GREEN TECHNOLOGY APPLICATION POLICIES FOR SUSTAINABLE DEVELOPMENT: INTERNATIONAL EXPERIENCES AND LESSONS FOR VIETNAM

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Summary:

On a global scale, science, technology and innovation (STI) are expected to play an important role in realizing sustainable development goals (SDGs). However, in reality, STI has not been closely linked to the SDGs, as shown by the fact that most research and innovation efforts do not focus on sustainability. This article examines the experiences of three countries: China, India, and Malaysia. Lessons learned from these countries show the need for a comprehensive green technology program, and financial and non-financial support policies from the state to promote research and development (R&D), raise public awareness, and flexibly adapt to the domestic context. They are the key elements for Vietnam to promote green technology application, towards long-term sustainable development.

Keywords: *Technology application policy; Sustainable development; International experiences.*

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1. Introduction

Science, technology and innovation (STI) have long been recognized as indispensable in improving economic performance and enhancing competitiveness. Also, STIs help address environmental and social challenges and improve the quality of life. Technology has the potential to significantly boost efficiency, increase productivity, improve access to services, enable data-driven decision-making, and promote sustainable practices in various sectors, including energy, agriculture, health, education, and infrastructure. Technological advances, such as those in renewable energy, digital connectivity, precision agriculture, and sustainable urban planning, can contribute to sustainable development by promoting economic growth, social inclusion, and environmental sustainability.

Technology application policies for sustainable development include aspects such as building a comprehensive program system, financial and non-financial support policies, promoting R&D, and raising public awareness. In addition, the promulgation of regulations and legal frameworks to encourage the development of environmentally friendly technology and minimize negative societal impacts is also an important aspect of this policy.

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The application of technology for sustainable development requires appropriate and effective policies from the State to promote innovation while ensuring a balance between economic growth, environmental protection, and social development. However, the process of developing and implementing technology application policies for sustainable development still faces many challenges, including the complexity of technology management, financial and human resources requirements, and the need for flexible adjustment to accommodate constantly changing economic, social, and environmental conditions.

STIs in Vietnam have not yet clearly demonstrated their role in the process of implementing sustainable development goals. Therefore, the objective of this article is to study the experiences of some countries in the world regarding technology application policies for sustainable development goals and draw lessons for Vietnam.

2. Status of Vietnam's science, technology and innovation activities for sustainable development goals

According to Dang Thu Giang (2019), STI play a key role in promoting the implementation of sustainable development goals set by the United Nations. According to the 2030 Agenda (Agenda 2030), this role is most clearly affirmed in Goals 9 and 17, as STI is not only the main driving force for the economic transformation process towards prosperity, inclusiveness, and environmental sustainability but also the foundation for promoting sustainable industrialization and enhancing technological innovation capacity. Not only does it increase efficiency and diversify the economy, STI also contributes to establishing modern infrastructure, improving productivity and competitiveness, reducing poverty, improving food security and nutrition, and developing sustainable agriculture. In addition, STI applications facilitate access to clean energy, improve the quality of health services, prevent diseases, ensure social equality with the principle of "leaving no one behind", and promote flexible and personalized access to education. Through international cooperation and establishing global partnerships on STI (according to Goal 17), countries can strengthen their capacity to address economic - social - and environmental challenges, thereby strongly supporting the implementation of the "Agenda 2030" on a global scale.

To date, despite being expected to serve as an important driving force, STI have not yet fully played their role in implementing sustainable development goals due to a lack of connection with practical needs, limited incentive policies, as well as ineffective implementation and application capabilities. A recent study by the University of Sussex has pointed out the incompatibility between STI activities and the SDGs. In high- and middle-income countries, most research and innovation activities are not closely linked to the SDGs, as shown by the fact that 60% - 80% of scientific

publications and 95-98% of innovation activities are unrelated to these goals. Furthermore, 80% of SDG-related innovations in wealthy countries are concentrated in only 6 of the 73 countries, with the United States alone accounting for 47% of all innovations (*Ciarli, 2022*).

This study has identified several reasons why STIs have not fulfilled their role in implementing Agenda 2030, notably issues related to the orientation and application of STIs to address current pressing sustainability issues:

First, the issue of orientation: Most of the published research (60% - 80%) and patented activities (95% - 98%) are not aligned with the SDGs. This shows the lack of connection between the STI direction and the global sustainable development goals.

