Impact of Green Technologies in Manufacturing Sector

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ABSTRACT: ***Green technology is known as the sustainable technology which is used to generate the energy and it will includes the environmental aspects. The role of green technologies in manufacturing field that allow the techniques which help to protect the environment and find the way to overcome the problems of the environment. They permit for expansion of the production sector technological capabilities, while producing cleaner productions, efficient management of resources and re-conversion of waste and pollution. Green technologies mean technologies that have either been technologically developed but have still comparatively low world-wide market share and still remain relatively early in technical maturity, while the technology already relevant to day-to-day life. In this paper, author studied about the role of green technologies in manufacturing field and also explains the scope of the green technologies in manufacting fields. In future, green technology is used to rescue a damaged ecosystem from life. The primary purpose is to preserve the natural world and remedy its adverse effects and it is also called clean technology or environmental technology.***

KEYWORDS: ***Green Technologies, Innovations, Manufacturing, Production.***

INTRODUCTION

1. Green Technology:

In industrialized as well as in emerging countries, green technology explains technical changes. Green innovations are those which are either technologically mature, but either weak on the world market or at a comparatively early stage of technological maturity. This paper focuses on how it can help address environmental issues in industrial sectors and also enhance the productivity of countries[1]. Middle-income countries (MIC) countries are particularly important when they are at an environmentally sound stage of growth, whilst these countries have already reached an administrative and operational level in order to take advantage of comparative advantages in terms of goods for manufacture. Figure 1 shows the implementation of green technology in manufacturing field.

Figure 1: This Diagram Shows the Implementation Of Green Technology In Manufacturing Field.

Following that, people look into the effects of the manufacturing sector on innovation, especially in MICs. Moreover, people also go into the effect of green technology on the manufacturing industry's efficiency[2]. The study indicates that the process of transition into sustainable production and use involves reforms at four stages:

1.1.Technology Levels:

Acquisition of technological expertise to incorporate into production procedures; this would necessitate actor in MICs being familiar with the successful ideas for introducing as well as the strategic advantages innovations have use for businesses.

1.2.System Perspective:

The integration of heterogeneous expertise from the diverse fields in which green technologies are introduced would include an emphasis on system-related aspects of green technology implementation.

1.3.Paradigm Shift:

Process development supporting environmental transformation of MICs would entail broader social dialogue in order for a number of players to realize the considerable advantages of green technology.

1.4.System knowledge level:

Qualification of learning procedures at every levels in order to trigger breakthrough innovations; this requires active participation by educational and training actors.

There are noteworthy gaps in innovation expertise, which can be seen in both general innovation and green technology metrics. The challenge for countries with higher levels of innovation competence is to connect established expertise with manufacturing implementation. This necessitates networking activities and enhancements to the innovation infrastructure.

In this study, This is a combination of technology which has achieved a certain degree of technical complexity but still has no global market share (e.g., solar photovoltaics), and of innovations which are comparatively early technological ripening but which still apply in theory to everyday life (for e.g., electric flexibility). The latest World Economic Forum (WEF 2013) report highlights the risks to the natural environment posed by economic activity: “Pollution levels have risen, biodiversity loss is becoming more troublesome, and climate change and its unforeseen impacts are causing concern. In addition, the world is experiencing a growing shortage of water, electricity, and mineral resources, all of which are in high demand. Despite some attempts to fix these problems, human activities unfavorable environmental impacts are making the planet less habitable”. “Social and the environmental sustainability progressively affect economic policy decision & can need an effect on economic recital”, according to the WEF. Simultaneously, these problems raise the questions of whether ingrained concepts and model that focus solely on economic development and ignore natural resource use, so social issues can still supply adequate solutions. In direction to advice policies that set & attain the required targets, and to improved track progress towards increased long-term stability, the connection between the issues must be better understood and measured.

