

The Role of Green Finance in Promoting Industrial Innovation and Decent Employment in India

Mr. Sunil Hegde¹, Rishabh Bajaj¹, Rishav Rajsah², Garv³,
Himanshu Chaudhary⁴

¹Assistant Professor, JAIN (Deemed-to-be-University), Center for Management Studies, Bangalore
^{2,3,4}Student, JAIN (Deemed-to-be-University), Center for Management Studies, Bangalore

Abstract

The Viksit Bharat 2047 vision documents of India put sustainability, technological innovation, and inclusive development at the centre of its developmental path. In this context, green finance has been a key tool by directing the capital to the sectors that are environmentally friendly and enhancing economic growth in the long run. In this paper, the writer examines how green finance can affect industrial innovation, and how it can create decent jobs in India. The study will utilize a descriptive-analytical methodological approach based on the secondary text of reports by RBI and SEBI on sustainable finance, statistics of the World Bank, and the international research on sustainable finance. The findings show that the development of green financial instruments, such as green bonds, ESG investments, and climate-oriented lending in India, has grown at an unprecedented rate supported by the well-developed regulatory frameworks. Such mechanisms have significantly increased the renewable energy project, uptake on clean-technology and up-skilling of industries.

The analysis also highlights the fact that green finance has helped in the establishment of stable and skilled jobs in the solar and wind energy sector, electric mobility, sustainable infrastructure and waste management. These green jobs not only increase the number of jobs, but also provide quality employment, in terms of skills training and long-lasting economic stability. The report concludes the idea that green finance is an engine in strategic transformation of industries in a way of sustainable growth, innovation-oriented growth, and employment inclusion. Its alignment with the long term development goals of India makes it possible to designate green finance as an essential pillar in the development of a robust, developed Indian economy by 2047.

Keywords: Green Finance, Industrial Innovation, Green Jobs, Sustainable development, Viksit Bharat 2047.

Introduction

India now happens to be at a critical crossroads in her economic transformation, with a dream of becoming a developed nation by 2047 under the Viksit Bharat 2047. The sustainable economic growth, modernisation of industry, innovation of technology and the development of quality employment, which will be based on this are long-term national agendas. In this respect, the concept of green finance has also

become a strategic fiscal tool that can be used to align economic growth with environmental protection. In a world where climate change, environmental degradation, and lack of resources in many instances is putting an ever-increasing strain on world economies, the movement to make sustainability a part of financial and industrial infrastructure is changing to being not only desirable, but also necessary. In an economy that is growing at a very high rate like that of India, green finance would serve as a medium of relying on the growth of the industries without jeopardizing the ecological balance, as well as the social services.

In very modern usage, green finance means financial investments that train becoming eco-friendly projects, resilient infrastructures, advancement of renewable energy, and drive of low-carbon industries. It includes the use of green bonds, sustainable loans, climate funds and ESG (Environmental, Social and Governance) investments. Institutions such as the world bank on the international front have emphasized the need to channel capital towards green undertakings to achieve sustainable development. In India, the regulatory agencies like the Reserves Bank of India and the Securities and Exchange Board of India (SEBI), have published the frameworks and guidelines to promote sustainable finance and responsible investment. Such trends are the indicators of the fact that green finance is gradually turning to be part of the Indian financial framework.

The core of this Indian dream is industrial innovation to become a global manufacturing and technological hotspot. However, the conventional development models have in the past relied on fossil energy and resource based production processes, which create consequences of environmental degradation and risks that are not immediate but that accumulate over time. Green finance is transformative since it will guide capital to clean-tech, renewable energy projects, electric mobility, energy-efficient factory, and green infrastructure. Such programs as the National Green Hydrogen Mission or Make in India show that the country is dedicated to industrialisation based on environmental sustainability. Such programmes require massive financial support which can be efficiently geared using green financial instruments. Green finance increases innovation and technological improvements in industries, by reducing the financial risk of sustainable projects and fomenting the incentive to join the game in the private sector.

