

Impact Factor: 6.017

ISSN: 2278-9529

# GALAXY

International Multidisciplinary Research Journal

## Special Issue on Tribal Culture, Literature and Languages

National Conference Organised by  
Department of Marathi, Hindi and English

Government Vidarbha Institute of Science and  
Humanities, Amravati (Autonomous)

**13** Years of Open Access

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## **Loopholes in the Sustainable Manufacturing Industry Growth and Development**

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### **Abstract:**

The industrial sector plays an important role in India, one of the fastest-growing economies in the world. The development of industrial estates is becoming inevitable for India, particularly for enhancing the share of manufacturing in the country's GDP and creating several millions of additional jobs. Industrial development and trade in industrial goods have proven track records in effectively tackling issues related to various matters. However, the manufacturing processes undertaken by Industrial development activities distribute a way for creating elements that are degrading the status of our environment. To find its solution, the world has proposed the idea of a sustainable manufacturing industry. Considering this issue, this present research paper will try to highlight shortfalls effectively in achieving the goal of moving towards a sustainable manufacturing industry.

**Keywords: sustainable development (SD), supply chain manufacturing (SCM), Government regulations, Sustainable Development Goal 9 (SDG 9).**

### **Introduction:**

#### **What is sustainability?**

The term 'sustainability' means to continue at a fixed rate. And if we use sustainability in the context of the industry then what will be the meaning of that term? A sustainable industry provides energy efficiency, conservation of resources, and low waste production. We can consider them as a pillar of sustainable industrial development. Energy efficiency is very important because globally there is a huge concern about saving energy and saving the environment. So, reducing the carbon



footprint on the environment is very important. What is also very important is to ensure that resources that are used in all different other terms are also conserved, and the amount of waste that is produced should be reduced significantly so that there will be a sustainable method of manufacturing and a sustainable method of production in sustainable manufacturing industries.

So, in Industry 4.0, the reposition is to include the characteristics of the previous industrial revolution in a much more sustainable way. So not only do we want to introduce new things, but also, we also have to ensure that whatever has existed from the previous industrial revolutions continues at least in the same form that it was before and also to introduce newer technology and continue the same things in a much more consistent sustainable manner so that it does not become one-time kind of affair. Industry 4.0 or the fourth industrial revolution is a comprehensive industrial revolution that takes into account sustainability issues because it is not just talking about introducing new concepts, but also ensuring that there is sustainability in the long run. It incorporates emerging issues of globalization as well.

### **Objectives:**

- To study the concept of sustainability for industries.
- To study the Importance of industrial development.
- To find Loopholes in achieving sustainability in the manufacturing industry.

### **Importance of the study:**

- **Industrial Development:**

The industrial sector plays an important role in India, one of the fastest-growing economies in the world. The industrial estate program in India is perhaps the biggest undertaken by any developing country. Since it started in 1952, since then there has been immense growth and now there are nearly 2000 industrial estates spread across the country. The development of industrial estates is becoming inevitable for India, particularly for enhancing the share of manufacturing in the country's GDP and creating several millions of additional jobs. Today industrial development is headed toward a new horizon in the form of large special industrial investment regions. Development is associated with supportive activities such as transportation, housing, trade, and commercial activities and with the consumption of resources such as water, energy, and materials, disposal of waste materials, and many more.



These activities have local and regional level implications, for example, lands acquired from agriculture users or that are in proximity to human habitats, have the potential to cause social impacts and can trigger protests from the local populations. Lands that are in environmentally sensitive zones could have an adverse impact on flora and fauna and ecosystem services. Industries emit air pollutants, generate waste, and discharge wastewater, creating pollution risk. Industries use, store, transport, and handle hazardous chemicals and materials that could be accidentally released and could lead to disasters. For ensuring sustainable local and regional development and for ensuring sustainable industrial development, it is important to properly plan the new industrial areas with a Site identification that has to be based on sound land use planning considerations, land use compatibility, local and regional context, protection of the surrounding environment, livelihood and well-being of the human population.

