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Green Industrial Policies: North vs South Comparative Analysis

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Abstract:- The goal of green industrial policy, a strategic government initiative, is to hasten the growth and development of green industries to facilitate the shift to a low-carbon economy. In this study comparative analysis will be applied to compare two or more countries in order to point out their similarities and differences this will be applied with qualitative and quantitative method. The aim of the study is to determine which green industrial policies are more effective in raising competitiveness, boosting productivity, and fostering economic growth. Some nations are trying to tackle climate change, but their efforts are failing because they do not have a well-defined green industrial policy. Stronger and more intelligent policies to support industrial development and job creation are needed, according to an increasing number of governments and institutions worldwide, to turn the decarbonization imperative into an opportunity for green growth. Additionally, the Sustainable Development Goals (SDGs) of the United Nations, which integrate environmental protection, deep decarbonization, and aims for economic growth and good jobs, constitute a green growth agenda. The study will advance knowledge, research, and development for all underdeveloped nations, particularly those in the Sub-Saharan region The study will advance knowledge, research, and development for all underdeveloped nations, particularly those in the Sub-Saharan region. The framework can do more to help Countries have one Generic green industrial policy which will give guidance to all developing countries (BRICS) and help are uniform to cater all communities manage urban wetlands, identifying opportunities for other countries that are still emerging. It can facilitate research and peer-to-peer exchange on innovative funding and financing methods for green industrial projects. It is thefore important to developing countries that are behind to catch up with green industrial economy for the development and growth of the economy. The policy implication of the study will be the study will not support workers and communities that are negatively affected by the green transition as most of the communities are still not up to speed with issues of green transition and policies Findings and recommendations resulting from this study will be summarized into a strategic guide by the end of 2025.

Keywords*: Green, Industrial, policy, climate change, energy.*

1. Introduction

The goal of green industrial policy, a strategic government initiative, is to hasten the growth and development of green industries to facilitate the shift to a low-carbon economy. The green industrial policy is based on the five-year plan to achieve macro control of ecological and environmental improvement specifically for heavy polluting industries like iron ,coal, electric power, steel with an emphasis to green and clean production and incorporating green development. Khan (2015) points out that each developing country has its own environmental policies that it must adhere to. The green industrial policy includes sunrise and sunset policies, subsidies, research and development, local content requirements, feed-in tariffs, tax credits, export, green public procurement rules, and renewable portfolio standard. Some nations are trying to tackle climate change, but their efforts are failing because they do not have a well-defined green industrial policy (Aghion et al.,2015, Cosbey, 2017).

Padilla (2017) and Ambec (2017) argues that even if governments put their own national, social and economic objectives first, there are strong arguments for not delaying the transition to a green economy.Through product and process innovations, resource efficiency is increasing worldwide. Put differently, fewer natural resources are

needed to produce the same unit of output; but this increase in efficiency has been quite modest, with the effect that GDP growth globally has more than outweighed the efficiency gains (Jackson 2016, Wiedmann et al. 2015).

Green Industrial Policy therefore aims to identify and facilitate new industrial and economic opportunities and promote structural change by mitigating against negative environmental conditions arising from rapid industrialisation and promoting development of the circular economy ((Altenburg and Lütkenhorst 2015,Aiginger,2013, Aiginger,2015, Aiginger &Rodrik ,2020).Furthermore the study compare the similarities and difference with regards to the green industry policy specifically looking at the effect of green industrial policy on global value chain Policy makers traditionally use industrial policy to enhance productivity, boost competitiveness, and promote economic growth. (Aiginger,2015, Aiginger &Rodrik ,2020).

Other authors describe Green industrial policies as industrial policies with an environmental goal or more precisely, as sector-targeted policies that affect the economic production structure with the aim of generating environmental benefits.(Aiginger,2015, Aiginger &Rodrik ,2020).Policy and institutional recommendations made by industrialized countries to developing countries today did not bring them to their current state. Chang (2003) pointed out that the majority of these made active use of "bad" trade and industrial policies, like export subsidies and protection for emerging industries

Since 2015, certain sustainable development goals (SDGs) that reflect the necessary balance of environmental, social, and economic components have been linked to the global shift toward sustainability in accordance with the 2030 Agenda. (Loanna et al.2023). In this context, industrial policy influences all the SDGs to varying degrees, but it has a direct relationship with a few of them.(Kastelli et al.2023). The green industrial policy is based on the Five-Year Plans to achieve macro-control of ecological and environmental improvements specifically for heavily polluting industries such as iron, steel, coal, and electric power, emphasizing clean and green production and incorporating green development into national

This paper focuses on developing countries ‘s Green Industrial policy, especially on the global value chain effects, environment, and energy sector. It analyses India ,China, South Africa, and European Union’s green Industrial policies in the context of drivers such as energy access ,regulations ,trade, local environmental challenges, and climate change risks. Human activities have immense impact on the global environment, and these impacts will continue if current trends persist (IPCC, 2007; Vitousek et al., 1997).Green Industry means economies striving for a more sustainable pathway of growth, by undertaking green public investments and implementing public policy initiatives that encourage environmentally responsible private investments, whereas Green industrial policy seeks to address market failures and protect the environment. GIP and industrial policy are similar, although GIP has unique challenges and goals (Rodrik,2014)

Industrial strategy has been viewed as taboo in mainstream economics literature since the WTO system arrived amid the neoliberal order in the global economy, despite its acknowledged role in the East Asian miracle (World Bank 1993). But the industrial policy came back into vogue after the global financial crisis of 2008, thanks in large part to the work of Stiglitz and Lin (2013) and Mazzucato (2013). Mazzucato (2015) specifically reimagined the state's function in the context of the entrepreneurial state, even within advanced economies.

