Social Aspects of Green Technology: A Review on Environmental Protection

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Abstract. Over the last few years, a wide range of building materials, systems, and technologies have been produced around the world, and concern about the field's sustainability challenges has been mandatory. Green technology refers to a variety of new and resourceful advancements in creating environmentally-friendly transforms in daily life. It has been prepared as well as used in such a way that natural resources along with the surroundings are protected. It is intended to be an optional source of technology that lowers the need for fossil fuels and causes not as much of damage to human, animal, in addition to plant health, as well as to the environment. The use of green technology is intended to diminish waste and pollution. Environmental technologies as well as clean technology are other terms for it. There have been studies on innovation that assumes environmentally friendly properties of materials, systems, and technologies; nevertheless, nothing has been said about the social aspects of sustainability. It is important to remember that sustainability encompasses not just environmental, but in addition financial and societal dimensions, the latter of which has direct repercussions for society's well-being. Because worldwide concerns of environmental deterioration have compelled our society to take action, efforts aimed at this goal should be based on historical and cultural values, as well as the interaction between humans and nature to rethink development and evolve the concept of long-term sustainability. New ecologically friendly technologies are, without a doubt, critical to achieving long-term development. The purpose of this research is to emphasize the societal characteristics or features that contribute to environmental conservation through green technologies. The study is based on reviewing of secondary data sources like journals, articles, newspapers, social media, books, etc.

Index Terms: Environment protection, Green society, Green technologies, Social sustainability

I. INTRODUCTION

Technology is well understand at the same time as a set of courses designed for adjusting, and using tools, equipments, techniques, crafts, and systems, as well as technique of systematize them, in order to solve a setback, improve an existing solution, achieve a target, handle a functional input/output connection, or execute an explicit task. Humans and other animal specie's aptitude to manage as well as adapt to their natural habitats is greatly influenced by technology. Green technology is also known as green engineering or environmentally conscious manufacturing, which entails the development, performance, and integration of buildings (Zuo & Zhao: 2014). According to the Green Technology Organization (2014), green technology is a collection of efforts that includes methods and materials used in everything from energy generation to the development and usage of non-toxic cleaning products. Green technology is a gradual approach (system-level approach) to product and process design that prioritizes the value of nature while simultaneously being concerned about quality and economy (Billatos & Basaly: 1997). When interpreted in the context of the system's life cycle or the building's system life cycle, this system becomes evident. A building's life cycle system begins with planning, design, construction, operation, maintenance, and disposal and continues throughout the building's lifespan. Technology has had a significant impact on our society and its surroundings and has aided in the development of more modern economies (including today's global economy) and the rise of the leisure class, despite its idleness and lethargy. In order to maintain this sense of well-being among society's citizens, they must consider the environment's long-term viability. Technology has had an extensive range of effects on society and its environs and has aided in the advancement of increasingly modern economies, together with today's global financial system. Automobile technology, Bio-technology, Nuclear technology, Aircraft technology, Atomic, Computer technology, Telecommunication technology, Renewable energy technology, Internet technology, Nanotechnology, and other technologies that science has contributed to society have changed people's lifestyles and provided relaxation or contentment. In order to maintain this sense of security among society's citizens, they must be concerned about the environment's long-term viability. The adoption of new technology has an impact on a society's culture and values, and it frequently presents newly ethical issues. On the way to enhance any existing systems in society, it is common practice to compare them to a theoretical, anticipated system of the same type known as an 'Ideal system'. The term 'ideal system'[1] refers to a method or a system with ideal features, i.e., one that is flawless in each manner; it is what the mind imagines to be perfect. Ideal engines, ideal current sources, ideal voltage sources, ideal

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switches, ideal transistors, ideal semiconductor devices, and amplifiers have all been defined and accepted as principles to increase the value and routine of such useful gadgets or systems (Aithal & Aithal: 2015). Researchers have discovered to facilitate by keeping those hypothetical devices or structures in mind, they have been able to advance the distinctiveness of convenient devices or systems in order to improve their performance. As a result, an ideal technology model is required to plan the enhancement of any realistic technology's performance. The idea of ideal technology can be defined as a technology that is able to meet all of a person's essential necessities while also providing a rich, comfortable lifestyle without negatively impacting society or the environment. In order to raise the worth of existence to a new plane, ideal technology should have certain features with full impartiality, so to facilitate every human being in this cosmos might live a contented and relaxed existence as well as experience what is referred to as 'paradise on earth'. The optimal technological system characteristic's a model consisting of input setting, output setting, green circumstances, and system necessities are based on a variety of criteria. Manipulate the underlying nature of substance to deliver elucidation to fundamental and complex challenges of mankind.