Another aspect of sustainable development that is also critical is the decent creation of jobs. According to the International Labour Organization, decent work is productive work that provides decent income, security in the work place, social security and individual growth opportunities. The green transition promises millions of people new jobs in renewable energy, waste management, sustainable agriculture, electric vehicles and green construction. The growth of solar and wind energy industries in India has already developed a lot of jobs. Green finance in the form of funding of environmentally friendly businesses and start-ups helps not only to promote the industry but also to create stable and progressive jobs.

Furthermore, green finance enhances the position of India in the international world of investments. Global investors are becoming more focused on the ESG compliant markets, and destinations having strong sustainable finance systems are receiving more foreign direct investment. By introducing green finance to its development agenda, India improves investor trust and reduces its workability to the economic policies that exist globally on being sustainable. It is the leading factor to larger goals of economic resilience, climate act, and inclusive development planned as Viksit Bharat 2047.

Green finance is a critical interface between green sustainability, modernisation of industries and job creation in India. It enables the shift to the low-carbon sector, drives innovative-led development, and develops decent employment. With India moving towards the realist dream of becoming a developed

country in the year 2047, the effective integration of green finance in industrial and employment policy will significantly outline a sustainable and inclusive economic prospect. Therefore, the context of the role of green finance in the development of industrial innovation and decent employment is not only timely but also consequential in the framework of the long-term goals of Indian development.

Review Of Literature

When exploring the topics of green finance in the emerging markets, it is always true that we have seen strong interrelations linking development of sustainable financial systems and development of technology. According to Zhang, Mohsin, Rasheed, Chang, and Taghizadeh-Hesary (2019), alignment of public spending with green finance projects does not only contribute to green economic growth, but also acts as the driver of technological advancement due to the optimal distribution of resources and the increased competitiveness of that industry.

Liu, Wang and Zhang (2020) in their firm-level statistics illustrate that green credit policies trigger a significant increase in green patenting. The authors argue that environmentally compatible lending takes off the impact of financial constraint and as such, firms will commit more resources to research and development, especially within clean technology sectors.

Similar observations are supported by Chen and Ma (2021) who believe that, as the Asian economies, green finance promotes green total-factor productivity thus establishing a high level of innovation efficiency and technological modernization.

Renewable energy is highly dependent on financial instruments. In their study, Azhgaliyeva and Liddle (2020) indicate that green bond elevates clean-energy investment in jurisdictions, graphs industrial restructuring and results in new job opportunities. Falcone and Sica (2019) share similar results, stating that green financial instruments reduce the unpredictability of novelties in the sphere of technology and stimulate innovation in the field of low-carbon or energy-efficient approaches. Taghizadeh -Hesary and Yoshino (2020) contribute, information asymmetry in green-energy funding is reduced in green finance, and hence, the role of the police in the joint engagement of the company will increase, and they will be the foundation of industrialization.

In a more general policy sense, Popp, Newell, and Jaffe (2010) provide a sound theoretical base by demonstrating the combination of environmental regulation and monetary incentives to influence innovation in the environmentally sensitive industries. Bowen and Kuralbayeva (2015) discuss international labour-market effects, stating the fact that as green policy can lead to short-term shifts in the sector, in the long term, it can also result in workforce benefits provided that financial and training systems are sound. This position is supported by the International Labour Organization (2018), which claims that investments into renewable energy, energy efficiency, and sustainable infrastructure could generate millions of good jobs on the global scale.

Cai, Aoyama, and Zhou (2021) discover that in the Asian region, employment in the renewable industries is increased by the combination of sustainable finance instruments and strict environmental policies. They point out their evidence of the synergy between fiscal support and industrial policy in enhancing job creation. Soundarrajan and Vivek (2016) note across the subcontinent that sustainable banking fosters corporate behaviour that is environmentally-friendly, especially when the decisions rely on environmental stipulations in terms of lending.

The important role of policy support has also been given by studies in India recently. As shown by Kumar and Prakash (2021), sound regulatory environments are enhancing investor confidence in the presence of

the green-bonds market in India, which is the scaling of investments associated with climate matters. According to Bhattacharya and Sharma (2018), the terms of financial support of solar and wind programs have led to resource diversification in the Indian energy sector and speedy structural changes. Ghosh (2021) also reports the noticeable job-making impacts on the renewable-energy supply chain and Sahu and Narayanan (2022) demonstrate that solar projects create rural employment opportunities in terms of installation, servicing, and related support services.