- **Diversity in industrial development:**

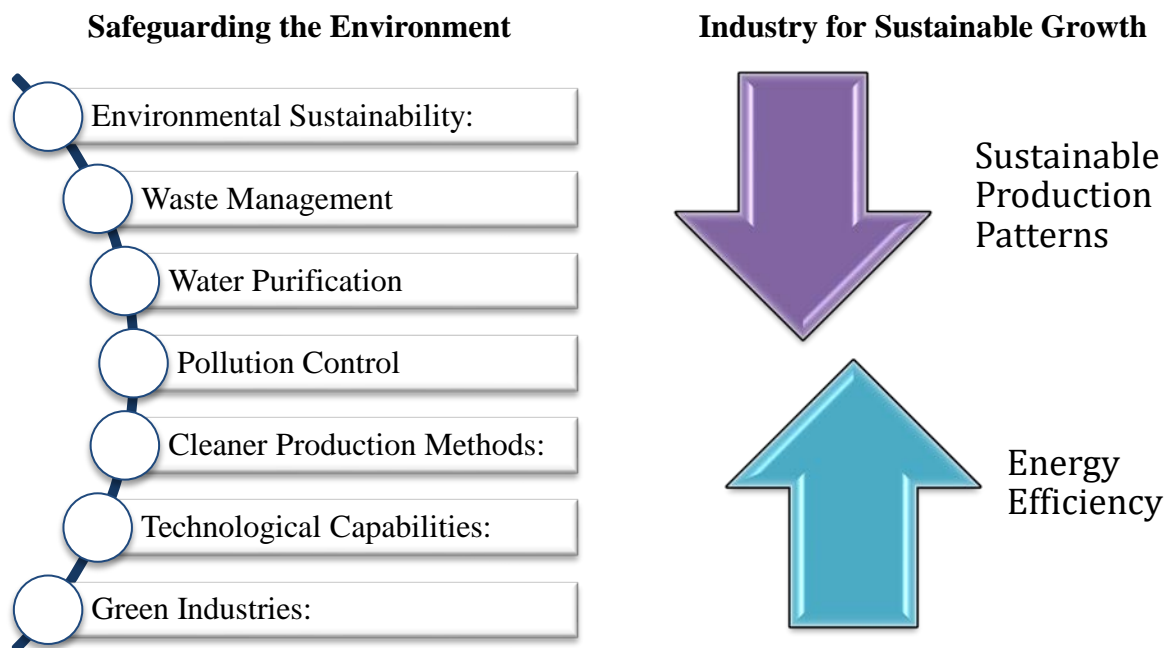
When it comes to prosperity, remarkable differences remain between and within the regions, countries, and societies. In the past, economic growth often occurred without providing the opportunity for participation and reward to a significant segment of the population, especially women and youth. Poverty remains the central challenge for our world, but we have effective means to eradicate it within the next generation. There is not a single country in this world that has reached a high stage of economic and social development without having a vast industrial sector. Industrial development and trade in industrial goods have proven track records in effectively reducing poverty. The earlier industrial revolution in Europe and the United States, in Japan, and the more recent example of the latter half of the 20th century including in the Republic of Korea, China, and many other Asian tigers and dragons speak for themselves. For many developing countries, these successful examples represent a model for effectively lifting large numbers of people out of poverty.

- **Creating shared prosperity:**

The industry is an important source of employment accounting for almost 500 million jobs worldwide or about 5th of the world's workforce. Manufacturing industries and their related service sectors can observe large numbers of workers provide them with stable jobs and good benefits and increase the prosperity of their families and community. An efficient agro-industry enhances stability for rural households, increases food security, and helps economic transformation.

- **Safeguarding the environment:**

Any progress on poverty eradication will be short-lived if we do not achieve economic growth within an environmentally sustainable framework. No country has yet fully resolved the issues of waste management water purification and pollution. Experience shows that environmentally some production methods in the industry can significantly reduce environmental degradation. We have the technological capabilities for cleaner industrial production today. Green industries can deliver environmental goods and services.