Additionally, the Sustainable Development Goals (SDGs) of the United Nations, which integrate environmental protection, deep decarbonization, and aims for economic growth and good jobs, constitute a green growth agenda. Environmentalists have a history of prioritizing conservation over the difficult task of generating riches for the billions of people who want a better material living. To address the political, economic, and environmental aspects of climate change, governments adopt Greening Industrial Policy. Sustainable institutional, technological, and economic change are supported by Greening Industrial Policy. (Andreoni &Chang (2019) It addresses the commitment issues and market imperfections that impede sustainable investment, moving beyond the framework of a free market economy. To shift to a low-carbon economy, effective Greening Industrial Policy increases political support for carbon control. Diverse forms of Greening Industrial Policy are used by multiple governments, for different reasons. Environmental factors must play a major role in industrial policymaking as the mitigation of climate change and other ecological issues progressively influence the course of economic

development in the future. There is no precise line separating environmental policy from green industrial strategy. The goal of environmental policies is to preserve and use the environment responsibly.

As a result, until they are profitable, the public sector must assist them through industrial policy. Green industrial policy seeks to mitigate the adverse environmental effects of paid industrialization, promote the growth of the circular economy, and identify and enable new industrial and economic prospects in addition to spreading structural change. Certain nations employ intricate forms of conventional industrial strategy, which typically pose difficulties in showcasing their industrial policy in a timely, competitive, and targeted manner. Some nations are making proactive investments in the green economy; these nations are prepared for a low-carbon future and are among the top nations for the green future. The goal of Green Industrial Policy is to modernize global industry and solve climate change in the developing countries and to deal with the effect of green industrial policy on global value chain ((Altenburg and Lütkenhorst 2015)

Therefore, there is a need for support from the public sector in the form of industrial policy to become commercially viable. Green industrial policy helps to identify and facilitate new industrial and economic opportunities and disseminate structural change by mitigating against negative environmental conditions arising from paid industrialisation ad promoting development of circular economy.There are some countries that are using complex of traditional industrial policy which in most cases are challenging to demonstrate its industrial policy in time bound competitive and targeted oriented manner therefore impose the study to have to attend to unanswered questions.(Nolan, 2001,Oqubay ,2015).

This research will seek to address the following questions: What are the challenges and opportunities that are associated with green Industrial policy ,2)Does the policies address empower the green technologies and production green technologies and encourage traditional industries to produce goods and services in greener ways ,3) How best can all developing (BRICS) countries adhere to the Green Industrial policy 4) Which effect has green industrial policy have on global value chain and 5) What recommendations can be given to ensure all countries competition are boost and their economies are increasing.

Governments and societies should speed up structural economic change and take the initiative to drive the transformation for two main reasons. The first is the difficulty of generating riches. Productivity growth and greater wages are largely driven by structural transformation, which is the reallocation of capital and labour from low- to high-productivity activities. Innovation, manufacturing, and technology generate a lot of knowledge spillovers that increase productivity in non-manufacturing activities. (Rodrik & Sabel ,2022)

The implementation of green industrial policy aims to realign the economy from fossil fuels to strategically important green industries, like the production of zero-emission vehicles and renewable energy sources. Public cooperation, direct investment, subsidies, and other actions that the market would not do on its own are all included in industrial policy. Globally, industrial policy is the cornerstone of contemporary economies. It's imperative that we take similar action for the upcoming green industry, as it will bring successful, sustainable, and inclusive future in a net-zero world if we have a clear objective, proper planning, and an ambitious budget. Public investment in green industries is currently far less than what is required to achieve net-zero emissions.

Global initiatives like the Paris Agreement, the SADC Climate Change and Action Plan (2015), the African Union (AU) Climate and Resilient Development Strategy and Action Plan (2022–2032), and others offer frameworks that enable a favourable climate to assist the green transition. In accordance with these principles and instruments, nations have created national policies, strategies, and programs over time. (Kasamba,2023).What was discussed In Paris was not implemented in some of the developing countries and thus increase the climate change politics. The process of creating and commercializing new ideas and altering the way that business is conducted through the generation of novel, inventive concepts is known as research and innovation. Innovative concepts that are both economically feasible and sustainable are needed to enable the energy transition.(United Nation,2015,Kasamba,2023,Amusan,2016,brickton ,2016)

