

A comparative analysis of Green Entrepreneurship and Development among selected countries.

Ms. Venus Rana

SRF , Department of evening studies, MDRC, Panjab University Chandigarh

ABSTRACT:

Various forms of entrepreneurship which focused on innovation, opportunities, and growth have distinctive effects on sustainable development. Green entrepreneurship or environmental entrepreneurship plays a vital role in the sustainable economic development of a nation. Entrepreneurs that firmly believe in the green environment and growth will develop green products and technologies that have emerged as a driver of economic progress. Policymakers around the globe are finding ways to adhere to the 17 sustainable development goals given by the United Nations for the benefit of people and communities and to fulfil the needs of society as a whole. This paper will try to establish the dependency of economic growth on green entrepreneurship in different countries which are: India, South Africa, The United States of America, The United Kingdom, Switzerland and Australia. Development without economic, social, and environmental aspects is incomplete. Therefore, these aspects will also be included in the present study. A cross-sectional study of the above mentioned six countries for the year 2019 will be done. Renewable Energy from Green Sources and Carbon dioxide emissions will be taken as proxy for green entrepreneurship as the exact data for the same is directly unavailable. Various policies will be suggested to overcome the problem of growth which leads to environmental degradation and to drive positive economic activity outcomes.

Keywords: Green entrepreneurship, Economic Development, Human Development Index (HDI), GHG's Carbon dioxide emissions, Environment, sustainability, renewable energy.

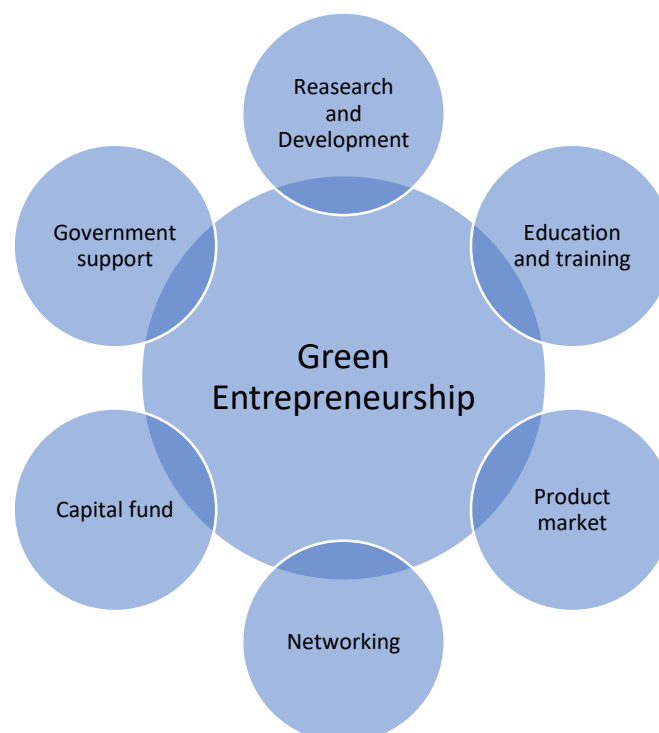
1. Introduction :

A connection between entrepreneurship and sustainable development relies on the three essential pillars: the economic, social, and environmental aspects of a nation which are explained by the triple bottom line theory (Dahri and Omri, 2018). Entrepreneurs who consider environmental externalities before making their decisions are known as green entrepreneurs. Mostly in developed economies, the mindset of entrepreneurs has changed and they have started taking into account the environmental consequences of their entrepreneurial activities (Gu and Zheng, 2021) and are discovering and adopting green technological innovations to enhance environmental quality through corporate social responsibilities (Zhao, Seibert, and Lumpkin 2009). For human beings to exist, world resources should be used responsibly and not recklessly for the hunger of economic growth. According to Farinelli et al. (2011), developing (emerging) and industrialized countries can have different ideas about green

entrepreneurship. They contend that wealthy nations concentrate more on being "green" and on market potential, whereas developing nations concentrate on entrepreneurship and market demands.

The 2030 Agenda of Sustainable Development was adopted by the general assembly of the United Nations in 2015 to promote the transformation of the world, it followed a document constituting “a plan of action for people, planet and prosperity” (United Nations Assembly 2015). The integrated and indivisible 17 sustainable development goals (SDG’s) with 169 sub targets for stimulating efforts for the next 15 years in the strategic areas for humanity and the planet were planned and adopted. The UN 2030 Agenda for Sustainable Development states that the emphasis should be on better utilization of economic resources for promoting socio-economic stability and business competition by optimising economic goods and services to achieve environmental sustainability. By identifying practical, sustainable organisational processes, skills and business strategies focussed on environmental preservation should meet consumers' needs while minimizing their impact on nature ((Roomi, Saiz-Álvarez, and Coduras 2021). This is the core of relation between sustainability and entrepreneurship. Firms require a robust and stable economy for innovation and investment purpose, on which future jobs will depend. SDGs have favoured business behaviours which are more social, responsible and institutional through sustainable entrepreneurship, firms still apply traditional economic performance measures related to gross domestic product (Cresente et al. ,2021). Economic sustainability cannot be measured through traditional indicators . One must include new economic indicators such as pollution, waste generated, transportation, water consumption, consumer spending habits etc in order to measure how we are managing the environment and the impact of our decisions ((Roomi, Saiz-Álvarez, and Coduras 2021). The components of green entrepreneurship includes environmental quality, social welfare, innovation, sustainability, technological advancement and economic development (Haldar, 2019).