The impact of technological changes on both developed and developing countries is important. “Statisticians have so far been dedicated to understanding how economic growth affects environmental or income quality in a region, and vice versa”, according to the WEF (2013). But little is known about the relationship between these dimensions of sustainability and competition and productivity”. Previously, they were correlated with higher costs and pressures. However, there is mounting evidence that there are numerous opportunities for developing new industries, especially in developing countries. Because of the increasing pressure on the climate, global demand for eventually rise. Only by ensuring environmental protection countries would be able to fully benefit from economic development[3]. In particular, the manufacturing sector has negative environmental implications, specially in developed countries, but it is also the industry that can deliver solution to sustainability problems by providing new market opportunities. Figure 2 shown the manufacturing process of products.

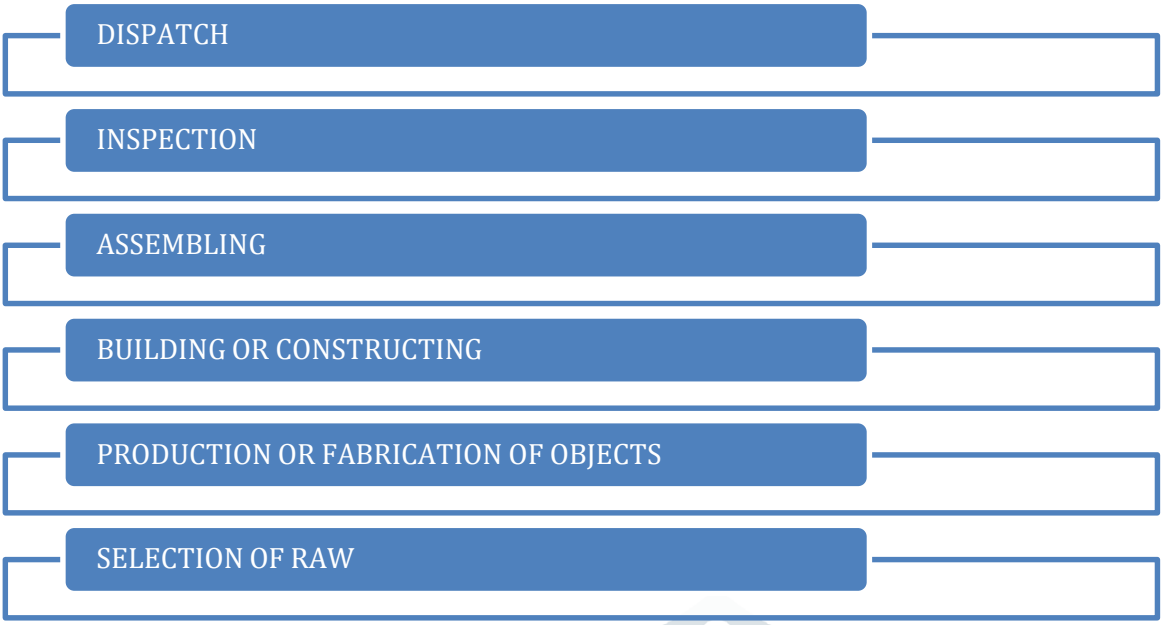

Figure 2: This Diagram Show The Manufacturing Process of Products Which Contains The Several Steps Like: Dispatch, Inspection, Assembling, Building or Construction, Production or Fabrication of Objects and Selection Law.

As a result, the emphasis of this report is how the manufacturing sector can help in solving environmental problems while also improving countries' competitiveness. Author concentrate on (MICs) because they are in a stage of development with the greatest environmental impacts while also having established institutional and organizational structures that enable them to benefits from the inexpensive advantages that the solution they create provide.