The input properties are;

- Ubiquitous, in the sense to facilitate the technology that can make available solutions and services to users at anyplace, and for any amount of time.
- Able to control the primary character of substance to make available the elucidation to fundamental and complex tribulations of mankind.
- Affordable to everyone, as it utilizes ordinary elements found in nature and manipulates them effectively to meet human needs at a low cost.
- Inexpensive and self-sufficient in terms of resources, making it appealing to people/countries in a variety of economic situations.

The Output properties are;

- Having equivalent chance and comparable solutions are provided to all users, regardless of their sexual category, religion, conditions, edification, financial condition, or country of origin.
- Mechanization; ultimate technology make routine all the procedures in all types of businesses to eliminate human intervention in work/manage and deliver expected results related to programming.
- Able to identify and address essential necessities such as foodstuff, drinking water, renewable energy, wearing, sanctuary, fitness, and a healthy atmosphere.
- Make available users with a comfortable life by delivering solutions to their desires.

The System Requirement Properties are;

- General-purpose technology to hold up all human and existing organisms on the planet's fields and issues.
- Infinite potential for life in the universe to flourish further.
- Discover latest prospects to advance and explore contentment in addition to, greater leisure in people's lives by making it trouble-free, uncomplicated, quick, and user-pleasant to work out all types of problems and deliver a quick optimal answer.
- The technology must be independent, reasonable, and self-regulated in order for it to achieve its aim.

The Environment conditions are;

- Creating innovative products/services with optimal qualities open up endless business prospects; maintaining a clean surroundings throughout its processes and avoiding process footprint whilst accomplishing a specified function and,
- Having no side effects, it should be out of harm's way for consumers along with the surroundings.
- Several technologies that possess the aforementioned features/distinctiveness are regarded as perfect, but unadventurous technologies have significant downsides/confines in terms of the aforementioned properties (Shubhrajyotsna: 2015).

Problems of Environment, Safety, and Health

In retrospect, the western public buildings revolution began in the 1950s. To achieve the purpose of the building as an office, a hospital, a commercial center, and so on, the building was planned with a simple construction that featured water and electrical supply facilities. The impact of the industrial revolution in the 18th century contributed to the widespread usage of machinery, engines, and mass production. That revolution was viewed as a stepping stone into the construction industry, particularly in the public sector. This causes businesses that operate in the building to go through a widespread development period. All communication, industrial, and commerce affairs were aided by the usage of the telephone, fax, and computer, resulting in a new revolution in the 1960s-communication and information technology. As a result, these revolutions shifted the prior building landscape from environmentally friendly to energy-intensive and heat-producing technologies (Zhen-Yu: 2014).

The usage of air conditioners to cool the people, spaces, and computer rooms became necessary as a result of this situation. This necessitates a large number of energy consumers in the occupied structure. However, it has been claimed that the usage of centrally controlled air conditioning has resulted in deaths as a result of airborne infections such as Legionnaire's disease[ii] (Wood: 2003). Furthermore, improper control of the flow of water from the building cooling system adds to mosquito breeding

grounds and the spread of diseases. The resulting technology has caused health issues and puts building inhabitants' lives in jeopardy. The globe is currently confronted with a number of global challenges. Smalley (2005) identifies a number of current global concerns, including energy, water, food, the environment, poverty, violence and war, epidemics, education, democracy, and population. According to him, if a man has the knowledge to manage the environment sustainably, the energy issue may be effectively overcome without endangering the ecosystem.