Second, the issue of inequality: In high-income (HICs) and upper-middle-income countries, only 30% - 40% of research is related to the SDGs. Meanwhile, in low-income countries (LICs), 60% - 80% of research is related to the SDGs but only counts for 0.2% of the global total research. This is because most of the global research is conducted in HIC countries without collaboration with researchers in LICs - where the SDG challenges are most severe. As a result, opportunities for STIs to address the context-specific challenges of disadvantaged countries are limited.

Third, the issue of focus: Although most stakeholders consider social innovation activities and policies to promote innovation at the central and local levels to be important in addressing the SDGs, support for these types of innovation and research related to social issues such as poverty, inequality, and conflict still lags behind research and investment in advanced technologies.

Fourth, the problem of knowledge separation: There is currently little effort to translate research results into innovations to address complex social problems. In addition, there is some evidence that STI activities have both positive and negative impacts on the SDGs.

Fifth, the problem of mismatch with regional needs: National research priorities are often poorly aligned with regional SDG challenges. This is the case in lower-middle-income countries such as India (which does not prioritize research on hunger or gender equality), and in most HICs, such as the United States, which does not prioritize research on key environmental challenges related to unsustainable consumption and production patterns. Globally, military-related research often receives significant funding, even though military objectives are not mentioned in the SDGs (*Ciarli, 2023*).

The above five issues reflect the public goods nature of STI activities, which are non-exclusive and non-rival when there are many users, such as clean air or a healthy environment. Because these benefits cannot be monopolized or commercialized easily, private enterprises often lack the motivation to invest

due to difficulties in recovering capital and profits. In addition, the benefits of sustainable development are often positive externalities, not fully reflected in market prices, resulting in the market failing to properly assess the true value of these solutions. As a result, investment and interest from the private sector in STI projects serving sustainable development goals are limited, although they bring great benefits to society.

In Vietnam, according to Nguyen Quang Tuan (2016), the commercialization of research results in areas serving the poor and economically disadvantaged regions also faces many challenges, mainly because beneficiaries often cannot afford new products or technologies. Farmers in developing countries are a typical example: they need scientific and technological solutions to improve productivity and cope with problems such as pests or climate change, but their limited income prevents them from purchasing these products. This leads to the market for research results in that field being almost non-existent, making it difficult for scientific and technological organizations to have the motivation to commercialize and recover investment capital.

Not only does the supply side of green technology face many difficulties, but the demand side of green technology also encounters numerous barriers to its application and use in the production chain. According to the analysis of Xia et al. (2019), when businesses consider applying green technology to their operations, they often face a series of different barriers that slow down or even hinder the transition process, specifically outlined below:

Technological barriers: Technically, green technology is often complex and requires deep expertise. However, a scarcity of high-quality human resources makes it difficult for businesses to maintain and operate new systems. In addition, the lack of supporting information technology applications (such as monitoring software and data management) and the lack of synchronized infrastructure make the green technology deployment process costly and time-consuming to upgrade or adapt.

The production barriers: The production process also encounters obstacles when integrating green technology. First, product design is often not optimized for environmental standards, forcing businesses to modify their designs or structures, which increases costs and reduces competitiveness. In addition, the lack of technical data, environment, and quality standards makes it difficult for businesses to plan long-term, slowing down progress or even causing them to abandon green ideas. The cost of replacing green materials and components is often high, and the supply is limited, creating financial risks. Furthermore, uncertainty regarding capital recovery and commercial benefits makes businesses hesitate to invest in new technology.

The management barriers, corporate culture, institutions, and markets: Regarding management, senior leaders often fail to view the environment and green technology as strategic goals, resulting in insufficient resource

allocation and a lack of clear objectives. Employees often lack information and training and are unaware of their responsibilities in green transformation. Poor internal communications leave them confused and uncooperative. In addition, the lack of environmental priorities makes green activities easy to be sidelined. From a policy perspective, inconsistent or constantly changing regulations create additional risks, while businesses lack financial support, public infrastructure, and stakeholder commitment. If consumers are unwilling to pay more for green products, or the supply chain is uncooperative, the process of adopting green technology becomes even more difficult.

