumers in Sustainable Initiatives**:
Involvement of consumers in sustainability initiatives promote a sense of ownership and their mutual responsibility towards environment and society. Brands can initiate programs to raise consumer participation, such as beach clean-ups, tree-planting programs, or recycling initiatives. Involvement with consumers beyond the point of buying strengthens brand loyalty and gives a message of sustainability.

❖ **Collaboration and Partnerships**:
Collaborating with compatible organizations or sustainability professionals can boost a brand's credibility and extend its reach. Partnerships can result in co-branded campaigns, and joint efforts and shared knowledge to drive sustainable consumer behavior.

❖ **Price Incentives and Loyalty Programs**:
Offer price incentives, rewards and giving discounts, for selecting sustainable goods can be an effective approach. Loyalty programs that provide special benefits to those customers who continuously select eco-friendly options and foster long-term sustainable consumer behavior.

7. CONCLUSION

In conclusion, sustainable marketing and consumer behavior are two mutually dependent forces that play a vital role in shaping an environmentally and socially responsible future. Sustainable marketing includes adopting eco-friendly and ethical practices, promoting transparency, and supporting business strategies for the benefit of our planet and society. On the other hand, consumer behavior pulls the demand for sustainable goods and services, stimulating businesses to support sustainable practices throughout their value chain. Consumers are more conscious toward environmental issues and their social responsibilities have changed the marketplace. Consumers now look for the goods and services that show their values, their priorities, and ethical consideration. As a result, businesses go with sustainable practices to capture this growing marketing segment.

Goal of sustainable marketing is to educate and empower consumers to make better choices, this leads to change their behavior that support eco- friendly and socially responsible alternatives. By revealing the positive impact of sustainable goods and highlighting their brand's commitment to sustainability, businesses will be able to build trust and loyalty with consumers.

Joint efforts of businesses, society and governments are necessary for achieving meaningful progress towards sustainable development. Sustainable marketing initiatives that include consumer engagement, social responsibility and circular economy practices contribute in addressing global challenges such as climate change in climate, resource diminution and social inequalities. As the demand for sustainable goods and services is continuously growing, sustainable marketing and consumer behavior will drive positive changes in industry practices and influence policy decisions.

Ultimately, sustainable marketing and consumer behavior offer a route towards a harmonious coexistence with the planet, conserving its resources for upcoming generations while safeguarding the well-being of all living beings. As businesses and consumers accept sustainability as a core value, they contribute to a collective movement that can form a brighter and more sustainable future for all.

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ABOUT THE BOOK

The discussion surrounding sustainable economic and management practices has taken on unprecedented significance in an era characterized by rising environmental concerns and the pressing need for responsible resource management. The comprehensive book "**Sustainable Economic and Management Practices: Challenges and Future Prospects**" explores the complex interactions between economic development, corporate governance, and environmental protection. The book discusses the complex issues that modern business enterprises must deal with and provides smart methods for incorporating sustainability into their fundamental procedures.

The book's focus is on management techniques that can address problems and encourage the adoption of sustainable practices. The book presents case studies of businesses who successfully made the switch to circular business models, emphasizing the advantages realized in terms of less waste and increased profitability. The book additionally addresses the value of stakeholder participation. Sustainable practices require cooperation between corporations, governments, civil society, and consumers in order to succeed. The chapters in the book explore the idea of shared value, in which firms match their goals with social demands to produce benefits for both.

The book provides a comprehensive viewpoint on the complex interplay between business management, economic development, and environmental protection. The book provides an extensive set of resources for incorporating sustainability into their business practices by addressing problems, offering case studies, and suggesting creative alternatives. It emphasizes the fact that adopting sustainable practices is not only morally just but also a strategy to build resilience, generate money, and achieve long-term success in a world that is always changing. This book serves as a guide for a future where economic prosperity and environmental responsibility coexist peacefully while corporations continue to struggle with the challenges of the 21st century.

The book entitled **"Sustainable Economic and Management Practices: Challenges and Future Prospects"** is divided into two volumes. Volume 1 covers sustainable consumption and production, sustainable green finance, green aspect of cryptocurrency, energy consumption, sustainable cities, circular economy, social entrepreneurship, sustainable business and development, digital economy, sustainable marketing, and consumer behavior.

Volume 2 covers sustainable consumption and production towards sustainable future, green investment, employee retention and sustainable practices, green HRM practices, sustainable research environment, contribution of environment in promotion of entrepreneurship, role of CSR in attaining educational goal, blue economy.

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