Innovation results have been simultaneously improved with the development of green finance reforms. Wang and Zhi (2016) explain that green finance reforms increase the efficiency of investments within environmentally friendly sectors and industrial productivity. Being further confirmatory to the innovation impetus, Xu and Li (2022) discover that green credit policies are linked to high levels of patenting activity amongst manufacturing companies. Lee and Lee (2022) elucidate that the connection among financial institutions and industrial companies strengthens the innovation environment and leads to technological modernization.

Lastly, Sharma and Kaur (2023) argue that the sustainable finance frameworks in emerging economies must incorporate in a systematic way into its construction the social goals, including the quality of employment and equity.

World Bank (2020) finds a resolution that strategic investment in climate-resilience initiatives does not only stabilise the economies, but also drives innovation, and recommends the urgency to align strategies of financial institutions with long-term sustainability objectives.

Objectives

- To examine the idea, industry trend, and underlying meaning of green finance in the Indian financial system.
- To examine the role played by green finance in industrial innovation and embracing of sustainable technology.
- To assess whether the green financial instruments influence the encouragement of renewable energy and green industries in India.
- The aim within the framework of the study was to determine the role of green finance in creating decent and sustainable jobs.
- To investigate the connection of the concept of green finance with long-term development goals of India through Viksit Bharat 2047.
- To solve the challenges, and suggest policy recommendations that enhance green finance as a means of ensuring sustainable growth of the industrial sector and the workforce in India.

Research Methodology

The study is organized based on a descriptive and analytic research framework that is aimed at examining how green finance can be used to impact industrial innovation and generate dignified jobs in the Indian realms. The main attention is paid to the secondary data collections, including academic reports, peer-reviewed papers, governmental bulletins, and detailed financial records. The preeminent institutions whose data has been acquired include the Reserve Bank of India, the Securities and Exchange Board of India, the World Bank as well as relevant publications that have been a product of Viksit Bharat 2047 initiative.

The investigation breaks down green financial tools, such as green bonds, ESG-oriented investing and sustainable lending structures, analysing their implications on fields and sector development and growth at work. A comprehensive examination of statistical data, regulatory provisions, and industry studies has been carried out to explain existing trends and patterns that are identifiable. Qualitative verdicts based on the synthesis of derived insights based on descriptive statistics underpin the derivation of evidence-backed conclusions based on the contributory role of green finance in supportive sustainable economic growth in India.

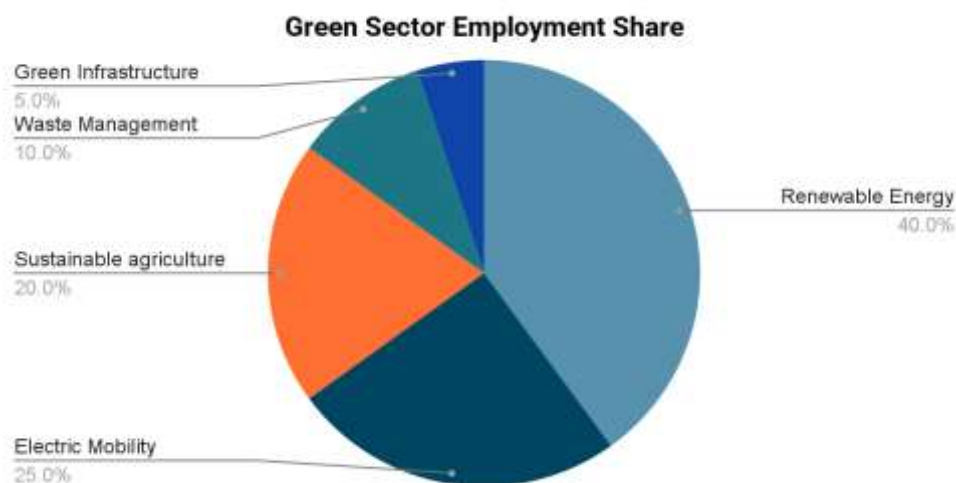
Research Gap

Even though the concept of green finance has been explored by some studies, the majority of the current research is more concentrated on green finance in relation to environmental sustainability and mitigation of climate change. There are hardly any studies which offer a thorough examination of the impact which green finance simultaneously has on the industrial innovation and establishment of decent jobs in India. Also, previous studies tend to make comparisons without instruments like green bonds and ESG investments, instead of their connection to the national development goals, such as the Viksit Bharat 2047. Minimal internalized analysis in the Indian setting links economic sustainability, and growth in technology and quality job creation.