Building management, particularly in public buildings, is extremely pertinent to these issues. Not only that, but managing public buildings also entails land conversion, land product changes, water usage, and construction materials (Wiedmann et al: 2013). As a result, the environment was still a factor in these four factors. These four characteristics existed even before the structure was constructed. Following the construction of the structure, the process of ensuring that the facility's residents are comfortable and secure begins. It necessitates building services such as air conditioning, elevators, and fire alarm systems, as well as security and communication networks like telephone and fax Internet access and enough lighting, are required. To function at the needed level, such systems require energy. Energy and water consumption patterns have an impact on a building's operating costs. The usage of materials, design, location, temperature, purpose, and tenants of the created building, all have an impact on consumption patterns (Suh et al: 2014). One most important characteristics of ideal technology is its sustainability, as well as the fact that it emits no greenhouse gases into the atmosphere, i.e., perfect technology is green technology. Equal way in to healthy foodstuff, clean drinking water, health care, elegant sanctuary, edification, energy, profitable opportunities, as well as employment opportunities are the underpinning of a sustainable society. Humans live in harmony with their natural environment in this ideal civilization, conserving resources not only for their own generation but also for future generations. Everyone has an elevated excellence of life, and there is social integrity for one and all. Nanotechnology, next-generation nuclear power, biofuels, bio-plastics, smart monitoring, and prediction analysis, tidal energy, as well as other technologies are examples of future sustainable technologies. On behalf of building, maintenance, and future growth, sustainable cities require sustainable technology. Recycled building equipment, green roofs for rainstorm water management, and zero-energy buildings (t) are examples of sustainable construction (those that produce at least as much renewable energy as they consume), natural aeration structures, and sustainable infrastructures such as sustainable metropolitan drainage systems, less cultivation sites, renewable energy source such as sewage-derived biogas (Zuo & Zhao: 2014). Sustainable restricted resource production, such as recycled rainwater for consumption and metropolitan farming plots, and so on, and sustainable transportation systems, such as open trains and buses to facilitate or to run on renewable fuels, synchronized bicycle paths in addition to walkways, enlarged way in to transportation, tolls designed for private vehicle use, and so on. Sustainable technologies can be promoted through changing government policies to assist research as well as the adoption of such technologies, as well as educating individuals on how to endorse and employ such technologies in everyday life.

Green Technology (GT) is a king of environmental therapeutic technology that minimizes the environmental harm caused as a result of items as well as technologies designed for people's convenience. Green technology is thought to increase agricultural productivity at the same time as falling environmental dreadful conditions along with preserving natural assets. Green technologies are long-term solutions that do not leave a footprint when employed for various processes and applications. Sustainable technologies can be promoted through changing government policies to assist research as well as the adoption of such technologies, as well as educating individuals on how to uphold and use such technologies in everyday life. Green technology does not throw in to environmental degradation in any way. They encourage the automation of all processes in order to eliminate the need for human interaction. They are sustainable, improve people's lifestyles, and contribute to human comfortability because they do not hold up environmental deterioration or throw in to the creation of a footprint. Green technology can be used to make significant technologies such as aircraft technology, automobile technology, biotechnology, computer technology, telecommunication technology, Internet technology, renewable energy technology, atomic and nuclear technology, nanotechnology, and space technology green. Such green technologies have the potential to help solve problems in both basic and advanced civilizations. Now we didn't like to go over some of the more general aspects of technology, starting with the one that's nearest to us;

Nanotechnology as Green Technology

Human's basic requirements and comfort desires are predicted to be met by developing nanotechnology. And foodstuff, intake water, energy, textile, sanctuary, health, in addition to environment are the essential requirements of humans, whereas comfort desires include automation in all fields, space exploration, and extended lifespan, among other things. Nanotechnology is the atomic, molecular, and supra-molecular manipulation of matter. The primary as well as most commonly acknowledged explanation of nanotechnology pertained to an exact technological idea of perfectly manipulating atoms and molecules for the formation of macro-scale commodities, which is nowadays known as molecular nanotechnology. Nanotechnologies designed and controlled enlargement leads to environmental sustainability, making it a green technology (Smith et al: 2007). The following are some of the applications of nanotechnology that were previously regarded to be green technology;

- Renewable energy that is clean, safe, and economical.
- Lighting that uses a division of the power/energy used by traditional lighting systems.
- Sensors for detecting and identifying hazardous chemical and biological agents, as well as techniques for removing hazardous compounds from the environment.
- Green construction and long-term infrastructure.
- Adapted production techniques to reduce greenhouse gas emissions.
- Recyclable materials that is stronger, lighter, and more durable.
- Therapeutic devices along with pharmaceuticals to become aware of as well as cure the syndrome more efficiently with fewer or no side-effects.
- Inexpensive filters to offer clean drinking water from seawater.