**Source:** Author Self

- **Industry for sustainable growth:**

Committing to sustainable production patterns makes business sense. It reduces the wastage of costly resources and contributes to increased competitiveness. Similarly, since energy inputs represent an important cost of production for industries, cleaner energy, and energy efficiency have progressively become core determinants of economic competitiveness and sustainable growth.

- **Employment creation and income generation:**

How much impact industry has on poverty eradication, environmental sustainability, and food security is ultimately defined by the pattern of industrialization our country chooses to follow. A long-term strategy can put in place a framework of stable economic, legal, and political conditions. It can also create incentives to invest in the necessary education, infrastructure



product quality, agribusiness solutions, innovations, and entrepreneurial skills. Sound industrial policymaking remains a top priority around the globe. At all levels of development, Industry can be a primary driver in fighting poverty, ensuring food security, and preventing social polarization.

### **Research methodology:**

For this study purpose, a qualitative research technique has been applied with the assistance of available secondary information on various platforms to fulfill the research objectives.

### **Discussion:**

- **Sustainability in terms of the manufacturing industry:**

When we talk about sustainability what is required is to consider some industries, in our case the manufacturing industry, and assess the sustainability issues. First of all, we need to assess how sustainable that particular industry is in terms of its processes that are existing or the product that is being manufactured. Manufacturing industries are considered a base of modern industrial society and are the cornerstone of the world economy. So, to estimate this sustainability and access it is required to evaluate the term sustainability (S) over sustainable development (SD), sustainability divided by sustainable development.

Sustainability (S) over sustainable development (SD) considers different issues and different parameters, some of these are linked to the issues of globalization which is considered one of the important drivers of sustainable industries. Globalization issues affect the sustainability of any development or any manufacturing or production system. so these issues are one of the most fundamental requirements. Five different elements of globalization can be depicted, such as business model, the energy price, information, and communication technology adaptation, supply chain management, and inclusion of emerging markets which can also be known as a cornerstone behind globalization.

- **Supply Chain Manufacturing (SCM):** Supply chain management talks about the consideration of the different stages through which the production system, starting from production to the supply, goes through. It is a strategic function in any manufacturing industry, where there are different suppliers, the production system as a whole, and different customers, and each one of these together goes through different stages. So, the sequence of the stages for



the whole system is what supply chain manufacturing (SCM) talks about. So, the most important stage in supply chain manufacturing is the selection for outsourcing components or parts of raw materials. So, it has many additional environmental concerns as well that contribute to overall sustainability such as issues of climate change, contamination through the introduction of different waste to the environment, and quantity and quality of different types of resources, both human and non-human resources for the consumption, rather than optimal resource consumption, etc.

- **Information Communication Technology (ICT):** ICT overall is the backbone of most of the modern manufacturing industries today. So, if there is no information technology or communication technology then there is no information and no communication within and across the enterprises. There is a requirement for distributed communication between different people, between different labs of the same organization, across different locations, and different campuses of the same organization, and it is also required for having proper communication between the different partners of the particular organization, who contribute to the manufacturing of the product or the services. So overall information communication technology is very crucial.

Here ICT is in greater contact and not just in terms of computers and communication technology but also different other things like sensors and actuators for the connectivity between them and it is required to have communication between the customers, the producers, the suppliers, and so on. ICT needs to be able to share information between themselves and it is required to enable Enterprise Resource Planning (ERP) based systems which is software for maintaining the diverse operations of an enterprise, then wireless communication technology. Here wireless is such a technique that makes portability a reality, as portability of different equipment, then mobility across the different partners of the company, and mobility of different equipment that is being used in the manufacturing process. So also, these are very important so wireless communication technology is very important.