Green industrial policies are plagued with the same challenges that confront both industrial and environmental policies. On the industrial policy side, this entails the well-known risks of government failures.Governments may

lack the resources required to monitor the outcome of an industrial policy, or the will to do so, in case of regulatory capture. On the environmental side, this includes the political and social challenges of adequately pricing resources and externalities and/or creating a demand for greener products. As a result, the success of green industrial policies may be particularly difficult to evaluate: the demand for many of the products and behaviors they aim to develop (for instance, carbon capture and storage) usually depends on the existence of supporting public policies. They cannot, therefore, be easily subjected to a market test if prices do not internalize the environmental externality(Altenburg and Lütkenhorst 2015).Most developing countries are moving from agriculture or mining as their main economic drivers to services without going through a proper process of industrial development, a process known as premature deindustrialisation (Rodrik 2016)

To date there has been few systematic and comparative empirical analyses of the nature of economic development in Europe, India, China, and South Africa. The study shows that three of the BRICS that are experiencing de-industrialization (Brazil, Russia, and South Africa). China is the only country where an expanding manufacturing sector accounts for a significant part of aggregate growth.

The study will advance knowledge, research, and development for all underdeveloped nations, particularly those in the Sub-Saharan region. The framework can do more to help countries to have one Generic green industrial policy which will give guidance to all BRICS countries. It can facilitate research and peer-to-peer exchange on innovative funding and financing methods for green industrial projects.

Findings and recommendations resulting from this study will be summarized into a strategic guide by the end of 2025. It is recommended that all challenges that hinders greening industrial policy be addressed. Greening industrial policy must be prioritised to improve promote the growth of the circular economy, identify and enable new industrial and economic prospects.

2. Literature Review

Industrial policy agencies work to promote structural reform that will lessen regional imbalances, support small businesses and labour-intensive industries, and/or make the economy more ecologically sustainable (Altenburg and Lütkenhorst 2015).Because industrial strategy has continued to assume various names and forms, it may not be accurate to speak to it as a resurrection. Examples include industrial innovation policies (Nelson and Langlois, 1983), innovation policies (Edler and Fagerberg 2017; Soete 2007), mission-oriented innovation policies (Mazzucato 2018), and many more

2.1. Comparative analysis of green Industrial policy to the developing countries

2.1.1. China, India, South Africa ‘s green Industrial Policy

In line with the 2030 plan, the Paris Agreement, and calls for bettering the industrial structure and energy mix, China aims to peak emissions before 2030 and achieve carbon neutrality by 2060.Although there is a lot of room for greening, India's green industrial strategy is more difficult because the country hasn't shown how to use it in a competitive, time-bound, or target-oriented manner. South Africa's green industrial policy is based on the Department of Trade and Industry's (DTI) current formulation of the nation's industrial policy, which includes trade, technology, small business promotion, investment facilitation, competition, strategic and informational leadership, and labor market policy. In comparison to other countries, South Africa faces power management challenges while attempting to transition to an electric vehicle or green industrial policies. In addition, South Africa intends to expand its economy, press the private sector to promote localization and the growth of local suppliers, and step-up efforts to enhance aggregate domestic demand, primarily through the localization of public procurement. Green industrial policy as an instrument for economic structural change.In the fight against climate change, it can be used to assist nations in making the transition to low-carbon economies or in lowering environmental pollution (South African Reserve Bank, 2021).

Government restructuring of the economy is encouraged by industrial strategy, which directs resources toward industries thought to be promising for future growth (Altenburg and Rodrik 2017; Aghion, Boulanger and Cohen 2011). To stay up with technological improvements, China's industrial policy encouraged investment from both

domestic and foreign sources. It is the only nation where foreign direct investment (FDI) favoured the manufacturing sector and manufactured exports, and where, starting in 1995, local investment began to overtake FDI in terms of importance. Expanding the coalition for change is one way that green industrial policy might break carbon lock-in, according to a major finding in the literature on the political economy of technical transition (Breetz et al. 2018; Meckling et al. 2015). The emergence of new sectors has changed the structure of China's energy politics by enabling new businesses and redistributing regional authority. China's green industrial policy has resulted in increased R&D and manufacturing expansion, lowering prices and increasing adoption of clean energy technologies (Helveston and Nahm 2019; Lewis 2013). The global scene has been greatly impacted by China's green industrial program. Its effects have been felt globally, with savings that enable other countries to decarbonize at a faster pace and at a lower cost than they otherwise might have (Helveston and Nahm 2019). In general, China's green industrial policy has helped to build and reorganize global value chains (Nahm 2021).

The complex intersection of national and international political economy is where green industrial policy is developed. Nations purposefully seek trade and industrial policies that impact the location of global value chains in order to support homegrown industry. Even while not all countries are well-positioned to become competitive exporters of the same green technologies, countries may be able to gain direct economic benefits at home if industrial policies can help establish competitive domestic manufacturers (Lewis and Wiser 2007). However, it is difficult for a country to build an industry on its own given the nature of the global economy. Industries depend on international supply networks, foreign markets, and investment and end demand.

For example, China is actively funding initiatives including coal, oil, and natural gas in low-income nations that have urgent energy demands. But in the 1990s, China implemented a number of green industrial regulations that revolutionized the renewable energy technology market. The international policy community gained knowledge from these and other experiments in the next decades. They claimed that in order to finance infrastructure, stimulate innovation, and establish new sectors, the state has to take action (Meckling and Allan 2020).