Figure 1: Six prerequisites for a successful green entrepreneurship



Source: Author's compilation

In this study, we are including variables such as carbon dioxide emissions and renewable energy as indicators of environmental entrepreneurship and their impact along with the human development index on the gross domestic product of six countries: India, South Africa, The United States of America, The United Kingdom, Switzerland and Australia. These countries represent the underdeveloped, developed and developing countries. The time period for the study is 2019 which was a normal year as COVID-19 led to abnormalities in various activities. A multiple regression analysis is done to check the dependence of growth i.e. Economic aspect on social (HDI) and environmental aspects (CO₂ emissions and Renewable Energy Sources).

2. Theoretical and Empirical Literature:

According to several studies (Dean and McMullen, 2007; Hall et al., 2010; Shepherd and Patzelt, 2011), entrepreneurs are seen to stimulate economic growth and serve as agents for resolving social and environmental problems. Entrepreneurs find, innovate, create, and ultimately seize chances. But empirical data reveals that not every one of the three pillars of sustainable development leads to profit from entrepreneurship. Although the benefits of entrepreneurship for the macroeconomy have been thoroughly demonstrated and discussed in a number of literature reviews (e.g., Neumann, 2021; Urbano, Aparicio, and Audretsch 2018; Van Praag and Versloot, 2007). However, it also exacerbates inequality (Atems and Shand, 2018) and environmental degradation ((Youssef, Boubaker, and Omri 2018; Dhahri and Omri, 2018; Gu et al., 2020). Evidence reveals that countries lack access to environmentally friendly items and that their investments in environmental projects are insufficient to maintain a sustainable environment. According to this perspective, resources should be managed wisely and effectively so that environmental entrepreneurship can support environmental policies and regulations, which will ultimately lighten the load on the environment (Adedoyin et al., 2021).

Entrepreneurship is favourably associated to poverty reduction (Rupasingha and Goetz, 2013) and human development (Dhahri and Omri, 2018). There are a variety of studies that tried to explain green or environmental entrepreneurship through various methods. Neuman, (2022) through empirical estimation assessed the relationships between (GEA) national share of green entrepreneurial activity and economic, social, and environmental development. Data from the Global Entrepreneurship Monitor for 11,909 early-stage entrepreneurs was combined with data from additional international databases and aggregated to the macro-level of 53 nations. Ordinary least square regression were estimated where impact of GEA rates on Gross Domestic Product (GDP) , modified Human Development Index and Carbon dioxide emission was studied. The results indicated that new green ventures have a positive social and economic impact. Green ventures are less harmful and more beneficial for environmental quality. Higher GEA shares are positively correlated with economic and social development, but not with environmental development, according to the findings. Additional experiments demonstrated the conclusions robustness to modifications in time-lags, economic development levels, and dependent and independent variable measurements. According to (Liu, Yan, and Zhou 2015), there is a connection between the economy's growth rate and carbon emissions. They noted that rising emissions in China are associated with rising economic growth, but that the rising emissions impede economic growth. In contrast, Fan and Hossain (2018) found that pollution emissions encourage economic expansion while economic growth acts as a catalyst for carbon emissions. The growth rate of the economy and

environmental quality have a balancing relationship, according to Hickel and Kallis (2020), which indicates that both of them cooperate to accomplish sustainable development. Resources should be used wisely and effectively so that environmental entrepreneurship can support environmental policies and regulations, which will ultimately lessen the environmental burden (Adedoyin et al., 2021).

Wei et al. (2022) have explored whether green growth is promoted by environmental entrepreneurship or not. Secondary data of ten emerging Asian economies were taken from the year 1990 to 2019 from OECD and World bank. Green Economic Growth (GEG's) was dependent on environmental entrepreneurship (EE), technology innovation (Patent), internet users (internet), trade openness (Trade), and financial development (FD) in the long run. Applying Auto Regressive Distributed Lag Model and cointegration techniques the results exhibited that Environmental entrepreneurship and green renewable energy has significant and positive impact on green economic growth. Trade causes green economic growth and there exists bidirectional causality between green economic growth and financial development.

(Vasilescu, Dimian, and Grădinaru 2022) using a logistic regression model for 7326 companies from thirty-six European countries identified factors influencing the decision to use green technology considering demand and supply, resource efficiency and targeted policies. Company's age and financial performance, level of development of country, and incentive measures have a significant potential of driving green entrepreneurship. Financing turned out to be major driver. The development of green products and services can be challenging for businesses in less developed nations, hence some regions needed support programmes to foster green entrepreneurship. Many entrepreneurs in less developed nations were highly educated, intelligent, and creative people who can successfully manage sustainable business models if sound practises were transferred along with a cash infusion. Bucea-Manea-tonis et al. 2021, demonstrated that working from comfort of home and suitable environment can enhance productivity of labour and eco innovation by employees. Sustainable entrepreneurial activity was measured from a triple social, economic, and environmental view, including and excluding component of eco-innovation. Total Early-stage entrepreneurial activity (TEA), entrepreneurial intentions, business closures and dynamics were considered for the year 2016 and 2019. Results indicated that out of 42 sample countries Asian countries have most potential in terms of TEA ((Roomi, Saiz-Álvarez, and Coduras 2021). AMO (Ability, Motivation, and Opportunity) theory's three most dynamic components are examined in relation to the significance of university students' entrepreneurial intentions to promote social change through green entrepreneurship, using the partial least square structural equation model (PLS-SEM). Students' entrepreneurial purpose is discovered utilising a deductive method that was created using a PLS-SEM (Mia et al., 2022). Primary data of 302 students' respondents collected through survey questionnaires. The AMO theory has an impact on the predictor variables of incentives, education in entrepreneurship, and skills, and these skills are statistically significant and acknowledged in relation to green entrepreneurship. A green entrepreneurship strategy's significance is, nevertheless, influenced by the entrepreneurial aim that supports the advancement of social change. Schaper 2002, has discussed the nature of entrepreneurship, evolution, barriers and triggers, policies and learning from past experiences. Rajkamal et al.,2022 explored different challenges and innovations of green entrepreneur in Salem District of Tamil Nadu to examine what factors act as the obstacles in business and ways to transform them into opportunities using Snowball sampling of 50 respondents using Simple Percentage Analysis, Chi-Square, and the Henry Garrett Ranking Method. The results exhibited the age and the