In the context of green technology applications facing many barriers from both supply and demand sides, or in other words, the science and technology market is facing many "market failures", the role of the State becomes extremely important to correct market failures with appropriate policy tools.

In terms of technology provision, the State can support by building a comprehensive program system, including clear and stable regulations and standards, providing businesses with a solid legal foundation to invest in and develop green solutions. The State can also promote investment in basic infrastructure (renewable energy systems, green transport networks, environmental information databases) and improve science and technology capacity through direct and indirect funding of R&D activities, encouraging innovation at institutes, research centers, and universities. This helps reduce technical and economic risks and facilitates the development, improvement, and commercialization of domestic green technology.

In addition, on the demand side, the State plays a role in guiding and stimulating the market. Financial support policies such as tax incentives, credits, or funds to support businesses applying green technology can encourage businesses to confidently innovate production lines and improve technology. At the same time, the State can use non-financial policies such as communication and education to raise public awareness of the economic, social, and environmental benefits of green products and services, thereby promoting market demand and motivating stakeholders to adopt clean solutions. The State can also act as an intermediary, connecting supply chains, and establishing an interactive platform between businesses, researchers, and customers to promote cooperation, sharing knowledge, experience, and green initiatives.

3. International experience in developing policies for the application of green technology for sustainable development goals

3.1. China's experience

In recent years, China has issued many specific policies to promote the application of green technology, thereby supporting the transformation to a

sustainable development model and minimizing environmental impacts. In the 5-year plans, especially the 13th Five-Year Plan (2016 - 2020) and 14th Five-Year Plan (2021 - 2025), China has set goals to reduce carbon emission intensity, increase the proportion of renewable energy, and encourage innovation in environmental technology. These plans provide comprehensive orientations, creating a legal basis and orientation for policies prioritizing green technology, improving energy efficiency, and reducing greenhouse gas emissions.

The inclusion of targets for carbon emission reduction and renewable energy share in the 13th and 14th Five-Year Plans demonstrates China's strategic and comprehensive approach to sustainable development. Through the Five-Year Plans, the Chinese government not only sets out its vision and long-term goals but also concretizes them into targets, tasks, and measures for local governments, enterprises, and research organizations to implement. This is a top-down yet effective approach, in which the State plays a regulatory role, guiding both the market and society toward green technology.

Specifically, reducing carbon emission intensity and increasing the proportion of renewable energy are demonstrated through setting legally binding targets or economic incentives, creating pressure and motivation for industries to shift from a fossil fuel-based model to clean energy sources. These goals are often accompanied by supportive policies such as tax incentives, financial support, subsidies for solar energy, wind power, or infrastructure development for electric vehicles. This not only reduces barriers to market entry for green technology businesses but also promotes competition and R&D towards innovation, improving quality and efficiency, and reducing technology costs.

In addition, the Five-Year Plans are closely related to the development of legal corridors, environmental standards, and technical regulations. These documents guide enterprises in meeting new requirements, thereby expanding the market space for environmental technology, encouraging them to invest long-term, and improving competitiveness. The targets are also quantified and closely monitored, creating a system for evaluating the effectiveness of implementation at the local level, forcing local governments to participate more proactively in promoting green technology, supporting enterprises to improve production processes, transform business models, and upgrade infrastructure and public services.

Integrating green technology targets into the Five-Year Plans also helps China align its policies with the international context. In the global trend towards emission reduction and environmental protection, these targets help China maintain a pioneering position, both ensuring sustainable economic development and affirming its international role in dealing with climate change. In this way, the Five-Year Plan becomes a key tool, not only for political guidance but also for direct impact on market structure,

technological innovation, and shaping the future of greener, more sustainable socio-economic development *(Hepburn et al., 2021).*

Alongside the Five-Year Plan, the "Made in China 2025" Strategy is seen as an important milestone in the journey of transforming the Chinese economy from a traditional industrial model that relies heavily on cheap labor and primary resources to a modern, high-quality, and sustainable industrial model. In the context of climate change pressure, resource depletion, and increasing demands for sustainable development, this strategy integrates industrial upgrading to use clean and efficient technology.