India has a long history of promoting renewable energy (RE) due to its awareness of the country's susceptibility to fluctuations in energy prices and its natural condition of scarcity. In 1992, for instance, India became the first nation to establish a ministry devoted to RE. India's current framework for renewable energy policies is divided into three sections: overarching, direct, and indirect policies. Through the empowerment of new enterprises, China's green industrial policy has grown to include research and development as well as an increase in the deployment of clean energy technologies (Helveston and Nahm, 2019; Lewis, 2013).By strengthening the coalition change, green industrial policy can reduce carbon lock (Breetz et al., 2018; Mecling et al., 2015). Policies that are not exclusive to the solar or wind energy industries but rather cover a wide range of issues pertaining to other energy sources are known as overarching policies. Broad aims that align with the best possible use of the nation's endowments of energy resources are among the things that overarching policies do, such as giving the power sector in the nation direction. Direct policies help the necessary manufacturing entities and project development parties in order to meet the needs of the RE energy industry. Policies that centre around larger initiatives for R&D in science and technology, financing and human resource development, or project development and R&D are referred to as indirect policies. They also serve to improve the environment that supports these technologies.

2.2. What are the key phases in the development of a green industrial policy?

Green industrial policy is aiming to hasten the transition to a low-carbon economy, green industrial policy (GIP) is a strategic government program that promotes the growth and development of green industries. Sustainable development and transformation are at the centre of the green industrial policy-making process. Three dimensions exist, though: The levels of consumption-centeredness, firm-level sustainability, and productionist innovation-drivenness are the first three dimensions.

What is the role Catch up in Green Industrial policy

Catching up is the process of reducing the gap in sectors that are lagging behind and subsequently closing that gap (Wit & Boersma, 2002). South Africa's green energy sector is catching up to the trend of moving to alternative

energy solutions with its renewable energy initiative, which includes the renewable energy independent power producer, procurement program (Ndlovu, 2020). Public and private investment in these economic endeavours, as well as in infrastructure and resources that enable lower carbon emissions and pollution, improved energy and resource efficiency, and the preservation of biodiversity and ecosystem services, are what fuel increases in employment and income.

2.3. Climate change Mitigation plan for developing countries Sustainable Development Goals (SDGs) target

The 28th Conference of the Parties (COP28) to the United Nations Framework Convention on Climate Change (UNFCCC) will take place in the United Arab Emirates (UAE) in 2023 at Expo City, Dubai. Numerous national governments and organizations made climate finance commitments during COP 28, including to the Green Climate Fund, Adaptation Fund, Least Developed Countries Fund, and Special Climate Change Fund, among others. The South African government has made bold statements around climate change and environmental protection, as exemplified by various climate change policy papers and laws. Extreme weather events have continued this year; longer droughts, stronger tropical cyclones, intense heatwaves, and rising sea levels are all inevitable as global temperatures rise and cause more and more pain and economic harm to people.(Channing et al.2023).

South Africa refined its mitigation targets for 2025 and 2030 by creating fixed level target ranges for both years. The following sectors were identifying for mitigation: Energy, waste, processes, product use, forest, agriculture, and land use. Searching for similarities and differences between analysis units is the aim of comparative analysis. India ‘s NDC target is to reduce emission intensity of its GDP by 45 percent by 2030 from 2005 levili and it will reach this target with the existing policies (Thube et al.,2021).By 2030 China aims to decrease its carbon intensity by 65% from 2005 level to reach over 1200 GW installed wind and solar power.Share of non-fossil fuels in primary energy consumption should reach 25%by 2030.The forest stock should be 6 billion cubic meter above by 2030.China estimated 54 million green jobs and 4 million jobs for renewable energy.China as broadcasted that it will no longer build coal fired power plants and will step up to support countries in developing countries to increase green and low carbon energy.

2.3.1. Climate change policy

Reducing short-lived climate pollutants will prevent millions of premature deaths each year from air pollution and climate change. A warmer climate increases public health challenges like heat-aggravated illnesses, vector borne diseases, and decreased access to safe water and food. A comprehensive strategy to address adaptation and mitigation in the short, medium, and long terms (up to 2050) is the National Climate Change Response Policy. Energy and climate change are closely related since greenhouse gas emissions from energy production play a significant role in global warming. Destructive storms, altered ecosystems, and land degradation are all results of climate change. In certain places, people intrude into natural ecosystems because they must gather biomass to meet their energy needs when they lack access to modern energy sources.

2.4. Accountability

According to Rodrik (2014), the author asserted that accountability serves to both uphold the integrity of public entities and justify their actions. The objective of green industrial strategy is to serve the public welfare rather than the interests of the two parties involved, private companies and bureaucrats. A proactive communication approach can enhance transparency. The more open and transparent the initial steps are, the less likely it is that real or imagined scandals will later overshadow industrial strategies. Political. There are various approaches to enhance accountability even in democracies. The designation of a prominent political supporter for green industrial policies facilitates cooperation and provision of information.