Data Analysis and Interpretation

This section toned down a strict study and critical interpretation of the secondary data collected to question how green finance has contributed to industrial innovation and decent employment encouragement in India. The data is absolutely authoritative and consists of published reports, statistical releases, and policy documents of authoritative bodies, such as the Reserve Bank of India, the Securities and Exchange Board of India (SEBI), the World Bank, and the International Labour Organization. It is analytically structured into salient thematic headings in order to make it easier to understand and comprehend.

Pie chart No 1: Green sector Employment share



Source - International Labour organisation

Employment Distribution in Green Sectors (Year-2024)

Renewable Energy (40%) - The sector has now been the most major source of employment creation and it is mainly because of growth of solar and wind projects.

Electric Mobility (25%) This is due to the creation of large numbers of jobs through the development of electric vehicle production and the subsequent expansion of the charging system.

Sustainable Agriculture (20%) -Implementation of organic farming and environmentally friendly operations will help in generating rural jobs greatly.

Waste Management (10%) - The labor market of the sector takes the form of jobs in recycling processes and waste-to-energy plants.

Green Infrastructure (5%) - Due to the erection of environmentally sustainable buildings and other green infrastructure, a small, but significant, source of employment is generated.

Overview of Green Finance Flow in India

Secondary data is examined in this study to analyze the relationship between green finance and industrial innovation as well as the decent employment outcomes in India. The presence of sectoral finance data on the Climate Policy Initiative and other areas, gives us an insight into the breakdown of green finance flows in major areas of mitigation. In particular, clean energy, energy efficiency and clean transport are monitored as the prime areas of green financial implementation.

Table 1: Description

Sector	Amount (Rs Billion)	% of Total Green Finance
Clean Energy	1,768	47%
Energy Efficiency	1,287	35%
Clean Transportation	657	18%
Total	3,712	100%

Source - Landscape of Green Finance in India 2022 (Climate Policy Initiative).

A huge 47 per cent of this is dedicated, considering the booming green finance sector in India in clean energy agendas, including solar plants, wind power plants, hydro facilities, and bio-energy plants. With this kind of allocation, the improvement of technology is triggered, research undertakings in energy storage are enhanced, and the emergence of smart grid structures. Simultaneously, it will foster a balance of direct and indirect jobs in the fields of installation, engineering, manufacturing, and services in the supply chain. Energy efficiency, which has assumed a dominant 35 percent position, forms the basis of the adoption of modern machinery, intelligent building systems and improved power distribution networks thus supporting professional labour in retrofit, audit, consultancy and maintenance sectors.

As an element of green finance, transportation focuses more mainly on electric-vehicle infrastructure (EV) innovation in batteries, renewal of the public transportation infrastructure, and encouragement of bottom-emitting logistics. Although this industry has a relatively small share, it creates jobs in the production of EVs, the installation of charging stations, and mobility technologies and has a huge potential, which can increase.

Green Finance Development in India.

The past ten years have been characterized by the significant growth in green finance in India, which highlighted the commitment of the country to combating climate change and having a sustainable approach to industrial development. The Climate Policy Initiative (2022) is of the opinion that, the total Indian green finance that can be tracked stood at around 3.7 trillion Indian rupees through FY2021-22 of which domestic inflows comprise an approximate of 83 per cent of the total inflows. A significant percentage of this capital has been channeled towards renewable energy, energy efficiency and sustainable transport infrastructure. In 2023, the issuance of sovereign green bonds by the government was another step in strengthening the green financial architecture in India and thus indicated a solid government involvement in financing sustainable development.