First, "Made in China 2025" encourages enterprises to shift from large-scale, energy-intensive, high-emission production to smart production, reducing waste and utilizing recycled materials. Industries such as automobiles, electronics, machinery, renewable energy, and new materials are encouraged to apply green processes throughout the entire value chain: from design, material selection, and production process optimization, to waste treatment. This not only helps reduce long-term costs by saving raw materials and energy but also increases competitiveness in the international market - where environmental standards are becoming increasingly more stringent.

The emphasis on sustainability in "Made in China 2025" also creates a favorable environment for R&D activities. When enterprises see clear incentives and guidance from the government, they have greater motivation to invest in green technology development, from low-emission production processes and product lifecycle management systems to energy-saving machinery and equipment. This attracts high-quality human resources and promotes cooperation between enterprises and research institutes, universities, and international partners. As a result, the green technology market becomes vibrant, enhances technological self-autonomy, and improves China's position in the global value chain.

Furthermore, "Made in China 2025" lays the foundation for building an ecosystem that supports businesses: a more complete legal framework, stricter technical standards, as well as financial incentives - such as tax incentives and innovation support funds - that help reduce the risks and costs of transitioning to green technology. This reduces policy uncertainty for businesses, enabling them to confidently make long-term plans and gradually adopt and scale up clean production.

China is one of the pioneering countries in formulating comprehensive strategies and policies to promote green technology. The Five-Year Plans, the "Made in China 2025" strategy, and renewable energy policies have laid a solid policy foundation. China has significantly reduced its carbon emission intensity, increased the proportion of renewable energy (solar, wind), and become the world's leading manufacturer of solar panels, wind turbines, and electric vehicles. This has not only contributed to reducing air pollution and

dependence on fossil fuels but also enhanced its international competitiveness, allowing China to occupy a large market share in the global green technology market. Promoting green technology creates millions of new jobs in renewable energy, equipment manufacturing, and R&D, while improving energy efficiency and reducing long-term costs (*IEA, 2021*).

3.2. India's Experience

In recent years, India has implemented many specific policies to promote the application of green technology, reduce dependence on fossil fuels, and move towards sustainable development.

In the study by Kavita Surana, Anuraag Singh, and Ambuj D. Sagar (2020), the authors analyze how the science, technology and innovation-based incubator system in India can contribute to the implementation of sustainable development goals. India has implemented many policy programs and initiatives such as Startup India, Atal Innovation Mission, and Technology Business Incubators (TBIs) supported by the Ministry of Science and Technology of India. These programs aim to accelerate the growth of emerging technology companies by providing workspace, seed funding, investor connections, management skills training, and access to a network of technology experts. Notably, the Indian government and its investment partners are targeting key sectors related to the SDGs, such as renewable energy, clean water, sanitation, public health, and sustainable agriculture.

Noteworthy is how incubators in India connect startups with universities, research institutes, and industry, creating a multi-dimensional network of collaboration. Startups in the incubators are encouraged to develop technology solutions that focus on solving social and environmental challenges. For example, some incubators support startups specializing in smart water treatment, water-efficient drip irrigation systems, or small-scale solar energy solutions targeting rural communities. This support goes beyond the technical level and extends to business coaching, commercial model building, marketing strategies, and fundraising - helping these solutions scale up, reach markets, and create long-term sustainable impact.

However, incubators still face difficulties in mobilizing long-term capital, lack strong connections with international markets, and sometimes lack a rigorous impact assessment mechanism toward the SDGs. Nevertheless, the Indian experience shows that clear policy orientation, multi-dimensional support, the establishment of an open cooperation network, and a focus on sustainable values can help STI incubators become a launching pad for green, environmentally friendly technology solutions, aiming at long-term sustainable development goals. This is an important lesson not only for India but also for many other countries looking for effective models to apply STI to solve the big challenges of the time.

India's experience in using STI incubators to promote green technology applications and implement the SDGs shows a broader and multi-layered approach than the traditional model. In the context of developing countries like India, incubators not only provide infrastructure, networking, and startup support services but also need to go further to address the specific needs of society and the market.