2.5. New Industrial Policy

New industrial policy acknowledges a broader multidimensional set of objectives (beyond competitiveness. New industrial policy acknowledges both the need for intervention, rooted in market failures, and the implementation difficulties (government failures).New industrial policy moves the debate away from the view of industrial policy

as a mere set of tools to allocate resources, towards understanding it as a process. All the new developing countries must have uniform green industrial policy. (Altenburg,2017). Green industrial policy aims to identify and facilitate new industrial and economic opportunities and promote structural change by mitigating against negative environmental condition arising from rapid industrialisation and promoting development of circular economy.It is important that countries start investing in the sustainable transition.

2.6. Impact of COVID 19 on Green Industrial Policy

The COVID-19 pandemic has brought the crumbliness of the global economy to the fore. Like many other economies around the globe, the South African economy was not spared by the pandemic. The lockdowns instituted to mitigate the spread of the virus have had large negative impacts on the economy. The economy was literally shut down in April 2020, under Alert Level 5 lockdown, and gradually reopened as of May 2020.(Arndt et al.2020,WHO,2020,WHO,2021) The lockdowns and the uncertainty induced by the COVID-19 pandemic have resulted in severe impacts on the economy, manifested in firm closures, job losses, restricted people movement, heightened uncertainty, and large gross domestic product (GDP) decline in 2020 (Arndt et.al.,2020). Various levels of institutional variety continue to influence the scope and speed of industrial policies for sustainable growth at the national level. Two Indian health industry cases operating during the COVID-19 pandemic provide a good example of this problem (Srinivas 2023). Two Ugandan enterprises are pursuing the practice of using waste materials in the production process in accordance with the principles of green industrial policy, which is one of the still-underappreciated opportunities to lessen the negative environmental effects of industry (Buda and Ricz 2023). Efforts to increase the amount of greenhouse gases naturally absorbed by healthy ecosystems should also not be overlooked.

2.7. Is industrial policy a successful strategy?

One important aspect of industrial policy that receives little attention in the public and scholarly discourse is the factors that influence policy execution and its difficulties. The amount that an industrial policy's implementation rather than its concept determines its effectiveness is a point that the literature constantly undervalues. According to Coutinho et al. (2012) funding, taxation, trade-related measures, public procurement, technical and informational assistance, and regulation. The cost of capital is determined by the financing conditions, which include interest rates, loan terms, the availability of equity and venture capital funds, etc. A tax system's structure establishes the incentives for businesses to operate. Tariffs and non-tariff trade-related measures set the terms for essentially.

2.8. Effective collaboration between all elements of society

Citizens must accept policies; private sector must contribute with knowledge and expertise. There is a need for Research and Development to close the gap between South and North in terms of Green Industrial policy. BRICS must aim to increase acceleration in renewable energy and mitigation of climate change especially to countries that are still behind. As climate change becomes a concern and global powers push to work towards Green Earth, the European Union has introduced a ‘Green Deal Industrial Plan’ to expand its environment-friendly and energy-conservative ways of business and trading. The EU plan aims to cut red tape and provide massive subsidies

2.9. Countries practices regarding Green Industrial policies.

Over 95% of the nation's energy was imported in 2011, and by 2030, its energy consumption is predicted to treble. The government of Morocco not only promotes foreign direct investment in wind and solar energy projects, but it also helps local supplier companies grow and develop corresponding skills. Furthermore, in order to grow different labor market segments, governments support both low-tech rooftop solar thermal and photovoltaic projects and high-tech investments in concentrated solar power facilities. China's plans to encourage electric mobility are outlined by Altenburg et al. (2017), with the dual goals of reducing urban air pollution and boosting the competitiveness of the country's automotive sector. Although China's technological advancements depend heavily on this industry, it has not yet been able to match the productivity levels of its foreign rivals. Therefore, by jumping ahead of emerging technology, the switch to electric powertrains is considered as a chance to increase national competitiveness (Altenburg et al. 2017).No other nation compares to the government's extensive support

program. Four areas of technology development have seen advancements: low-speed autos, two-wheelers, modern cars and buses, and battery manufacture. Morocco takes advantage of its favourable solar and wind energy production conditions to lessen its heavy reliance on fuel imports, provide employment, and foster technological development.

2.9.1. Effect of green industrial policy towards global value chain

Green technology innovation can promote the innovation of green products and green processes so as to further strengthen its comparative advantage and improve the position of Global value chain ,labour division and increase the industrial value chain (Lee, Di Qu, Mao ,2021).Green industrial policies covers regulations, investment incentives and policy support to stimulate and coordinate the development of environmental technologies (Harrison et al ,2017,Rodik,2014).Green industrial policies are economic intervention that serve as goals and purpose of state.Political so green industrial policies helps to encourage political actins to address climate change by reducing cost an generating societal benefits (Schmidt,2020). (Xiao et al., 2017) state that one of the most significant developments in 21st-century trade is the emergence of global value chains (GVCs), which are defined by the outsourcing, fragmentation of production, and trade in tasks. In the past ten years, a number of variables that had previously made it possible for GVC integration to happen quickly have gone the other way, which has led to the data decline that has been seen (Cigna et al., 2022).

2.10. Political economy of Technological change and Transnational Procedures

Many researchers build a discussion about the political economy of green technology change (Aklin and Urpelainen,2018,Breet et al.2018,Geels et al.2017,Lewis,2013,Nahm,2021,Schmidt and Sewerin ,2017).This literature show the power of green industrial policy to generate new technologies.