- **GPS** (Global Positioning System) can be used for localizing the factors of production and the fourth one is the Radio Frequency Identification System (**RFIS**) which is a system required to tag the different parts of the production system or different equipment that is needed by different items or elements or agents that need to be tagged, that help to have complete and



efficient monitoring of this of the mobility and portability of these different parts and constituents of the whole production system.

- **Energy price:** In large-scale enterprises, there is a consideration of energy consumption. The larger the enterprise the larger the energy consumption. This is not sustainable and not beneficial for the environment. More energy consumption leads to a bigger impact on the environment, which is not very desirable. So, for enterprises, it is very important to ensure that there is reduced energy consumption through the introduction of this newer technology. The energy has to be first created then it gets transformed into a different form and then gets consumed. For instance, electricity gets generated into generating power plants, then it is transferred through different grids and transmission lines. It is transferred from one location, from one generating station to elsewhere to the station, to the electricity subsistence and different other points. So, one form of energy is transformed into another form of energy. The lighting lamp and the bulbs in the warehouses, then electricity is transformed into light energy so then it is transferred and that light is something that is getting consumed. This happens to other energy consumption processes in the manufacturing process of any product. What is required is whatever the cycle however the energy consumption and this transformation take place, whatever we eat what is important is to ensure that there is reduced energy consumption overall and that basically will also have an impact on the economy and environment.

So, it is required to have energy supply also at reasonable prices. So, increasing the price of energy is not good because if the price of energy is increasing then that will affect the overall price of the product or the service that is being created and that is not going to be sustainable overall from another perspective. Sustainability has different facets and what is also not desirable is to increase the cost of the product or the service that is being generated or developed.

Reduction in energy consumption is also required and energy production can be done not only from non-renewable sources of energy but also from renewable ones like solar, wind, and so on.

- **Emerging markets and their consideration:** markets can meet the standards of newly developed innovative products. However, the issue is that it is difficult to identify all the world's emerging markets. Whenever a particular product is introduced, it goes through a typical phase of dictatorship like a Monopoly kind of thing. So, the company that introduced the product has a Monopoly, and then gradually it has to transform towards the free market and free economy, where it will be made accessible to the greater part of the world and so the





consideration of the emerging market becomes very important, particularly for developing countries like India.

- **Business model:** business models will be helpful for the greater and bigger society. So, it is required to have mass customization that will incorporate the knowledge including consideration of international culture across different countries, different societies, and also the local culture where things have been introduced and produced first. So, business models have a direct linkage with mass customization so what is required is from the globalization point of view the product that is manufactured should not only cater to the needs of the local community but also to the international community. So, business models need to be developed which should take the strategic approach by considering the bigger and more strategic issues for a particular organization, or business, which will maximize the economic profit for an enterprise by taking into account the competitive benefits and promoting the product values.

Emerging issues are also there like globalization, which also contribute to the sustainability factor so emerging issues are there are many of the emerging issues which contribute to sustainability one is the technological growth of the population government regulation of the consumption of natural resources, and consideration of crisis recession and depression contributors' sustainability factor from emerging issues first one is the technology considerations are very important to say technology broadly can be classified as hardware and software. So within the hardware, there are different technologies in the manufacturing industries such as computer numeric control machines, barcode base technology, RFID, and NFC. All of this has also contributed to the overall advancement of the manufacturing industries. In terms of software such as ERP, GPS-based software technology GPS has emerged and has contributed to the advancement of the manufacturing industries. What we need to ensure is that all these different technologies should be included to have better sustainability. So, advancement in technology facilitates manufacturing with higher quality products, lower cost products, and products that are manufactured in reduced time. The quality of the product that is developed should be improved with the introduction of this newer technology, then the cost of production should be less so that the overall product comes to the market at a reduced price and comes faster to the market, and the product life cycle should be reduced so there is a reduced manufacturing time. The role of technological advancement in the global market is about converting from the traditional system of manufacturing to the automatic



system and this is how technology can help in the particular objective and also can help in having greater agility, faster development, and flexible, changeable, maintainable products.