influence to launch a business, employing technical or professional knowledge and skill did not correlate. Mathur and Tandon, (2016) attempted to study the opportunities and challenges encountered by green entrepreneurs in India using primary (130 students) and secondary data. To identify the factors influencing and impeding green entrepreneurship in India, factor loading, analysis of variance (ANOVA), and a correlation coefficient between components were used. According to the report, millennials were generally quite aware of the environment. The correlation between gender, age, and environmental knowledge, beliefs, and attitudes, however, was minimal. (Dhahri, Slimani, and Omri 2021) has considered time series data of 20 developing countries and determined the behavioural effect of entrepreneurship on the achievement of Sustainable development goals (SDG's). Long run causality analysis showed that opportunity driven entrepreneurs contribute towards SDG's on the other hand necessity driven entrepreneurs have a negative effect on the attainment of SDG's.

Thus, various studies explored different aspects of green entrepreneurship by combining two or more variables.

2.1. Research Gap:

Very few studies have incorporated pollution level, renewable energy sources and human development index simultaneously in order to find the effects on economic growth. In our study we will try to find out the significance of these factors for overall economic development of different countries and not just monetary growth.

2.2. Hypothesis:

H_0 : Growth of a country is not significantly affected by the carbon dioxide emission, renewable energy and human development index.

H_A : Growth of a country is significantly affected by the carbon dioxide emission, renewable energy and human development index.

3. Data Base and Methodology:

Six countries has been randomly selected each one belongs to different continent to add diversification of results on the basis of varied geographical conditions. Data of six countries: India, South Africa, The United States of America, The United Kingdom, Switzerland and Australia has been taken from different sources. For Example, to study the impact of green entrepreneurial activity (GEA): Carbon dioxide emissions (CO_2) represented by CE and share of renewable energy (RES) including hydroelectricity in total energy production has taken from BP world statistical data for the year 2019. Energy is given in exajoules before transformation. Human development index scores have been taken from HDI report 2019 from UNDP ranges between 0 and 1. Growth rates were taken from world bank data (GDP at constant 2015 US dollar)¹, World Bank national accounts data, and OECD National Accounts data files. The following equation has been used which is modified from various previous studies (Neuman 2022; Roomi 2022; etc.)

$$\ln GDP = b_0 + b_1 \ln RES + b_2 \ln CE + b_3 \ln HDI + e$$

¹“ Gross domestic product (GDP) represents the sum of value added by all its producers. Value added is the value of the gross output of producers less the value of intermediate goods and services consumed in production, before accounting for consumption of fixed capital in production.”- World Bank

Where,

$\ln \text{GDP}$ is log of GDP of given countries

$\ln \text{RES}$ is log of renewable energy share of given countries

$\ln \text{CE}$ is log of Carbon dioxide emissions of given countries

$\ln \text{HDI}$ is log of human development index of given countries

b_0 is intercept term

b_1 is coefficient of $\ln \text{RES}$, and b_2 is coefficient of $\ln \text{CE}$ and b_3 is coefficient of $\ln \text{HDI}$

e is the error term.

After applying regression on the above equation. Results are discussed in next section.

4 Results and Discussion:

Following results have shown:

Table 1: Findings of Multiple regression analysis :

Model 1: Multiple regression analysis , using observations					
Dependent variable: $\ln \text{GDP}$					
	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	10.3320	0.862938	11.97	0.0069	***
$\ln \text{RES}$	0.287331	0.0469350	6.122	0.0257	**
$\ln \text{CE}$	0.108628	0.0442405	2.455	0.1335	
$\ln \text{HDI}$	1.16562	0.294305	3.961	0.0582	*
Mean dependent var	12.30000	S.D. dependent var		0.599800	
Sum squared residual	0.014098	S.E. of regression		0.083959	
R-squared	0.992162	Adjusted R-squared		0.980406	
F(3, 2)	84.39323	P-value(F)		0.011733	
Log-likelihood	9.646750	Akaike criterion		-11.29350	
Schwarz criterion	-12.12646	Hannan-Quinn		-14.62792	

Source :Author's Calculation

Table 2 : R square and other values:

$$\ln \text{GDP} = 10.3 + 0.287 * \ln \text{RES} + 0.109 * \ln \text{CE} + 1.17 * \ln \text{HDI}$$

$$(0.863) (0.0469) (0.0442) (0.294)$$

$$n = 6, R\text{-squared} = 0.992$$

(standard errors in parentheses)