2.11. Procedures transnationally

The cross-border, occasionally illicit, trading of resources and trash makes international regulation essential as well. It is believed that between 60 and 90 percent of electronic waste is handled informally or without registration. E-waste worth US$ 18.8 billion is illegally transferred between countries, where it ends up being disposed of or repurposed in a hazardous manner (Rucevska et al. 2015). They directly affect circular economies because its goal is to restrict the export of toxic waste. On the other hand, these conventions offer some loopholes that have been exploited to significantly circumvent regulation (Khan 2016. Therefore, in order to bridge existing gaps, more national rules and oversight are frequently needed. Used electrical and electronic equipment suited for direct reuse is described by the Basel Convention as non-functioning electronic devices that require repair, refurbishment, or upgrade. Further definitions and criteria must be provided by national legislation to supplement these accords and treaties. Countries should specify what kinds of materials can be imported or exported in addition to being parties to the Basel Convention (Khan 2016).They decided to work together on managing cross-border travel and treating electronic trash in an environmentally responsible manner (Pan-African Forum on E-waste 2012). In the European Union, where there is no unified standard to specify the environmentally significant properties of recycled materials, better regional regulation is also required.

2.12. Employment created from waste collection and policy adherence to

Increased employment has important social benefits in addition to major environmental ones. Khan (2021) and Salazar-Xirinachs et al. (2014).Remanufacturing, or the process of replacing obsolete or damaged goods with new parts and modules, has the potential to bring 310,000–320,000 employment to the UK manufacturing industry (Next Manufacturing Revolution, 2013). Unskilled people can generate significant revenue streams from waste collection, sorting, and recycling (Khan, 2021; Ellen MacArthur Foundation, 2013). There are still many developing nations and certain areas of industrialized nations without well-developed waste management systems. Under such circumstances, waste scavengers' people who scour metropolitan areas and landfills for recyclables they may restore and resell often find work in a completely unregulated industry. Between 500,000 and 4 million people are employed in this unorganized sector in Latin America (Marello and Helwege 2014).

Khan (2021) pointed out that the absence of centralized waste treatment has led to entrepreneurial activity. In some cities for example, waste pickers hold contracts with municipalities for their services, and waste picker cooperatives have developed complex business operations including the use of mechanisation for some tasks (Marello and Helwege 2014). Although the sector itself is still predominantly informal, 76 per cent of waste pickers in Africa.

The circular economy in India has bright prospects. By 2050, construction, food, and agriculture combined with transportation remanufacturing could generate US$ 624 billion, or 30% of the country's present GDP (Ellen MacArthur Foundation, 2016). On the one hand, the informal waste picking community needs to be taken into consideration when developing countries construct better governmental recycling systems. Fighting poverty requires preserving the means of subsistence for a large number of people, particularly women, who make up the majority of waste pickers. However, there is still more work to be done in the areas of pollution control, labor rights, health and safety, and ending child labor. Public policy frameworks should therefore be inclusive and explicitly define the function and contribution of waste pickers.

2.13. Overarching Policies like Electricity Act

The Electricity Act of 2003 opened the door for legislative actions that aided and expedited the growth of renewable energy sources. According to Ministry of Power (2003), SERCs are mandated to establish the tariff for all renewable energy projects in the state and guarantee grid access for project sites, which are typically situated in isolated areas and far from main load centres. An over reliance on one energy source increases the nation's susceptibility to disruptions in the supply. Regular and prolonged blackouts are a daily occurrence for South Africans due to the potential for major disruptions in the electrical supply caused by coal shortages or maintenance issues in coal-fired power facilities. Given that some businesses depend on electricity, this creates obstacles for businesses and threatens economic collapse.

Table 1: Types of Green Industry

GREEN INDUSTRY NEEDED	GREEN INDUSTRY NEEDED
Green Carbon	Clean transportation
Energy efficiency	Environmental consulting
Green buildings & Green Construction	Green products & services
Green finance	Green forestry
Green technology	Recycling

Table1: Shows the green industry needed and the policies.

2.14. The Renewable Energy Independent Power Producer Procurement Programme

The South African Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) was established in 2011. It is a competitive procurement programme for renewable energy introduced to facilitate private sector investment into grid-connected renewable energy generation (Eberhard and Naude 2016).Global energy systems and all the related manufacturing and service activities related to power generation, transmission, and storage–are already undergoing a fast and radical change. Renewable energy technologies have been adopted widely around the world. Electricity from hydro, geothermal and certain biomasses can now compete with fossil fuel-based electricity, as do wind and solar power in good locations, and further cost reductions are expected. While 15 years ago renewable energy power installations played a negligible role in global electricity generation, “the world now adds more renewable power capacity annually than it adds in net new capacity from all fossil fuels combined” (REN21 2016; REN21 2017)

Table 2: North and South-Comparative Analysis

Activities	EU	Russia	India	China	South Africa
Green Industrial policy for each country	Deploy a mix of policy instruments carbon pricing, grants financing green regulation and standards, green public procurement	The Russian Green Deal is an economic framework program that will help overcome the COVID-19 crisis and transform Russia into a sustainable, green, and modern economy. The program sets an ambitious national goal for Russia to achieve net zero greenhouse gas (GHG) emissions or to become climate neutral by 2050.	India's Green Industrial Policy: Pursuing Clean Energy for Green Growth Carbon pricing Emissions Trading System Effort Sharing Regulation for non-ETS sectors Energy Taxation Directive	China's aims to peak emissions before 2030 and reach carbon neutrality before 2060 – while aligning with the 2030 Agenda and Paris Agreement – call for improving the industrial structure and energy mix	The Department of Trade and Industry (DTI) is currently responsible for formulating the nation's industrial strategy, which focuses on trade, technology, small business development, investment facilitation, competition, strategic and informational leadership, and labor market policy.