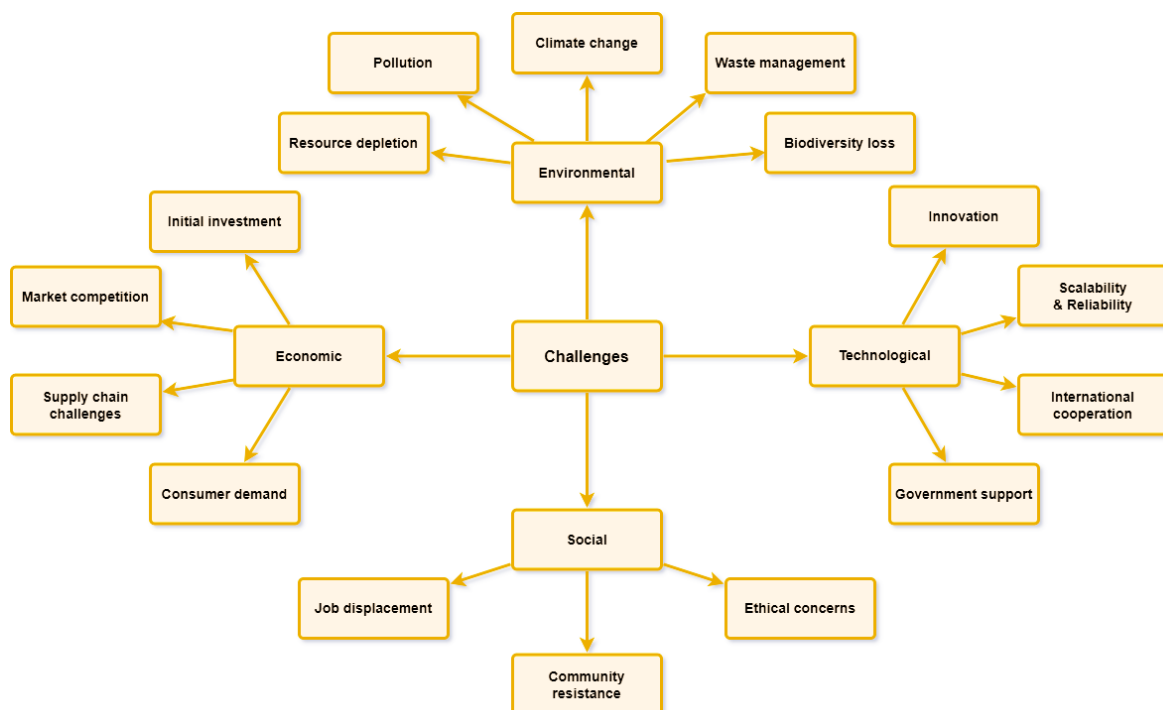
- **Government regulations:** these are required to be able to protect the public and private sectors. It is required to protect the enterprises. The different enterprises have their different requirements and those will have to be taken into consideration while arriving at different regulations and rules which can help these organizations, enterprises to offer better services and at low cost. So, government regulation will help in avoiding unfair competition and also to promote a sustainable environment considered development for everyone including the employees of the organization or the industries.

There are different types of regulations, some of these regulations have a direct impact on economic issues some of them have considerations of social issues and some of them have environmental issues. When a business or an institution enters a business price estimation, there are government regulations typically that will help in this price estimation. Then social issues will essentially help in opening channels of communication between employees and the enterprise for the management and environmental issues will concern the protection of the environment. Environmental issues are very important in the manufacturing process, so government regulations should be there to protect the environment because if there is some kind of production process that produces a lot of waste and in terms harms the environment, water or land, etc. are full of different industrial waste then that is not good, so there are government regulations which talk about how to reduce this waste and also the waste that is produced will have to be handled properly.