Variables: $\ln \text{RES}$ $\ln \text{CE}$ $\ln \text{HDI}$

Sum of coefficients = 1.56158

Standard error = 0.297093

t(2) = 5.2562 with p-value = 0.034342

Source : Author's Calculation

Results suggested that GDP is mostly dependent upon the human development index of a country. Relationship between both is positive and the significance level for this is 90%. The dependency of GDP on renewable energy usage is positive and significant at 95% level. The results indicated dependency of GDP on Carbon dioxide emissions came out to be insignificant. The standard error came out to be 0.083. Hence, we can conclude that from given observations the renewable energy and human development index has a major role to play in green entrepreneurship and also relationship between carbon dioxide emission and growth came out to be positive which suggested that more pollution occurs with high GDP growth. So entrepreneurs need to tackle pollution by forming new mitigating strategies. Therefore, we reject the null hypothesis. Some observations included that the United States of America used maximum renewable energy and South Africa utilized least renewable energy among the given countries. The data verifies the relationship between GDP and RES as suggested by regression model. The most developed country i.e. United States of America emits more carbon dioxide as compared to developing countries like India and South Africa. Switzerland emitted the least amount of carbon dioxide among the given countries in the year 2019. In the year 2019, Switzerland has the best HDI score on the other hand India has the least HDI score. In the next section we will take up some case studies from the selected countries which can serve as an inspiration for other businesses as well.

4.1 India:

By finding the connections between innovation and sustainability in the renewable energy sector, green entrepreneurs act as change agents, helping to shape India's trajectory for sustainable growth. The significance of green entrepreneurs in our market-based economy is not simply limited to offering early movers possibilities for growth, but they also play a significant role in encouraging other business communities to adopt green business practices. Such creative people function as 'pull' forces that encourage other businesses to go green by demonstrating the financial advantages of establishing a comparative advantage in greener products (Halder, 2019). India has a demographic advantage because around 68.9% of the population is between the ages of twenty and fifty-nine, so creating opportunities for innovation and fostering entrepreneurship among young people is seen as an important step toward fostering long-term economic growth in the nation. Education and financial circumstances of business owners do not significantly influence the growth of green business owners. Green entrepreneurs must possess an entrepreneurial mentality that is willing to take risks in pursuit of social, economic, and environmental objectives. India was placed 63rd out of 190 nations in the Ease of Doing Business 2020 (Government of India, 2022). The Indian government began a comprehensive programme of regulatory reforms in 2014 with the goal of facilitating business operations there. However there are many problems faced by young entrepreneurs, for example, Along with a lack of infrastructure, counselling, procedural difficulties, and administrative difficulties, lack of training and funding are acknowledged as two of the biggest issues facing startups and small scale industries (SSI's) in India (Desai, 2008). The existence of a scattered policy environment and a lack of policy implementation, insufficient R&D

investment, convoluted funding processes, inadequate amounts of angel investments, venture capital, and early stage seed funding, weak connections among the different actors of the knowledge economy and the market, insufficient emphasis on innovation and entrepreneurship in the educational system, a lack of rural infrastructure, and risk-averse business behaviour (Halder 2019). Government has introduced several facilities such as The Micro Units Development Refinance Agency (MUDRA) Bank, Micro Finance Institutions (MFIs) for issuing loans to small businesses having a requirement of credit from Rs 50,000 to Rs 10 lakh. Other government schemes like National Skill Development Agency (NSDA), National Skill Development Corporation (NSDC), National Skill Development Fund (NSDF) and Sector Skill Councils (SSCs), Make in India and Startup India, stand up India, Self-employment and talent utilisation (SETU), ATAL innovation mission, Pradhan Mantri Kaushal Vikas Yojana (PMKVY) and Green India. These schemes led to boosting of the dual objective of growth in economic and environmental aspects. Another scheme FAME (Fastest Adoption Of Manufacturing of Electric Vehicle) for completing electric car production. In India's developing green market, there is an abundance of opportunities for green business owners, and in the other orientation, green business owners act as change agents by encouraging people to think and act more sustainably (*Growing the Green Economy for People and Planet*, n.d.).

*Some notable startups in India are discussed below:

BECO is a direct-to-consumer firm that produces sustainable and green items like bags, tissue paper, reusable towels, and trash bags. Celebrities like Diya Mirza and Aamir Khan have invested in the Mumbai-based company since it launched in 2019, which has grown tremendously famous. Akshay Varma, Aditya Ruia, and Anuj Ruia, the company's creators, want to make things which are free of plastic and kind to the environment. Beco claims that by switching to a sustainable production and packaging approach during the past three years, it has prevented the production of nearly 500 tonnes of plastic garbage. In 2020, Nitika Sonkhiya founded MyONEarth to create goods for a sustainable way of life. The Delhi-based business sells a variety of organic goods made from bamboo, coconut coir, and coconut shell. MyONEarth produces stationery, clothing, travel gear, and home furnishings. Additionally, it manufactures dental items like bamboo toothbrushes. It started out with a business-to-business model, but during the lockdown it changed into a direct-to-consumer company. The company achieved a revenue of fifty lakh rupees just under a year after its launch. Green chemicals that are biodegradable and non-toxic are created by the sustainable firm Proklean, which is situated in Chennai. In 2012, Bala Chandrashekar, Vishwadeep Kuila, and Sivaram Pillai formed it. Proklean aims to provide environmentally friendly goods that are also cost-effective and secure to use. It uses renewable carbon-based raw resources to create its products. The business claims that by using environmentally friendly items, it has prevented nearly six thousand five hundred MT of carbon dioxide emissions. It hopes to have a substantial influence on the reduction of carbon dioxide when it scales up. The creators of Carrageen, an environmentally conscious firm that received fifty lakh rupees in funding at the Shark Tank competition in India in 2021, are Surabhi Shah and Chetna Shah. The 2018-founded business with headquarters in Indore creates biodegradable stationery and provides packaging options. The retailer Carrageen offers products including perforated compostable boxes that can be turned into spoons and plates as well as pens, pencils, monthly calendars, and calendars. It has customers like Haldiram and has a strong business-to-business model. Nitij Singh and Zoya Wahi created the sustainable fashion start-up Aslee in 2017. The Jaipur-based company uses hemp, bamboo, and nettle that are ethically sourced to

create long-lasting, environmentally friendly clothes. The 'slow fashion' manufacturing company Aslee collaborates with native Himalayas inhabitants in India and Nepal who contribute in every stage of the supply chain, from harvesting to fabric production (Khan, 2023)