Major drivers in the industrial field of green technology This segment gives a short description of key production drivers:

- Author examine the historical trajectory, current state, and projected future growth of energy use and greenhouse gases emissions (GHG) as the key motorists for energy & the climate technologies, as well as the related problems of energy resource supply and greenhouse gas impact.
- In the 2nd segment, we deliberate long-term shifts in the sustainable "development and consumptions" paradigm, which are gradually tying the entire products cycle from productions to consumptions together. Material effectiveness problems, recycling & the abridged impact on water, air and soil, through initiatives along with the producer of consumers chain are all covered in this segment, which goes beyond the report's main emphasis on energy and climate technologies. There are also significant chances for businesses to access new market through technological innovations as a result of this paradigm change.
- Finally, author present a list of renewable energy and environment technologies that will be discussed in the following section. Green innovations are often the most valuable from an economic and often social standpoint, which provides additional drivers.

2. *Manufacturing Industry:*

The main driving forces are energy use and greenhouse gas emissions. The advancement of green technology is being pushed forward by increasing energy use and greenhouse gas emissions.[4]. According to the International Energy Agency's World Outlook 2012 estimates, industry, transportation, and building account for approximately equivalent shares of energy use and GHG emissions is about 30% (Figure 3)

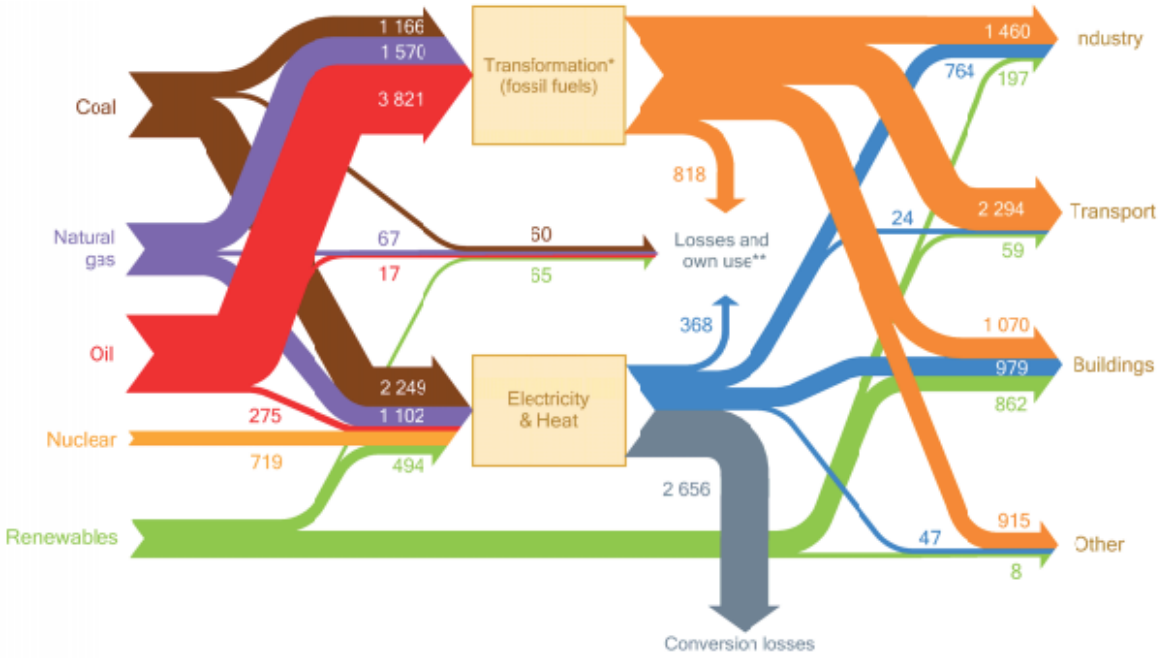

Figure 3: This Diagram Shows The Need Of Industry At Global Energy Systems. The Energy System Contains Coal, Natural Gas, Oil, Nuclear And Renewables[4]**.**

Trans-disciplinary, systematic research into the sustainable productions and consumption trends, as well as potential development paths, is needed in this area of research. The sustainable configurations, advanced science and technology principles are routinely mixed. Development, facilities, sustainability, and socio-ecological research are all required to make significant contributions to this process. Other fields of research, like biotechnology, materials, nanotechnology, infrastructure technology, information and communications technologies, will all play a role in the growth of long-term material turnover trends.[5]