So, there are government regulations concerning employment, advertisement, labor laws, environmental regulations are there, regulations concerning the safety of workers, the safety of everyone, health regulations are there and privacy protection of individuals. So basically, the employment and labor rules represent laws concerning wages and salaries, things such as the benefit of the workers in terms of retirement plans, compliance with health and safety issues, proper working conditions, issues of expatriate employees, such as visa an equal opportunity in employment in terms of promotion and consideration of all workers from different ethnicity in the equal platform, provision of authority or higher-ranking position. So these are different types of classes of regulations that are typically there in any industry. Advertisement regulations protect customers, firm honesty about a product, information regulation publicly then transparency on distribution and manufacturing process. Environment regulations or rules are maintained by

different rules, different acts, and different agencies such as the Environmental Protection Agency. Maintaining clean air, and reduction of chemical effects in soil, river, and water of different water bodies. The privacy regulations concerned the safety of security of the information, particularly the sensitive information that is collected about the different employees and the different other stakeholders by particular enterprises. Safety and health regulations will concern the health issues providing a healthy working environment and also overall safety workplace safety.

**Figure 1: Challenges in Achieving Sustainable Manufacturing**



**Source:** Author Self

- **The government regulations on population growth monitoring:** population growth affects industrial growth, food supply and fertility, sociology, economics, policies, politics, industrial locations, use of lands, and so on, there are three different countries based on population growth. The population growth of developing countries and their disadvantages is typically greater than the population growth of developed and helpful countries. So based on a United Nations report the population growth from 1950 to 2050 reduced between 30% to 13% in developing countries and increased between 8 to 20% in emerging and developing countries. So economic views on population growth can be of two types, pessimistic views and optimistic views. So, the pessimistic view of population growth affects economic growth, and the



optimistic view basically on the contrary talks about the increase of globalization issues such as trade and commerce, because of population growth. The pessimistic view affects and hides the overall economic growth the optimistic view increases globalization issues such as trade and commerce.

If the growth is not confirmed with the overall growth of the economy, then that will become a disaster for that economy.

- **Consideration of economic crisis recession and depression:** economic crisis talk occurs throughout not more than a few months recession discusses the decline in economic activity, in simpler terms, means slowing down slowdown of the economy so occurs over a period and that slowdown happens quite fast, exponential decline happens. When economic activities increase again then there will be the commencement of or the rise of the economy overall, from the recession then there will be some kind of acceleration in terms of growth. Depression is the extremity of recession, which is observed by the exponential unemployment increase, reduction in credit, significant reduction in trade and commerce, and a huge number of bankruptcies that might also consequently happen the currency value is volatile and the duration is over two years.

If there is an economic crisis then comes the recession phase which will be followed by the depression. So conceptually there will be a reduction in prices of different major commodities and what is important is to increase productivity and reduce the overall cost that becomes the solution. In terms of consumption of natural resources, this is one of the very biggest concerns because it has an impact on each sustainable development which is environment friendly as natural resources are the main source of revenue in developing countries. Social concerns about too much mining, too much extraction of oil and Gas, demographic shifts, societal behavior, politics, technology, economic situations, and difficult economic situations are the major contributors in terms of consideration of natural resources.