Green Technology for Cultivation

Green technology supposed to be useful, convenient, lucrative, and pollutant-free. The capability of farming land to uphold satisfactory levels of production above a long period of time devoid of hurting the environment should be considered a sustainability aspect. Some people describe sustainability as the ability to maintain productivity in the face of adversity. In this framework, agricultural sustainability should aim to maximize food production while remaining profitable. The following are the specific issues that green technology in agriculture faces:

- Classify suitable technology appropriate intended for income generation throughout sustainable farming, such as ecological farming, rural renewable energy, and so on.
- Reviewing confront and accessible guiding principle alternatives for the espousal of green technology (GT) under the sustainable cultivation advancement structure.
- Groping the impact as well as insinuation of nationwide policies in order to make recommendations on how to extend appropriate technologies.

The rebellion challenge is in the direction of formulating applied technology aggressive and sustainable nanotechnology advancements in farming are anticipated to work out the troubles in the foodstuff zone, in addition to take full advantage of productivity in agriculture. There is an escalating stipulate on behalf of foodstuff, enough sustenance, in addition to nanotechnology will offer solutions throughout meticulousness farming by means of nano-sensors[iii], nano-pesticides[iv], in addition to reasonably priced decentralized water purification.

Green Technology for Clean and Drinkable Water

Nanotechnology has the possibility to create competent, commercial, and environmentally sustainable way out for providing drinkable water used for human consumption as well as dirt free water for farming and manufacturing applications. Nanotechnology developments in inexpensive water filtration are predicted to solve the world's drinking water problem by delivering safe drinking water to everyone while remaining environmentally friendly. Water is one of the most valuable natural resources on the planet. The majority of it is prepared up of saltwater. By the year 2050, two-thirds of the world's populace will be afflicted by dearth, based on current consumption, population, and development rates. Nanotechnology, as a green technology, will give a solution to this problem by allowing for low-cost decentralized water purification, contamination identification at the molecular level, and much better filtering systems. This aids in the recycling of rainwater into clean drinking water, as well as the large-scale conversion of seawater into drinking water at a reasonable cost (Rasdi et al: 2001). Green nanotechnology-based water purification plants may turn out a huge quantity of drinking water using renewable solar or wind energy, making the water sanitization plant sustainable and low-maintenance.

Green Technology for Sustainable Energy

Nanotechnology advances in renewable energy that meets human being's complete energy requirement for basic needs and comfortable life. Balancing our energy needs through the cost to our planet's ecosystem is a serious confront. All the way through extra resourceful lighting, fuel cells, hydrogen storage, locally disseminated power generation, in addition to decentralized generation as well as storage; nanotechnology will lend a hand to fulfill our demand for energy solutions by reinventing the power network (Fisk: 2000). Nanotechnology, as a green technology, enables low-cost major renewable astral and wind energy invention and allocation devoid of causing environmental harm, therefore contributing to long-term sustainability.

Green Building Technologies

Nanotechnology opens up new possibilities in the building industry, allowing for the expansion of energy-efficient, extra-durable, ultra-high-strength, as well as ultra-lightweight production equipment. Nanotechnology is projected to accompany in a new standard change in all sectors of construction technology, following the IT and software revolution. Nanotechnology is seen at the same time as a game-changing green technology that can be able to assist in meeting the energy, environmental, and health needs of green buildings. Cement nano-modification is a relatively new field. The nanoscale scale allows for the synthesis and construction of materials, which allows for the growth of new-fangled products. New cement additives, such as innovative super-plasticizers and nanoparticles[v], are being developed. It is now possible to modify the characteristics, performance, and durability of concrete by manipulating the fundamental structure of cement

phases. Nano-modification moreover provides essential information for more correctly projecting the service life of concrete and insights into how to improve it. The difficulties are how to use green nanotechnology to increase building energy efficiency and heat control, as well as speed and durability of construction.