First, incubators in India have been closely aligned with sustainability goals since before the SDGs were formally launched in 2015, especially Goal 8 (promoting economic growth, full and sustainable employment) and Goal 9 (building sustainable infrastructure, promoting industrialization and innovation). However, for incubators to play their full role, they must engage in "non-traditional" activities, such as developing human capacity, seeking and training entrepreneurial talent, securing public funding sources, combining then with private capital, and focusing on social and environmental sectors that are in high demand but difficult to profit from directly (such as clean energy and public health).

Second, the Indian experience shows that in developing countries, incubators must take on a broader and more complex role than just providing basic support to young businesses, specifically:

- Orient SDG goals: Incubators and relevant government agencies need to identify sustainable development goals, set targets and measurement standards, and create specific plans to support startups in this direction;
- Organize and coordinate the incubator system at the national level: Comprehensive coordination helps reduce program duplication, prevent resource wastages, and increase operational efficiency and connectivity;
- Establish a framework for monitoring and evaluating effectiveness: The country needs to develop a system to monitor and evaluate the implementation capacity and outcomes of each incubator, as well as their impact on businesses, markets, and society. Continuous data collection and analysis help improve policies and identify appropriate success indicators for startups operating in the sustainable sector;
- Focus on human capacity building: In addition to supporting startups, incubators need to develop training programs and improve skills for incubator managers, researchers, and startup founders, helping them master knowledge on innovation, sustainable technology, and business management in a challenging environment.

Lessons from India show that to promote green technology applications and effectively implement SDGs, policies need to focus not only on establishing and supporting individual incubators but also on building a comprehensive ecosystem. This emphasizes the importance of involving diverse stakeholders, including the central government, local governments, national research

agencies, private investment funds, non-governmental organizations, and consumer communities. In the Indian example, public-private partnerships and a relatively favorable policy environment have enabled incubators to guide startups toward creating social impact while also providing them with the necessary financial, professional, and technical resources.

3.3. Malaysia's Experience

Malaysia has shown early interest in green technology through the National Green Technology Policy (NGTP) in 2009. During the 2010s, the Government made efforts to promote the economy towards "green growth" through programs, action plans, and business support mechanisms. Malaysia's Green Technology Master Plan (GTMP) (2017-2030) was shaped during a period when the country was facing an urgent need to balance economic growth, environmental protection, and social welfare. Internationally, challenges such as climate change, resource depletion, and pressure to comply with global environmental commitments (especially after the 2015 Paris Agreement) have prompted many countries, including Malaysia, to develop long-term sustainable development strategies.

Malaysia's Green Technology Master Plan (2017-2030) is a strategic and comprehensive plan that serves as a roadmap for the country's long-term green technology development. The establishment of medium- and long-term strategies represents a unified and coordinated effort in approaching environmental issues, responding to climate change, and transforming the economic model. Instead of focusing on short-term measures, the GTMP prioritizes building a sustainable foundation, thereby enhancing domestic competitiveness in the green technology sector and promoting innovation that meets international standards (*According to the Green Technology Master Plan of the Ministry of Energy, Green Technology and Water, Malaysia*).

Within the framework of the GTMP (2017-2030), the Malaysian Government has implemented many activities and measures to concretize the strategic vision and promote the application of green technology in many fields. These activities include:

(1) Building a clear policy and legal framework

Building a clear policy and legal framework in the context of GTMP is meaningful in laying a solid foundation for the green technology development roadmap in Malaysia. First, the issuance of guidelines, technical standards, and environmental regulations in key areas such as renewable energy, green buildings, green transportation, water treatment, and waste management not only helps create a specific and transparent legal corridor but also provides common standards for businesses, researchers, and investors to follow. These standards ensure that green technology is applied

not only at a basic level but also at a certain quality, aligning with the national strategy for sustainable development. For example, in the field of renewable energy, technical standards on performance, safety, grid connection, and regulations on greenhouse gas emissions will help businesses effectively evaluate, select, and deploy suitable solar, wind, and biomass technologies. Similarly, in construction, green building standards help designers, contractors, and investors comply with the principles of energy efficiency, sustainable materials use, construction waste treatment, and minimizing environmental impacts throughout the life cycle of the project.