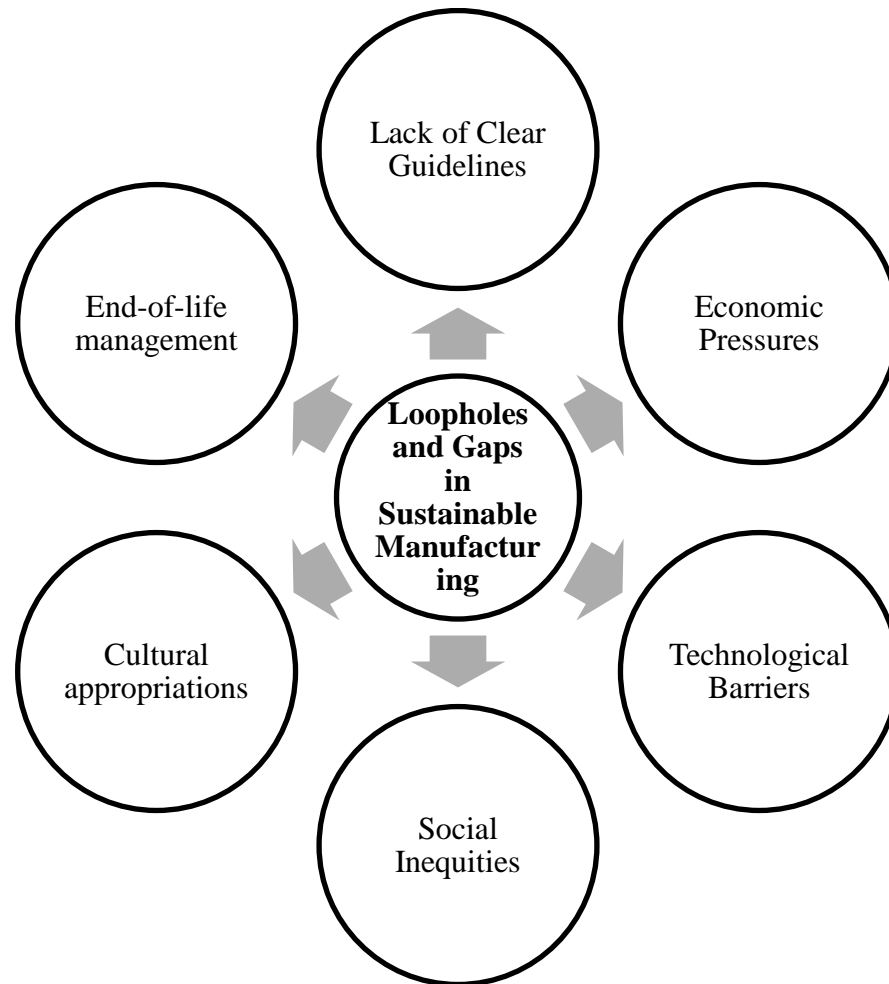
- **Industry: a priority for the post-2015 development agenda**

Sustainable Development Goal 9 (SDG 9) can be summed up as building resilient infrastructure, promoting inclusive and sustainable industrialization, and fostering innovation. We should improve our existing infrastructure to develop sustainable industrialization and foster innovation in reality. These steps form part of a cycle as business requires interesting infrastructure to operate. Businesses rely on materials, labor, and services as well as



innovations to survive and thrive. We can say that innovation leads to improvement in infrastructure, just as we can say existing infrastructure is required for innovation to take place ultimately both are true to achieve this sustainable development goal we need an industry-wide shift in the mindset of all businesses to pursue and implement absolute sustainable technology however they are must be existing infrastructure in the place for this process to occur. If you have to struggle daily to feed and clothe yourself and your family would you even have the time and energy to care about the sustainability of clothing manufacture of the regression degradation of arable currently more than half of the world's population is online and almost the entire world's population lives in an area covered by the mobile network this is and improve impressive achievement however real industrial improvement such as quality water and electricity system effective roads networks and advancement in the manufacturing sector are required to enable sustainable and resilient innovations and for the industrial infrastructure development, particularly in underdeveloped countries supporting this process, is an international objective as United nation sustainable development goal.

**Figure 2: Loopholes and Gaps in Sustainable Manufacturing**



**Source:** Author Self

**Conclusion:**

First of all, every country must achieve a higher level of industrialization in their economies and benefit from the globalization of the market for industrial goods and services. No one should be left behind in benefiting from industrial growth and prosperity and should be shared among women and men in all countries. Broader economic and social growth must be supported within an environmentally sustainable framework. New approaches are needed to globally harness and share available knowledge, technology, and innovations. Finally, all of this should be supported through multi-stakeholder partnerships. Inclusive and sustainable industrial development will be a key driver for the successful integration of the economic, social, and environmental dimensions of



sustainable development. Combining our efforts to reach this goal will be the ultimate priority for us in the coming years.

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