To deal with the complexities of overlap and discrepancies between different parts of technology study, it seem appropriate to start with areas with a high degree of possible interactions or the branch of productions and consumptions trends that will be crucial for future material series in the industrial cultures. To create and analyses interconnected growth trajectories, these focal areas of technology research will be merged. An interdisciplinary panel of actors, for example, will identify the focus areas one by one. Examples of conceivable changes to pattern of material sequences in material revenue could be:

- Usage-centred business model
- Hybrid values adding
- Carbon-neutral economic activities
- Dematerialized values adding
- Green chemistry
- Interactive values adding
- Bionic process concepts

3. *Climate Technologies and Sustainable Energy:*

Changes in paradigms, concepts, structures, and social organizations are all part of the transition to sustainable development and consumption patterns. However, both the diffusion of existing green technology into main market (which do’not necessitate technical innovation but does necessitate innovation in the field discussed above) and the development of fundamentally modern technologies are needed CCS in the industrial applications example). Researchers concentrate on the technology aspect of green technologies in this section, and researchers provide informations on a diversity of related climate and climate technologies.

- Energy-intensive sectors, such as steel/iron, cement, paper, aluminium, pulp and some chemicals, may benefit from green technology.
- • Green technology for less energy-intensive industries, particularly cross-cutting industrial technologies like smart grid and electric motors technologies for industrial load management.
- CCS technologies used for industrial sector.
- The renewable energy resources for the manufacturing sector

- Specific methods for reducing industrial gases like PFAS and sulphur hexafluoride (SF6). It should be remembered that the majority of the new industry potential for many of these innovations (in particular, cement, steel, and technologies for less energy-intensive industries) would be created in non-organization for economic co-operation and growth (OECD). OECD countries (see Figure 4), which implies that these countries could possibly also take the lead in technological equipment[4].

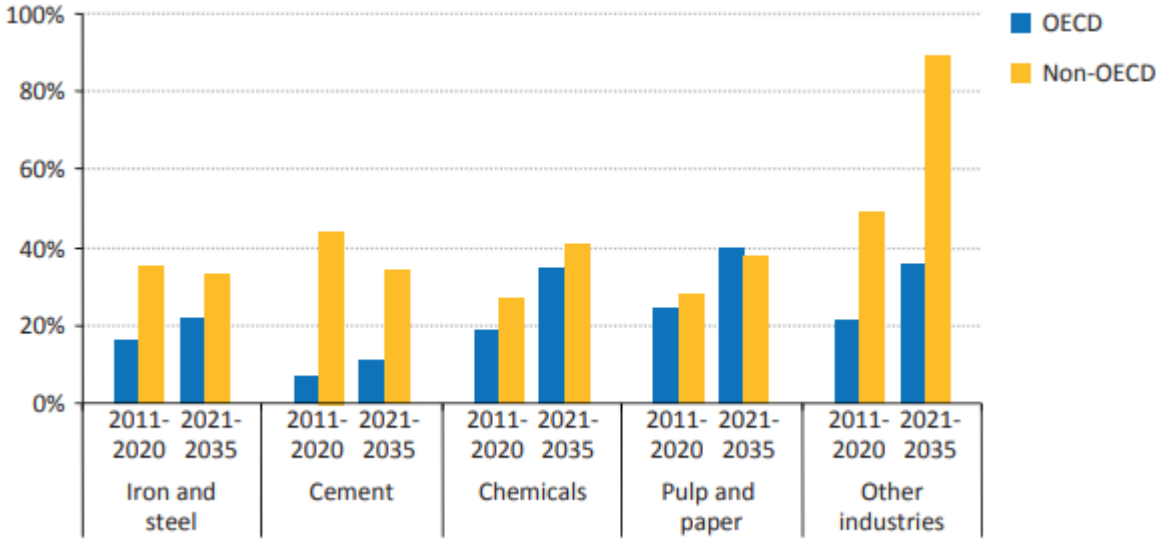

Figure 4: This Graph Showing The Data Of Organization For Economic Co-Operation And Development (OECD) And Non Organization For Economic Co-Operation And Development (NOECD)[4]**.**