Another important aspect is the updating and adjustment of regulations and administrative procedures. Normally, delays and complexities in licensing, inspection, or project bidding can hinder the application of new technology. To overcome this, the Malaysian Government has proactively reviewed and simplified administrative procedures, reduced cumbersome processes, and increased transparency in project approval. This not only helps businesses save time and costs, but also encourages proactively seeking, developing, and commercializing green technology. Transparency and legal openness help create trust for investors, helping them feel secure in investing in green projects, and promoting fair competition and innovation in the field of sustainable technology.

(2) Financial support and investment incentives

Financial support and investment incentives serve as an important pillar in Malaysia's policy ecosystem to promote green technology adoption and application. In the context of emerging technology markets often facing high risks, large initial investment costs, and unclear immediate effectiveness, financial support tools become necessary "lubricants" to help businesses overcome barriers and confidently deploy green solutions. First, the Green Technology Financing Scheme (GTFS) acts as a preferential capital channel, providing credit at lower interest rates than conventional commercial loans. This is a driving force to help businesses reduce financial pressure and easily realize projects, from innovating the production lines, applying waste treatment technology, investing in solar energy systems, to developing clean means of transport. GTFS not only focuses on short-term financial support but also creates peace of mind for businesses to make long-term plans, invest in R&D, train human resources, and improve productivity and resource efficiency. More importantly, this preferential credit support model helps reduce risks for investors, increase the ability to mobilize private capital, and attract resources from the market.

In addition, subsidy programs, tax exemptions/reductions for green equipment, raw materials, or products help lower costs, making green products more competitive than traditional products. When the cost of converting to green technology decreases, businesses have more motivation to experiment, deploy new processes, and upgrade infrastructure. At the same

time, consumers and industrial customers also tend to support green products more, because prices become more affordable and sustainable benefits are demonstrated. This spillover effect promotes the expansion of the domestic market, helps increase production scale, gradually reduces costs according to scale, and gradually creates a more vibrant green supply chain.

In the long term, financial support is also strategic in forming and strengthening the competitiveness of the domestic green technology industry. When businesses have enough motivation and resources to invest, they will increasingly improve their skills, upgrade equipment, and accumulate experience. The increased domestic competition stimulates innovation and improves product quality, thereby Malaysia can create a strong green technology industry, capable of expanding into international markets and taking advantage of the global trend towards sustainable development.

(3) Promoting R&D and innovation

Promoting R&D and innovation is one of the important foundations for building endogenous green technology capacity, thereby reducing dependence on imported technology and enhancing national competitiveness. Through research funds and cooperation programs between research institutes, universities, and enterprises, the Malaysian Government facilitates the connection and symbiosis between academic knowledge, practical skills, and market needs. Public research units with good expertise will support enterprises to solve complex technical problems, while enterprises, with a clear understanding of market requirements and implementation conditions, will help orient research towards practical applications. This linkage promotes the formation of an innovation ecosystem, helping ideas from the laboratory reach commercialization faster and reducing the gap between basic research and finished commercial products.

In addition, organizing competitions, awards, and specialized seminars on green technology act as a catalyst, nurturing the spirit of innovation and encouraging scientists, engineers, and start-up entrepreneurs to engage in new but potential fields. Through these events, promising ideas are identified, awarded, and promoted, helping to attract attention from investors, the public, and additional resources for R&D. Honoring outstanding achievements also creates a driving force for healthy competition, encouraging research groups and businesses to continuously improve products and technological solutions, find cleaner production, more energy saving methods and reduce emissions.

In the long term, the process of promoting R&D and innovation also has a positive impact on human resources. When training programs, scholarships, and good research environments are established, the team of engineers, scientists, and technical experts will develop not only in quantity but also in quality. This human resource becomes a valuable “brain capital”, providing a foundation for Malaysia to exploit and improve domestic green technology while quickly adapting to global trends. This helps the country increase its

ability to meet increasingly stringent international environmental requirements, take advantage of export opportunities, and enhance its position in the global value chain of green industries (*Zaboon and Salih, 2021*).

Specifically, GTMP focuses on a series of key industries. In the energy sector, the goal is to increase the proportion of renewable energy, improve energy efficiency, and reduce dependence on fossil fuels. In the manufacturing sector, GTMP encourages the application of clean technology, low-emission production processes, and the use of recycled and environmentally friendly materials, and promotes R&D to enable domestic enterprises to master technology and reduce long-term costs.