2.16. Greening growth policy

In order to greening growth, prices need to be reasonable in terms of environmental externalities, and effective in terms of eliciting the necessary response. To achieve this, a combination of both environmental and industrial policies is required, which we refer to as green industrial policies. Green industrial policies are industrial policies that have an environmental objective, or more precisely, sector-specific policies that impact the economic production structure in order to generate environmental benefits. According to OECD(2018), green growth policies are an integral part of structural reforms needed to promote strong, sustainable, and inclusive growth. Green growth policies can open up new growth opportunities, increase productivity, boost investor confidence in opening new markets, reduce the risk of negative shocks to growth, and provide strategies for green growth. By promoting renewable anergy, reducing pollution, improving waste management, and safeguarding biodiversity, India aims to foster sustainable development and balance economic growth with environmental conservation. According to OECD green growth, it means promoting economic growth and development, while ensuring that natural assets continue to provide resources and environmental services that contribute to well-being (OECD, 2023).

2.17. Carbon Price

The idea that a unique carbon price in the economy is the optimal policy has been challenged in second-best settings: in the absence of predictability and credibility of future carbon prices (VogtSchilb and Hallegatte, 2011), in the presence of technology lock-ins (Kalkuhl et al., 2012), in case of learning-by-doing (del Río González, 2009), or in the presence of distortion in labour markets and of distortionary revenue-raising taxes (Richter and Schneider, 2003). In such cases, there is a potential justification for overlapping policies, i.e. for specific sector-targeted policies in addition to price-based economy-wide instruments (such as a carbon tax). Importantly, a decision to deploy a sector-targeted policy should be conditional on a precise assessment of the market failure it seeks to address, as well as its costs and benefits**.**

2.18. What are the lowlights and highlights faced by developing countries on Greening Industrial policy

We have considered the challenges and opportunities facing the South African industrial sector when it comes to greening production and consumption, and the role that policy can play in promoting green industrialisation. One challenge the country faces is how to significantly shift electricity generation from coal to renewables without compromising on short-term economic growth and addressing the challenges of high unemployment and poverty.

South Africa has lot of biomasses from forestry plantation which can increase energy generation. We argue that the current electricity shortages, which are constraining investment and growth, are a blessing in disguise as renewable energy can be ramped up without the need to decommission some coal-generating assets in the short term. In the short term, the trade-off between coal and clean energy is not at all binding. Furthermore, the concern that a transition to renewables-based electricity generation could create the risk of stranded generating assets in the medium term is also unfounded for South Africa, as most of these assets are already nearing the end of their lifespan. Policy should also address the apparent misalignment between green economy objectives and those of other key sectors. For instance, the government may need to create incentives for the financial system to increase its support of risky investments in low-carbon technologies or increase government spending on Research &Development.

Greening the energy sector, though important, is only one part of the greening process for the industrial sector. Cleaner energy implies, all other things being equal, lower energy consumed to produce a unit of output. Greening of production and consumption also requires the production of green goods (and services) and complementary policies to incentivise demand of the same. South Africa is the most advanced manufacturing economy on the African continent. It is ranked the regional lead in sub-Saharan Africa, and 45th globally with respect to the competitiveness and industrial development index (UNIDO 2018). 46 These capabilities mean that South Africa has potential to participate in many industries/sectors producing green goods (Altenburg and Rodrik, 2017)

2.19. Plans for adjustment of Carbon boarder

A major concern for South African policymakers ought to be the developments in the EU around the carbon border adjustment mechanism. If the country continues to dither on greening, there is a risk that South Africa will be heavily penalised in trade once the EU's carbon border adjustment mechanism takes effect. South Africa has no choice but to pursue green growth in general, and green industrialisation in particular, as failure to do so will undermine its growth prospects and carry major socio-economic ramifications. South Africa's position vis-à-vis its peers suggests it will likely experience substantial erosion of its competitiveness. Government needs to be decisive and remove any barriers to the development of the renewable energy sector. It also needs to put in place better incentives to encourage green industrialisation. More specifically, all government industrial support must be reviewed, with particular attention being given to aspects of policy that hinder change. Carbon boarder adjustment will be implemented for steel, aluminium, cement, organic fertilisers fertilizers and power as per the European commission. China ' s carbon neutral policy and law are very comprehensive. China's approach is based on principle of national coordination ,prioritization of conservation ,government and market driven ,coordination of domestic and international energy resources and risk prevention.