4. *Chosen Green Technologies For the Energy-Intensive Industries:*

4.1.Processing of Iron and Steel:

Steel processing entails a number of steps that can be combined in a variety of ways, depending on the usable raw materials, product mix, investment capital and energy supply. The keys features of the 3 main procedure routes are:

- In a simple oxygen furnace, this is then transformed into steel. This route is extremely energy-intensive because to the presence of coke creation and sintering processes.
- The electronic application forms (EAF) way is mostly based on scuffle for the inputs of iron and has the meaningfully lower energy strength compared the BOF/BF route because of the lapse of iron and coke production processes.
- The iron ore-driven direct abridged iron EAF/ DRI route often uses iron ore scuffle for the inputs of iron. Contingent on the sizes, fuel and ore features the energy strength of DRI productions can be inferior than the BF route. The smelting reduction, which is an advocate of the explosion furnace process, has also received increasing attention in recent years.

5. *Selected Green Technologies For Less Energy-Intensive Industries:*

Electro-motors transform electrically and are often part of a system driven by a motor into mechanical power. Electrical engine-driven systems for pumping, ventilations, compressed air, transport & other mechanical form of processing and handling are used in industrial applications. Although electric motors & their control are characteristically the part that require most electricity in a powered systems, they often have a limited impacts on the complete effectiveness of the systems. The fact that the rest of the system component, such as pumps, ventilators, pipes, valves, ducts and end-user systems have an impact on both the mechanical energy requirements of the whole systems and the fatalities during the transfer of this powers. Therefore, it is crucial to adopt a systems approach in order to optimise the energy efficiency of motor system[3]. The efficiency levels of a particular systems varies from the level of advanced solution used to the overall designs of the systems. In the majority of cases, it improves the efficiency of the motor systems and it containing following steps:

- Utilization of the energy efficient motor.
- Selecting the basic components e.g. fans, pumps, variable speed drives, compressors transmissions, with the correct size, type and high efficiency.
- Optimizations of the designs and the whole system's operation.

DISCUSSION

Green technologies have an impact on innovation in the manufacturing sector. As drivers for innovation, green technology. In the last two decades, this is seen that several developments has been done in the field of green technologies. The role of innovation within the different strategies is markedly different.

The adoption of End-of-pipe solutions have initially been used. There are secondary innovations rather than altering the manufacturing chain. Consequently, the main sector of manufacturing was not compromised and primary engineering tasks included reductions in costs and emissions. The decline of toxins such as CO2 can be traced to this technique.

More integrated techniques for processing were used during the second phase, such as improved energy management procedures that decrease energy consumption and associated emissions. These techniques have to be incorporated into the core manufacturing process, i.e. factors such as consistency of production and improvements in efficiency are important. In the one side, this complicates these developments. Secondly, there are economic incentives to raise costs for manufacturing materials and lead to the modernisation of manufacturing resources. An example of this is the transition from conventional to totally modern procedures, e.g. steel or more power-efficient electric motors.

The third environmental approach stresses product and product decision processes completion and convergence. These methods solve issues such as toxicity-free product design and increased demand for limited yet useful services. They are related with new evaluation methods, such as the life cycle impost. The strategy adds yet another dimension of uncertainty of engineering to environmental issues, as they involve teamwork across the supply chain from manufacture and procurement of raw material to manufacturing, product reuse or recycling of material. Moreover, modern product also need new business model, which include shifts in businesses. These policies often open up modern economic opportunities when new product are needed for the expansion of new industries. In short, the corporate plans for the climate and creativity are the same line.