Green Technology for Aircraft and Space Travel

The problems that humanity faces on the planet are the effect of our desire to fly everyone at a low cost, which has resulted in high demand for diverse possessions as well as unrefined equipment. Although numerous of these minerals can be bring into being in space, the cost of extracting them is a significant hurdle. Aside from the cost, other barriers to space development include safety, reliability, and performance. There are four reasons, according to the National Space Society, why humanity should pursue space investigation and colonization. These factors, including endurance, expansion, affluence, and curiosity, all indicate that we, as a species, require greater space. Humans will be able to function in space more safely because of nanotechnology, which is a green technology. Propulsion fuels, structural resources, smart uniforms, electronics, as well as life hold up settings are all potential applications where nanotechnology could have an impact on space travel. Green nanotechnology is intended to produce materials that are extra resourceful, stronger, self-healing, as well as lighter than existing materials.

Green Technology for Education

Green higher education focuses on developing environmental knowledge, skills, attitudes, and values. Because of the economy's dependency on the environment, it is especially important in higher education. Higher education is critical for the formation and advancement of human capital. This resource ought to consider not just the economic part of business, but in addition to the societal aspects as well. The demand for green jobs is at an all-time high. Solar and wind energy must still be used to reach out to the masses in an efficient way, which necessitates the hiring of competent green managers. Beginning from the edifice industry to every managerial zone, there is a requirement to build a sustainable outlook that necessitates the hiring of a large number of green-oriented graduates. Buildings, energy costs, dependability, and performance must all be designed in such a way that they have a good impact on the environment. When it comes to open and distance learning, green technology can be used extensively (Aithal: 2016). Green occupations, green concepts; along with their endorsement in operations organization require ongoing research. The college's resources should be allocated in such a way that senior executives are committed, such as by constructing facilities, hiring faculty that deem in the green ideology, and developing a set of courses with the aim of encourages philanthropy and awareness among students. The incorporation of sustainability into the company plan is critical. Climate change, resource depletion, water concerns, poverty, hunger and war issues, and pollution produced by the environment all pose significant challenges to the current and future generations. Because of their low economic development and fast population growth, this is increased even further in underdeveloped countries. They play a vital role as educational institutions in examining various courses and degrees, as well as addressing concerns related to sustainability. Teachers, who are critical stakeholders in this system, have a foremost duty to play in staying updated and educated, as well as transferring knowledge in an innovative manner. The entire teaching style should be centered on learning rather than instructing. So that learning is particularly fruitful, pedagogy should contain real-world learning situations. Agriculture, natural farming, type of weather or climate in addition to environment, green tourism, green medical services, green transportation, and other topics can be included in this type of system. Due to their part to hygienic surroundings in numerous industrial automation processes, computer and information technologies are already called green technology (Guoliang: 2011). Green nanotechnology is defined as the growth of dirt free technologies to reduce environmental along with human health risks linked through manufacture as well as use of nanotechnology products, as well as to support the substitute of existing foodstuffs with new nano-products that are additional environmentally friendly all the way through their lifecycle (Billatos & Basaly: 1997). Green nanotechnology is the knowledge of how nanotechnology is able to improve the environment by conserving energy throughout manufacture, allowing products to be recycled after use, and employing environmentally beneficial materials.

Green Technology for Health and Medicine

Human health is a significant and substantial field of green nanotechnology study. According to the World Cancer Report[vi], there could be a 50 percent raise in new cases to 15 million by 2020, owing mostly to the world's ageing population. Green nanotechnology research has enormous potential for advancement in the medical field. Pharmaceutics and green nanotechnology are projected to advance, allowing patients to drink fluids containing nano-robots[vii] designed to assault and reconstruct the molecular structure of cancer cells and viruses. A nano-robot could operate on such a small scale that it would leave no scars, unlike traditional surgery. Furthermore, nano-robots have the potential to alter our substantial manifestation. They may be trained to do superficial surgical treatment, reshuffle the atoms of the human body to modify the shape of his ears, nose, eyes, or any additional physical characteristic he desires (Fisk: 2000).