In order to lessen air pollution, Tarun Mehta and Swapnil Jain created the Bengaluru-based business Ather Energy in 2013. Ather Energy produces electric automobiles. By introducing scooters powered by electricity driven by artificial intelligence and internet of things, which travel smoothly and make our lives more fluid, the two friends hoped to change the automotive industry. The business has built more than 350 'Ather Grid' charging stations in 38 Indian cities. During the funding stage, the company earned a lot of praise, which enabled it to expand its production facilities for the research, testing, manufacture, and launch of the automobile. The year 2017 witnessed the launch of a biomaterials startup 'Phool' in Kanpur by Ankit Agarwal and Prateek Kumar. The business recycles waste flowers from temples into products including scented cones, burning sticks, and Phool worm composting. The entrepreneurs came to the realisation that because withered flowers from temple waste disposal contain herbicides and insecticides, they may pose environmental risks. The business creates innovative packaging using Florafoam, a high-performing, moldable, and long-lasting material made entirely of recycled flowers. ZunRoof, one of the top solar rooftop firms in India, helps every Indian consumer have greater, healthier and more affordable personal energy usage. Pranesh Chaudhary and Sushant Sachan created ZunRoof in 2016, and it has its corporate headquarters in Gurugram, Haryana. The company currently has more than 30,000 designed systems throughout India and has installed over 10,000 plus residential solar rooftops. BOHECO is an agricultural company founded in 2013 that produces healthful items from hemp and cannabis plants' industrial byproducts. One cannabis plant may produce ayurvedic medicines, wholesome food, fine clothing, strong-tying ropes, and healthful food. The start-up successfully produced textiles, construction materials, and health and wellness products from sustainable hemp. An estimated forty-two million tonnes of municipality solid garbage are produced in urban India each year, which is bad for the environment. When collecting up hazardous waste like discarded sanitary napkins, medical synergies, and other plastic waste, rag pickers suffer severe consequences. They receive extremely meagre compensation for the work they perform to improve trash management in the nation. At that time, Rob Whiting, Parag Gupta, and Roshan Miranda set out to create a safe atmosphere for ragpickers by paying them a fair income while also lowering the nation's garbage rate. In order to give bulk waste generators end-to-end solutions, they established 'Waste Venture India' in 2012. It provides commercial and residential clients with expert debris collection and treatment services while giving waste pickers work. 'Just Organik' is a manufacturer and retailer of certified organic foods with a mission to increase consumer access to secure, wholesome organic food. It also attempts to encourage farmers in India to use organic farming methods, so generating long-term profit for them. In 2013, Pankaj Agarwal founded this company in the basement of his home. Today, he controls two significant branches across the country in addition to a processing facility situated in Delhi. The startup's slogan, "a walk towards a healthy future," emphasises the provision of food that is chemical-free, made entirely of natural ingredients, nutritious, reasonably priced, and tastier than ordinary meals. The founder of 'Banyan Nation', Mani Vajipey, developed the idea of reusing industrial plastic into a higher-quality plastic than virgin plastic because achieving a plastic-free society in our country is proving to be a difficult task. It is the very first vertically linked plastic recycling enterprise. The company employs environmentally friendly detergents to clean plastic, removing harmful impurities to provide plastic that is nearly virgin in quality. Additionally, it is the first business to recover both post-consumer and post-

industrial plastic garbage by integrating thousands of informal last-mile pickers through its supply chain using the cloud and the Internet of Things (Arangarajan, 2022). Therefore, India has a variety of green businesses run by green entrepreneurs. The government support is also encouraging young minds to opt for sustainable ventures producing green products.

4.2 South Africa:

Those in society who are most at risk from climate change are also the most vulnerable. In countries like South Africa, extreme weather conditions like rains and fires badly impact the livelihoods and the social safety net to help them cope is not adequate. Finding solutions that promote social and ecological resilience and provide these groups a chance to participate in choosing the solutions that are most appropriate for their local environment are key to creating an inclusive green economy. Therefore, developing an inclusive green economy requires a bottom-up strategy that promotes meaningful engagement in the process and can be supported by strong top-down policy signals. A very cursory examination of South African business incubators reveals that high growth industries like technology, manufacturing, and retail receive the majority of the support given to small businesses. Despite the fact that some of these businesses are social enterprises, most do not adhere to green economy ideals. This is the void that the African Centre for a Green Economy (Africege), in collaboration with the DOEN foundation, the Green Economy Coalition (GEC), and the New Economics Foundation (NEF), is attempting to close with the establishment of its innovation hub which intends to find and assist South African green and social innovations that have a high potential for creating solutions that help the shift to an inclusive green economy, both financially and in-kind. Grand Inga Dam in the DRC or the large-scale procurement of renewal energy in South Africa is also a major step towards greener economy (Amis, 2014). A primary survey of 103 green entrepreneurs showed that adopting environmentally friendly business practices has given entrepreneurs access to a wider range of opportunities. Numerous niches, including the creation of novel products, innovative business models, recycling, and energy efficiency, have been created by enterprising people and organizations. However, there are also some elements that are impeding the country's ability to build a significant green entrepreneurship sector. Maintaining green entrepreneurship requires factors including access to money, expertise, competency, information access, and assistance from the public and private sectors (Mukonza, 2020).