The enormous challenge of achieving sustainable development has become more sensitive to the need to transform whole industry. Especially with regard to energy, water, transport and chemtics, the resource base must be shifted and significant structural changes in the manufacturing sector encouraged, for instance, in the direction of an economic free of carbon. This requires not only substantial innovation in companies but a major co-evolution of technology with neighboring standardization, regulations and institutions, the education and training system. In other words, the complexity of innovation is also mesoeconomics. In short, environmental strategies with regard to innovation are becoming increasingly complex. This has important consequences for green manufacturing technologies. Green technology, especially cross-cutting the industrial technologies that are energy efficient technologies for energy-intensive and low-energy industries. CCS technology has features alike to end-of-pipe technology.

Renewable sources of power production are not altering the process itself but can help to make the electricity supplies used for industrial processes cheaper and cleaner. Innovations are generally accepted on the importance of reducing environmental pressures and promoting sustainable growth. Consequently, understanding how inventions arise is especially critical. Innovation is the initial use of a solution that is scientific, systemic or even structural. They may be gradual, i.e. the improvement of current solutions or the full development of new solutions. Innovations to change the atmosphere are referred to as eco-innovations.

In this context the term sustainability technology is also used to stress the economic aspect of eco-innovation in terms of integration into the procedure of manufacture, new procedures and even sector transformations. The process of innovation is not undeviating, but involves many loops of feedback between inventions, development of technology & diffusion. Early dissemination of technologies is crucial due to the necessity for producer-user interactions and market education. The factors of supply rigger innovation, i.e. the development of new technology ideas and concepts. However, the requirements for new solutions and the functions offered by new technology must also be fulfilled in order to be effective, also play an important role. A new technological paradigm is a radical innovation. The various design of opposing technologies guarantee diversity. The selection processes occur and a dominant design eventually arises.

Learning and cost savings on a larger scale contribute to increased diffusion, which makes for more gradual advances in the same technical course. The process of innovation is integrated into knowledge generation and socioeconomic developments. Innovation is therefore following certain paths that can lead to path addictions & obstacles to new technological solution. Innovations are not just a technological process. At the same time they need both organizational adaptations and the co-evolution of institution that support technological development. This joint development is crucial to the global debate:

- Creativity is not a straightforward process: the need for co-evolution is a roadblock to modern scientific paradigms. When a new path is defined, co-evolution increases the dynamic of innovation throughout the path.
- The process of globalization is also considered to be more global in finding new solutions and building up knowledge. The transfer of technology and system connections is more difficult than single advanced technology that embody technological changes.
- Institutional and Organizational co-evolution highlights the various facet of globalization. The economic growth is interconnected functionally with institutional changes that add to globalization's social dimensions. The process of innovation takes place at various stages. The selection procedure for the dominant project plays an main role in the early stages of radical innovation as does the availability of various solutions for the selection process. Market formation and feedback from users and manufacturers will become increasingly important in subsequent phases and technological and institutional co-evolution promotes further progressive innovations.

CONCLUSION

A development that has less impact on the surrounding atmosphere should be achieved by the industries throughout the world. Green technologies are not confined to normalize the pollution and recycling processes but it focuses on reducing the impacts of manufacturing processes at every stage of production. Green production is asserted which makes financial sense for business of all scales. Green Manufacturing attentions on primary goal such as minimization of emissions, accidents, effluents and nonrenewable energy resources, product, life cycle cost and services. An industry which was established already cannot shift suddenly from its conventional manufacturing methods to green manufacturing techniques since they initially incur high investment costs, but the budding industries can start directly with these green technologies so the cost of maintenance of the industry gets reduced on long run and our environment is safeguarded. In this paper, author discussed about the role of green technologies in manufacturing field and the future scope of green technologies in manufacturing field that how green technologies help in productions of manufacturing products. In future, green technology plays the important role in human life and green manufacturing's main aim is to protect the environment and to reduce product costs.

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