This gradual increase in green finance is not merely a marginal program on the environment but rather a revolution in capital formation towards a climate-sensitive, climate-related economic action. Ecosystems of sustainable finance and financial regulators have given out requirements on environmentally sound disclosures and generated a culture of responsible investments by allowing the establishment of ESG disclosure requirements and sustainable finance by the Reserve bank of India and the Securities and Exchange board of India. This has in turn led to increased institutionalization of green finance into the financial system of India.

Findings

- Nowadays, green finance is a turning point that drives the shift of India to the sustainable and low-carbon economy.
- The green bonds issue and the flow of ESG investments shows a constantly increasing trend.
- Authorities, especially SEBI and the Reserve bank of India have significantly enhanced transparency and in this way strengthened investor confidence.
- In India green finance has outgrown niche standing and established itself in the mainstream financial operations.
- The rapid development of the renewable energy projects has been triggered by capital raised through the green finance programs with a specific focus on solar and wind sources.
- The National Green Hydrogen Mission projects that are pinnacle projects explain how green finance helps in the rollout of emerging clean technologies.
- Green finance is an incentive, as it encourages industrial enterprises to apply more clean and energy-efficient technologies.
- Through ESG, corporations easily access capital and improve their visibility on the market, thus leading to innovativeness.
- The green finance domain supports the creation of jobs in the renewable energy sector, in the electric mobility sector, and in the sustainable infrastructure sector.
- Green employment assumes skill advancement programs and the development of safer and more sustainable working conditions.

Recommendation

- We need to expand the range of concessional credit facilities and sustainability-related financial tools, and in the first place, micro-, small-, and medium-enterprise (MSME) sectors to help them shift to greener environmental practices.

- There is a need to promote sound public- private sectors in order to attract large domestic and foreign funds in green infrastructure project, which consequently will lead to industrial innovation.
- The programs on skill development should be tuned to meet the industry needs with the courses of higher education and vocational training institutions, which should provide a supply of the adequate qualified professionals to the growing green labour market.
- I suggest that the campaign to create awareness among people and financial literacy on green finance should be stepped up across India, but indeed, in conjunction with streamlining policy tools to align with the long-term goals, as reflected in Viksit Bharat 2047 vision and hence ensuring sustainable, inclusive development.

Conclusion

The paper explored how green finance should facilitate industrial innovation and decent jobs in India in the larger perspective of sustainable development and Viksit Bharat 2047. The results indicate that green finance has become a paradigm tool that can be used to balance economic development with environmental sustainability and social integration. Green finance also plays a key role in transforming the industrial landscape in India by providing a channel of investment in renewable energy, clean technology, sustainable infrastructure and environmentally responsible industries.

According to the analysis, it can be concluded that the development of green bonds, sustainable lending institutions, and investment practices that are based on ESG has led to a positive effect on industrial innovative practices. Policy assistance and financial incentives have motivated industries to go green by implementing energy saving technologies and minimizing carbon emissions and investing in sustainable product and process research and development. This turning towards systems of greener production does not only increase environmental performance, it also boosts global competitiveness and resilience in the face of long term industrial challenges.

Moreover, green finance is of significance in facilitating decent jobs by promoting the development of new areas like renewable energy, electric mobility, sustainable manufacturing, and green infrastructures. Such industries create new employment opportunities which are less hazardous, professional and facing economic trends. Improvements in skills and technical advancement will lead to employment generated within the bounds of the green initiatives being of standard productivity, equity, and societal safety.

Nevertheless, the research also acknowledges some of the challenges such as the inability of MSMEs to access green finance, the absence of a unified set of green taxonomy, poor awareness, and workforce skills. These problems need to be met by robust regulation systems, effective financial accessibility, capacity development, and better co-operation between the government and the businesses to reach the full potential of green finance.

To sum up, green finance is a strategy that triggers the two-pronged approach to industrialization and employment creation, coupled with environmental effectiveness. Its successful application would help greatly in ensuring a sustainable economic development and bringing the dream of an inclusive, developed, and environmentally-friendly India to being in 2047. The enhancement of green financial systems today provides the basis of long term industrial innovation and decent jobs to come.

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