*Some notable examples of green businesses are:

‘Spektech’ founded in the year 2022 by Ephraim Moss is combating climate change through e-commerce combined with smart technology. They offer financial inclusion to those who are being overlooked in Africa through smooth funding. ‘The Soil Regen Guy’ founded in 2018 in Cape Town provides education and consultation to individuals, people indulge in maintaining food forests and community gardens, etc. ‘The Green Business College’ is a college in Johannesburg that is completely dedicated to raise green entrepreneurs. Founded in 2017, It provides affordable, short courses and business know-how through practical green skills. It also showed students different ways to reach sales channels for creation of their products’ demand. ‘Hemp Solutions’ uses technology to process industrial hemp in Paarl, founded in 2021 addressed important issues like creating jobs, agro carbon sequestration, industrialization of hemp, and supply of seeds, etc. ‘Celebratree’ founded in 2023 in Cape town is a carbon equity platform which let individuals, companies, and corporations celebrate their special occasions sustainably through indigenous trees plantation. They can purchase trees as gifts, later planted

on the farms. Transparency and accountability are ensured by the blockchain, which records every tree purchase.

4.3 The United States of America:

Organisations such as Green America pulls together people, organisations, and groups to put pressure on major polluters to address the climate catastrophe. Additionally, they support renewable energy solutions that boost employment while combating climate change and assist individuals and organisations in reducing their emissions. It also helps consumers for adopting sustainable shopping habits. In the U.S., conventional agriculture primarily relies on unfavourable chemicals, genetically modified organisms (GMOs), and methods that put many priceless social and environmental systems in danger. Instead, by establishing wholesome local food systems and tackling the climate catastrophe, some organisation offer food system that may contribute to the answer. Various legislative nature friendly actions has been taken in America such as ‘skip the bill’. The Senate, assembly and Environmental Quality Committee has passed it for offering consumers nontoxic paper receipt or e- receipt or no receipt for most businesses. These bill papers contain Bisphenol A (BPA) and Bisphenol S (BPS) which are endocrine disruptors leading to reproductive, developmental, and neurological problems. Amazon, the biggest clothes retailer in the U.S., falls short when it comes to safeguarding customers and employees from the harmful substances frequently present in garments. Green America's harmful Textiles campaign has been urging Amazon to address harmful chemicals in all of the apparel, footwear, and accessories that are sold on its website that contain hazardous chemicals. In response, Amazon declared that all of its private label brands sold in North America, Europe, and Japan will adhere to AFIRM's Restricted Substance List (RSL). The clothing and footwear industry's membership organisation AFIRM strives to solve chemical management. The AFIRM RSL makes sure that consumer products have a minimum amount of substances of concern. To prevent exposure to dangerous chemicals in all of its supplier factories, not just those that are on the clothing at the time of sale, Amazon will implement a Manufacturing Restricted Substances List (MRSL).

There are many such examples of green entrepreneurship like ‘Starbucks’ is to offer more plant-based milk including soy, oat milk, coconut and almonds etc. The company is collaborating with The Nature Conservancy to develop approaches to lessen the effects of its dairy on the environment and water while also enhancing farmer livelihoods. The biggest infant clothing shop in the U.S., ‘CARTER's’, is making significant efforts to employ sustainable materials and reduce the amount of harmful chemicals in its supply chain. Hydrofluorocarbons (HFCs), which are extremely polluting greenhouse gases used as refrigerants, are the subject of the first new climate regulation of the Biden-Harris Administration, which was finalised by the Environmental Protection Agency (EPA). The climate catastrophe is getting worse because HFCs, which are escaping from refrigeration systems, have hundreds to thousands of times the global warming potential of CO₂. The bipartisan American Innovation and Manufacturing (AIM) Act (December 2020) Omnibus bill required the new rule, which will gradually reduce the production and usage of HFCs in the United States by 85% over the following 15 years. The law is expected to reduce emissions by 4.6 billion metric tonnes of CO₂ overall between 2022 and 2050, or more than 1 billion passenger vehicles off the road for a year. A task force has also been established by the administration to find and stop the illicit traffic in the dangerous gases. These efforts encourage the proper reclamation and recycling of HFCs from old equipment to minimise HFC production in the interim and support the

switch to HFC substitutes, many of which are also more energy efficient. The Kigali Amendment, a global agreement to phase down HFCs, still needs to be delivered to the Senate for ratification. There is requirement of significant emitters to accept responsibility and modify practises quickly since the climate issue cannot wait.