Green Technology for Foodstuff and Processing

Food is a necessary component of our existence as well as for human survival. Humans have needed to eat to survive since the beginning of time. One of the most difficult issues for humanity will be to strike a sustainable balance between food supply and demand

that secures the human race's long-term survival. The necessity for sustainable food production and processing technology has become increasingly more vital as the world's population has grown rapidly over the previous several centuries. Green technology in the food and food processing industry faces a number of obstacles through the use of technologies to diminish the invention of process-induced toxins; societal aspects influencing consumer insight of current in addition to rising agri-food technologies, such as nanotechnology; and the requirement for as well as the importance of biodiversity in upholding world population's sustainable diets. Food processing is a diverse industry that uses a variety of raw materials, methods, and final products, and it requires extra care to maintain quality, security, and nutritional characteristics using green technology. Various technologies beneath the wide umbrella of biotechnology and nanotechnology, such as magnetic fields, non-thermal technologies, and so on, have the potential to decrease process-induced toxins in foodstuff and the environmental impact of foodstuff production and dispensation.

II. CONCLUSION

Technology has had an extensive range of effects on our society and its surroundings, as well as supporting in the advancement of more modern economies, such as nowadays global economy. Many technologies developed by science, such as aircraft technology, automobile technology, biotechnology, computer technology, telecommunication technology, Internet technology, renewable energy technology, atomic and nuclear technology, nanotechnology, and space technology, have changed people's lives and brought them happiness. In order to maintain this level of comfort among society's citizens, they must be concerned about the environment's long-term viability. We have highlighted the social characteristics or features of environmental protection through green technologies in this study. Green technology for farming, green technology for intake water, green technology for renewable energy, for construction, for aircraft in addition to space investigation, green technology for edification, green technology for foodstuff and dispensation, and green technology designed for health and medicine in the twenty-first century are also discussed in the paper. It is also very important that administrators and professionals utilize an appropriate representation of the green building. Global environmental degradation has compelled our society to re-evaluate its advancement and develop the impression of sustainable growth. New ecologically friendly technologies are, without a doubt, critical to achieving long-term development. Various green efforts are being undertaken in order to uphold and advance the excellence of the environment that will flourish in the future resource-efficient as well as sustainable thinking civilization. The urgency of current environmental problems, the newfound recognition of mutual environmental interests, and the fundamental role of science and technology in general, and green technologies in particular, in assessing and responding to environmental threats all provide expectations for international action in the application of science and technology to environmental concerns. For sustainable growth, environmental protection, resource conservation, and other socioeconomic issues must be addressed.

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[i] Ideal Systems: It is very well understood that with it we can easily recover the routine of every system by measure up to it with a hypothetical, predicted arrangement of that type called 'Ideal system'. The word 'Ideal system' refers to a structure which has ideal distinctiveness i.e., faultless in each aspects. It is what the brain imagines/pictures as being ideal. Retrieved from: https://mpra.ub.uni-muenchen.de/74395/1/MPRA_paper_74395.pdf

[ii] Legionnaires' disease is a severe form of pneumonia — lung inflammation usually caused by infection. It's caused by a bacterium well-known as legionella. Retrieved from; https://encyclopedia.pub/2823

[iii] Nanosensors are chemical or mechanical sensors that can be used to become aware of the occurrence of chemical species and nanoparticles or monitor physical parameters such as temperature, on the nano-scale. Cited from; https://www.azonano.com/article.aspx?ArticleID=1840

[iv] Nano-pesticides are being hailed as an up-and-coming technology that will diminish the adverse effects of pesticides on people and the environment. Retrieved from; https://ecos.csiro.au/nanopesticides-a-promising-new-pesticide-solution/

[v] Super-plasticizers are a elementary ingredient for lowering the yield pressure of concrete. Super-plasticizers are additions that allow a specified degree of workability to be acquired at a reduced water/cement ratio. Retrieved from; https://www.sciencedirect.com/topics/engineering/superplasticizers

[vi] The report focuses on avoidance and presents mainly wide-ranging indication of pertinent investigation accessible to date, ranging from evocative etiology, cellular and molecular biology, toxicology and pathology in the course of behavioural and social science.' retrieved from; https://www.iccp-portal.org/resources/world-cancer-report.

[vii] Nano-robotics: it is a technology of generating machines or robots at or seal the scale of a nano-metre. More particularly, nanorobotics refers to the still principally hypothetical nanotechnology engineering discipline of scheming and building nano-robots. Retrieved from; *https://www.sciencedaily.com/terms/nanorobotics.htm*