2.20. Free trade

Amsden (2012) argues that free trade "appears to have developed only in Switzerland and Hong Kong" as a "catch-up strategy". Evans (2010) argues that "development theory and history reinforce the proposition that there is no such thing as a no-development state, no development". This chapter presents a triple argument based on the Brazilian case: first, industrial policies are needed to promote economic growth; second, the effectiveness of policies depends on the State's ability to support the development of firms' capabilities; and third, an efficient development bank that can provide long-term financing is an advantage of industrial policy (Shin & Lee, 2012).

India has signed thirteen (13) free trade agreements (FTAs) with trading partners in the last 5 years. These include the India – Mauritius Comprehensive Economic Corporation and Partnership Agreement (CECPOA), India – United Arab Emirates Comprehensive Partnership Agreement (UAECPOA), and India – Australia Cooperation and Trade Agreement (CATA). China has built its strategic position in the world by signing a number of Free Trade Agreements (FTAs). The duty and tax reductions have helped China to become a leader in manufacturing in recent years. It is essential that all developing countries have a single green industrial policy. The European Union (EU) was founded on the principle of free trade between its members.

Europe was committed to pen World trade.Between 1999-2010 EU foreign trade double and account to 30% of the EU 's gross domestic product. South Africa signed EFTA-SAU free trade agreement ,a free trade agreement

SACU between its neighbouring countries (South Africa ,Eswatini, Namibia ,Lesotho and Botswana) and the European Free trade Association which consist of the following countries :Norway, Switzerland, Liechtenstein, and Iceland.Land locked us mentally when it comes to free trading.Intra African trade is not looked properly.Boarders must open free trade for generation to come to expose their creativity and to increase their generational wealth.

3. Main Findings

The main findings are highlighted as follows :Green trade and energy can accelerate China ;s green growth ,secondly it can enhance medium and high technology green trade which can contribute towards improving local greening growth ,thirdly the impact is heterogenous in region with different trade levels. In terms of free trade through this research we have found that China has established its strategic worldwide by signing number of free trade agreement, India has signed 13 FTAs in the past 5 years with its trading partners which include India-Mauritius comprehensive economic corporation and Partnership agreement and India -UAE Comprehensive partnership ,India -Australia cooperation and trade agreement.With regards to we have find out that Europe, was the EU ‘s founding principle.Europe was committed to pen World trade and South Africa we have find out that it has signed EFTA-SAU free trade agreement ,a free trade agreement SACU between its neighbouring countries. In terms of carbon adjustment, we have notice that developing countries will focus mainly on steel, aluminium, cement, organic fertilisers fertilizers and power as per the European commission. In terms of the green growth policy if implemented uniformly it will unlock new growth opportunities.With regards to the electricity policy there is serious gap in South Africa where the country is still facing a serious loadshedding which affect the economy to perform well

4. Discussion

First, industrial policies need to be implemented to stimulate economic development; second, the efficacy of policies depends on the State's capacity to support the advancement of firms' competencies; and third, a development bank that can efficiently provide long-term financing is a key component of industrial policies. In summary, the design of industrial policies needs to include goals and aspirations from an evolutionary standpoint. With the goal of achieving further advancement as indicated by the international competitive frontier, an industrial policy for economic transformation should be able to recognize and respond to the diverse competitive difficulties of different economic sectors. Simultaneously, the degree of institutional capability growth defines boundaries for policy aspirations.

A national strategy for sustainable development must include industrial policy, just as it must include policies for infrastructure, education, research, and technology. Second, full commitment and close collaboration among pertinent ministries and agencies are required once industrial policy is given political priority. Close collaboration with the private sector is also vital, as long as roles, compromises, benefits, and equivalents are clearly agreed upon and made public. Third, the significance of policy implementation cannot be overstated: public agencies need to have effective technical competencies and negotiating abilities in addition to clearly defined goals and responsibilities. The difficulties in coordinating and exchanging information should catch the attention of policymakers. In conclusion, the critical element is the availability of the tools required to carry out policy, specifically the existence of an having the tools needed to carry out policy is crucial, especially having a development bank that can effectively and efficiently offer long-term funding for economic transformation. A green economy improves the quality of life for residents and stimulates commerce and economic activity by minimizing or doing away with economic activities that harm human and environmental health.

5. Recommendations

Strong operational governance to address coordination among different types of stakeholders, different policy governance areas crucial.Secondly flexible policy design, addressing the information problem with learning from monitoring & evaluation. Re-alignments of all policies to suit the needs of the developing countries Public private partnership, blended finance; willingness to co-finance from private sector to weed out rent-seeking. Allow for policy experimentation, but with clear monitoring & evaluation plan, such that unsuccessful experiments are

stopped/restructured in time. Taking risk, not avoiding failure, by targeting particularly new to be developed eco-systems and markets, with stakeholders previously unconnected. Deploy a mix of policy instruments: carbon pricing, grants& co-financing, green regulation and standards, green public procurement.EU budget for 2021-2027 to climate action is good news, but to ensure that the remaining spending does not go against the green targets. Green monitoring of the EU budget and Next Generation EU funding. Climate-related spending could be overstated with current EU accounting rules.Develop a solid methodology for monitoring climate spending and report on it annually.

Author Notes

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