4.4 The United Kingdoms:

The UK economy increased by 75% over the past 30 years, but also reduced emissions by 43%. As a large economy, it is the first to pass legislation requiring Net Zero emissions by 2050. Only 8% disagree, with more than 35% believing that the transition to a greener economy offers opportunity for firms. The Opinium research also reveals that the majority of business owners said their clients and staff are pressing them for greater environmental protection “Build Back Greener” is the motto for sustainable businesses in United Kingdoms. Green Entrepreneurs represented by Jo-Jo Hubbard, co-founder of ‘Electron’ whose interface makes it easier to manage demand for renewables such as wind and solar, then there is, Jamie Crummie, co-founder of ‘Too Good To Go’ whose business reduces food waste and works in collaboration with restaurants, cafes, and retailers. ‘Ryse’, which Jo Bamford founded in 2018, is in the vanguard of the green hydrogen market in Britain. They use the electricity produced by wind turbines located around the United Kingdom to power their electrolyzers, which then separate water into molecules of oxygen and hydrogen. Following that, the hydrogen can be put to use for a variety of purposes, including transportation, heating, and industry. It is completely environment friendly because it is powered by renewable sources of energy, and it also improves air quality. One aspect of a future agricultural revolution is ‘Saturn Bioponics’ by Alex Fisher. Food is vertically grown in 3D hydroponic towers. By increasing planting density, the towers allow farmers to grow some crops in a fraction of the land needed in traditional soil farming. They provide a solution that achieves sustainable intensification while also raising productivity by up to four times and lowering production costs. Magda Daniloaia and Ieva Balciute, Co-founders of ‘Aequem’, let everyone to shop for necessities with little to no impact, by aggregating the best sustainable products available. They make sure that clothing comes from organic sources, preventing the use of pesticides and boosting soil health when producing textile fibres. Many of their items are manufactured using leftover materials or "dead stock," which would otherwise be disposed of in a landfill. They also look for recycled materials, which encourages the circular economy and reduces the need for manufacturing as many "new" products as feasible. Additionally, they concentrate on cutting-edge green technology in the market, such as Tencel, a fabric created from fibres of responsibly sourced wood (Salter, 2020). On November 4, 2020, the British government announced pound sterling 134 million in cleantech financing. The investments, which come from the UK's Sustainable Innovation Fund and are a part of the British pounds sterling 1.25 billion investment package to support ambitious, innovative businesses, are intended to assist clean growth projects in developing new technologies, creating new jobs, boosting productivity, and combating climate change. More than 1,000 initiatives will get financing up to 175,000 British pounds across the entire United Kingdom (IISD, 2020).

4.5 Switzerland:

Switzerland is becoming more well known for its views on environmental protection and sustainable development. Switzerland was recognised as one of the top five nations attaining the Sustainable Development Goals the quickest in 2017. Switzerland was included in group of leaders in environmental

management in 2000 (Schaltegger, 2002). Building resiliency and sustainability in cities and communities is the goal of Sustainable Development Goal 11 of the United Nations. Based on the Arcadis Sustainable Cities Index, Zurich was crowned the world's most sustainable city in 2016. The city's ambition to become a 2000-watt society, which is the amount of energy use that is generally regarded as sustainable for a city, was specifically mentioned as evidence of the city's commitment to improving the environment. Additionally, there is investment in buildings that are environmentally friendly, mobility for the future, and an effort to raise public awareness through activities like the Zurich Multimobil action day and annual environment days. Calvin and Geneva, two more Swiss cities, are both ranked among the top 100 sustainable cities. Without a question, Switzerland is a global leader in waste management and recycling. The nation effectively sorts and recycles reusable and organic garbage while transforming the remaining waste to electricity. The 'KVA Thun waste-to-energy' facility, for instance, processes 100,000 tonnes of burning waste annually, benefiting a total of three hundred thousand residents in 150 communities. Because of the plant's proximity to the city of Thun, special care was taken to ensure ecological and social safety. The plant has an effective system in place to control air pollution, ensuring that emissions remain at minimum and air quality criteria are maintained. Due to its numerous lakes and rivers, including the Rhine and the Rhone, Switzerland has made an effort to improve the quality of the water as much as feasible. One of the most cutting-edge wastewater treatment facilities in all of Europe is called 'ARA Bern'. The facility produces biogas out of the sewage sludge while simultaneously cleaning ninety million litres of sewage every day. After that, public transit systems use this gas. The first industrial-scale carbon-capture facility in the world opened outside of Zurich in 2017. Through direct air capture, the facility eliminates carbon dioxide from the atmosphere. The technique uses very little land and doesn't need water to operate. The carbon dioxide is gathered and sent to a greenhouse containing 250 thousand plants of the same size. The facility has the capacity to capture 900 tonnes of carbon dioxide, which is equivalent to the annual carbon dioxide release of about two hundred cars (Farell, 2022).

4.6 Australia:

Technologies like 'LETA' (Low Emission Technology of Australia) are cutting-edge innovations that can produce clean, dependable, economical, and flexible power as well as lower carbon emissions from "hard-to-abate" businesses like manufacturing, heavy transportation, cement manufacture, and fertiliser making. Patrick Keane, an Australian architect, and his wife Juliette Eve established 'Project Rattan'. To create distinctive furniture and architectural installations, they combine contemporary 3D technology and computer-aided design with traditional Thai arts and crafts. As suggested by the business name, Rattan, a fast-growing palm that is indigenous to Asia, is the material used to produce their items. The material's strength and malleability make it perfect for making furniture, and it can take the place of less environmentally friendly materials like plastic or slow-growing hardwoods like teak. They get their rattan from Thailand, and they process it safely. Because it comes from trees, it absorbs carbon instead of emitting it. The business employs traditional craftspeople to create its designs, which supports local economy. 'Returnr' is a business that is working to "stop the waste invaders." Returnr offers reusable food packaging in an effort to lessen the amount of plastic contaminating the oceans, which is mostly the result of food and beverage packaging being discarded into the water. Returnr sells groceries and prepared meals from both upscale and niche brands. It presents itself as the ideal "Pack, Empty, Collect, Wash, and Reuse" business. The eco-friendly cleaning product line from 'KOH' is a safer option for the

environment because it doesn't contain harsh chemicals or dangerous emissions. The company's refilling system is eco-certified by 'Good Environmental Choice' Australia and uses ten times less plastic than conventional cleaning supplies. 'Brighte' is on a mission to reduce the cost of solar energy investment so that it is accessible to every homeowner. Since 2015, the business has authorised more than \$500 million in funding and facilitated more than 1,800 solar and home repair projects. They have supported more than 60,000 Australian homes (Trace, 2021).