Transport is another key area, as GTMP aims to reduce pollution from vehicles, develop infrastructure for electric vehicles, and improve green public transport systems, thereby solving the problems of congestion, air pollution, and reducing greenhouse gas emissions. In the construction sector, the goal is to build and renovate buildings according to green building standards, improve energy efficiency, optimize water use, and minimize waste generated during construction and operation.

Waste and water management is also a focus of GTMP. This includes promoting a circular economy model, recycling and reusing waste, reducing the burden of treatment, and limiting water pollution. In addition, improving clean water treatment and wastewater treatment technology ensures water security and public health.

(4) Promoting and raising public awareness

Another important point of GTMP is to raise awareness, skills, and capabilities related to green technology across society. Through training, communication, and community education, GTMP helps businesses, organizations, and people better understand the economic, social, and environmental benefits of green technology. When awareness is raised, businesses will proactively seek and apply new technologies, increase their ability to adapt to increasingly stringent environmental regulations, as well as to improve their competitiveness in the international market - where environmental standards and sustainable development become key factors.

Overall, GTMP is not just a plan, but it also plays a "guiding" role, creating a clear and consistent policy framework, helping the Malaysian government, businesses, and the community move towards a greener, more sustainable economy. Through this, GTMP supports the building of a healthy green technology ecosystem, promoting innovation, improving the quality of life, minimizing negative impacts on the environment, and ensuring long-term prosperity for the country.

4. Proposed lessons for Vietnam

From the experiences of China, India, and Malaysia in promoting the green technology application to achieve sustainable development goals, Vietnam can draw some important lessons as follows:

(1) Building a long-term and synchronous strategic and policy framework

China, India, and Malaysia all emphasize the importance of a comprehensive, clear, and long-term policy framework. Vietnam needs to build and perfect a green technology development strategy and integrate it into its 5-year plans and socio-economic development strategies, while also refining legal documents, technical guidelines, and environmental standards. The policy framework needs to be stable and transparent to build trust among businesses and investors while remaining flexible to adapt to market conditions and scientific advances.

(2) Investment incentives, financial support, and tax incentives

Lessons from China show that providing preferential credit, financial subsidies, and market stimulation help reduce the costs and risks of investing in green technology. Malaysia through GTFS provides direct financial support, thereby encouraging businesses to confidently adopt green technology. Vietnam can apply similar measures: establishing a green finance fund, supporting low-interest loans, and tax incentives for businesses investing in R&D, production, and green technology use.

(3) Strengthening R&D, improving endogenous capacity for green technology

Promoting R&D and fostering collaboration between universities, research institutes, and businesses in all three countries shows that innovation is a core factor. Technology incubators in India have clear policy orientation, multi-dimensional support, established open cooperation networks, and focused on sustainable values that can help STI incubators become launching pads for green, environmentally friendly technology solutions, aiming at long-term sustainable development goals.

(4) Developing domestic markets and raising awareness

In Malaysia, the development of standards, eco-labels, and green public procurement have helped boost market demand for green products and services. China and India also utilize communication, education, and community programs to raise awareness and increase demand for clean products. Vietnam should promote communication about the economic, social, and environmental benefits of green technology, encouraging consumers to support environmentally friendly goods and services. At the same time, a "green" public procurement policy will create stable output, stimulating domestic market development.

5. Conclusion

Each country has its context, development level, resources, and priorities, but they are all moving towards a common global trend, which is sustainable development in all three aspects: economic, social, and environmental, to implement the "Agenda 2030". Vietnam needs to learn from the strengths and success lessons of China, India, and Malaysia and adjust them to suit its

domestic conditions. This includes combining socio-economic policies, cultural characteristics, infrastructure readiness, and management level. Vietnam can start with potential areas (renewable energy, sustainable agriculture, green construction) and gradually expand to other areas as resources and experience grow.

In summary, the lessons learned from the three countries show that the need for a comprehensive green technology program, financial and non-financial government support policies to promote R&D, raise public awareness, and flexibly adapt to the domestic context are the keys for Vietnam to promote green technology application and achieve long-term sustainable development./.

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