4.7 Policy Measures:

Renewable energy sources are frequently included while discussing "green innovation". The transition to a post-carbon economy, however, depends on much more than just advances in energy-related technology; it requires a trickle down on many fronts, from innovation in lifestyle to innovation in investment and governance (Mainguy 2011). Successful green innovators were driven by an innate need to learn via trial and error and were also able to produce successful businesses. The majority of their gains were once again invested in developing their environmentally friendly product or technology. They significantly impacted the social and environmental gains in wellbeing while preserving the economic viability of their line of work (Aerni 2010). A growing number of extremely profitable companies from the developing world are demonstrating that they can be just as environmentally friendly as their Western competitors by converting eco-consciousness into a competitive advantage. These "new sustainability champions" have been identified by the World Economic Forum (WEF) and the Boston Consulting Group (BCG), who claim that they are doing business in innovative ways that creatively overcome resource constraints and population pressure. These new green champions are outperforming their peers in terms of financial performance, proving that green businesses can generate higher-than-average economic growth margins by developing novel, lucrative ways to improve sustainability and new market solutions (Farenelli et al., 2011).

Government can help the eco-entrepreneurs through various ways which are discussed as follows:

- For agriculture sector, government financing should be made available to assist farmers in implementing cutting-edge new technologies such as green house construction, farmers are frequently undercapitalized, making high levels of investment very challenging. Additionally, lowering greenhouse construction costs may persuade more farmers to practise ecologically friendly crop planting.
- For industrial sector, conscious consumerism should be kept in mind while producing goods for market. The government needs to start appropriately rewarding innovators while cracking down on pollution and other forms of environmental damage. We also need to invest in more sustainable industries globally. This will encourage the development of green business ventures and provide businesspeople an advantage in the worldwide competition to thrive in tomorrow's high-growth industries. The government must work tirelessly to tap into the inventiveness of the business community of environmentalists. More than half of consumers said they would be ready to pay more for things that they can reuse or recycle (Accenture, 2019), and 72% of consumers now buy more sustainable products than they did five years ago. Ones that were branded as sustainable grew 5.6 times faster than ones that weren't, according to a 2019 New York University study.

- The truth is that society will only be able to solve the serious issues of global warming and climate issues through the development of newer and better technologies. Continuous Research and Development (R&D) is needed for sustainable products that can replace the conventional non-sustainable goods. Knowledge, technology creation, and diffusion are some important steps. It should be followed by a university-industry interface and coordination and cooperation between firms for technology usage.
- Many entrepreneurs wished to contribute something worthwhile to their community or nation. They believe that actively developing a long-term, sustainable economic activity and hiring people is the best approach to achieve this. Additionally, some of them had an even more ambitious goal, that they "want to change the world" (Linnanen 2002), at least within a specific geographical region and/or industry. In order to maintain the longer term perspectives for their firms, it was also discovered that a constant improvement of their business systems was a driver. Therefore, young minds should be influenced at the school level to give back to nature so that they can become assets for the nation and world by preserving the environment (Schlange, 2006).
- The regulatory environment for green entrepreneurs should be relaxed by reducing administrative burdens to enter green business, insolvency should be resolved without enforcing contracts. Flexible international trade, smooth court, and legal framework, easy property registration, and a high standard of the patent system are some drivers for eco-entrepreneurship.
- Training experience for entrepreneurs should be provided free of cost or with minimal charges, infrastructural development will further enhance the chances of green entrepreneurship.
- Various funding options should be available for e.g. Debt financing, public funding, stocks, equities, angel financing etc. for smooth economical function of the entrepreneurial activities.

4.8 Limitations:

The area of green or eco entrepreneurship is so vast that a single study or perspective cannot do justice with it. The paper utilizes only a few aspects of green entrepreneurship, other variables such as a number of sustainable start-ups, amount of investment in renewable energy projects, and adoption of environmentally friendly techniques are also a part of the sustainable planning and can be inculcated in further studies. What various types of transformative ecopreneurship may need to grow in various regions is yet another issue that should be taken into account in the future. Different eco-entrepreneurial strategies may be required in various places due to the differential demands that rich and poor people impose on our planet. For instance, the requirements for transformative eco-entrepreneurial responses in the least developed Sub-Saharan countries may be very different from those in industrialised economies that rely heavily on fossil fuels, such as the USA and Canada (De Bruin, 2016). More countries can be analysed and new elements such as green exports can be taken for analysing countries' contribution towards other economies.

5. Conclusion and suggestions:

In the present study we have seen how sustainable development goals align with eco or green entrepreneurship. Human development of a country affects the GDP significantly asserting the fact that it is very important to invest in human capital through education and training. This educated or skilled human capital can in turn make economical decisions for the betterment of environment while chasing growth. Renewable energy usage has a positive impact on GDP. Therefore, maximum energy for

business should come from this source so that we can reduce our carbon footprints. We have also mentioned selected case studies in different countries to understand how innovative people have become in saving Mother Earth from clutches of pollution and environmental degradation. Sustainability in business is not a one-time factor but a way of life that should become more assertive with the passing time. Mere growth can create a havoc in the society until and unless we ponder over ways to minimize our unsustainable production and consumption practices. Government and financial institutions can play a major role in supporting these green ventures.

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