

PURSUING SUSTAINABLE DEVELOPMENT THROUGH GREEN ENTREPRENEURSHIP AND ITS IMPACT ON EXPORTS WITH SPECIAL REFERENCE TO TAMIL NADU

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Abstract

Green entrepreneurship is an emerging trend in the pursuit of sustainable development due to the increased focus on sustaining a balance between environmental, economic, and social concerns. The purpose of the current study is to examine the main aspects that determine sustainable growth with the help of green entrepreneurship and its effect on export performance. The research in question is specifically aimed at comprehending the role of green entrepreneurial practices including resource efficiency, innovation, and regulation compliance in the process of improving international competitiveness. In order to fulfill the said purpose, a quantitative research design was utilized. The respondent sample of 150 was chosen by means of a convenient sampling, and it represented the participation of the entrepreneurs and business owners, who practice environmentally responsible activity. A structured questionnaire was used to gather the primary data and the Friedman Test was used to examine it and arrive at a conclusion about the relative significance of different factors determining green entrepreneurship and green export performance. The results also showed that there were large variations between the factors with resource efficiency and cost competitiveness being the most significant dimension and then came compliance and market access and value addition and product differentiation. Other factors like innovation, regional development and long-term resilience were also rated lower but also relevant. The research concludes that green entrepreneurship boosts potential export ability mainly due to efficient utilization of resource, compliance with sustainability and eco-friendly product innovations. The study offers good policy implications to sustainable industrial development as well as managerial implications that firms aiming to adopt green strategies in their export systems should consider in an attempt to attain long term competitiveness and relevance in the global markets.

Keywords: Resource Efficiency and Cost Competitiveness, Compliance and Market Access, Value Addition and Product Differentiation, Innovation and Upgrading

Introduction

The article will discuss the role of green entrepreneurship as business operation aimed at minimizing environmental impact without producing economic value in promoting sustainable development and enhancing export performance with reference to Tamil Nadu (India). We identify the theoretical connections between the concepts of green entrepreneurship, sustainability and trade competitiveness; the literature on the topic and area; industry illustrations based on Tamil Nadu (renewable energy, green textiles, sustainable agro-processing, and eco-tourism); and offer policy and business solutions to scale-up of

green exporters. In the analysis, it is argued that the green entrepreneurship can generate positive environmental outcomes with the help of supportive policy, finance, skill development, and market access mechanisms and enhance export diversification, value addition, and resilience. The sustainable development implies the balance between economic growth, social inclusion and environmental protection. The green entrepreneurship is a viable solution: entrepreneurs embrace cleaner technology, circular business models and resource-efficient production of goods and services with reduced ecological footprint. In the case of an export-driven state like Tamil Nadu - a center of industrial and manufacturing activities in India - the green entrepreneurship can fulfill two purposes: to satisfy the global buyers with sustainability-related demands and to access a new market niche in the foreign countries with a green-focused orientation. The article examines how green entrepreneurship can be used to promote sustainable development and export competitiveness, evaluates the strengths and opportunities of Tamil Nadu, and gives specific recommendations.

Conceptual Framework: How Green Entrepreneurship Affects Sustainable Development and Exports

Resource Efficiency and Cost Competitiveness

Green entrepreneurship favors sustainable development by emphasizing on resource efficiency, waste reduction, and minimization of energy usage in all production processes. By applying green technologies and a circular economy, entrepreneurs will be able to maximize the input (energy, water, raw materials) of the business, reducing costs and increasing profitability. Effective management of resources minimizes environmental effects as well as results in competitiveness in terms of costs thus firms are in a position to provide products that are environmentally friendly and at prices that are friendly to the market. Green entrepreneurs can lessen the reliance on scarce or imported resources by incorporating renewable energy, recycling systems and sustainable supply chains. This enhances productivity and operational resilience particularly in economies that are resource constrained. In the long run, resource efficient businesses are able to acquire competitive advantages which attract both the environmentally conscious consumers and investors. In such a way, resource efficiency is the economic core of green entrepreneurship that balances environmental responsibility with financial outcomes and proves that sustainability and competitiveness do not contradict each other, but they can co-exist in the context of the long-term developmental objectives.

Market Access and Compliance.

Green entrepreneurship promotes the adherence to the environmentally friendly standards and increases the market accessibility in the environmentally conscious global economy. With the increasing international regulations, companies that embrace the green practices are proactively addressing the international regulations on environmental, safety and labor requirements. Adherence to specifications like ISO 14001 or ESG guidelines will assist the green entrepreneur to gain credibility minimizing regulatory exposure to risks and fines. In addition, the presence of eco-certifications and green supply chain protocols results in the availability of high-quality local and overseas markets that will target sustainable products. Demands of many consumers and corporate shoppers have shifted to verifiable eco-friendly sourcing, production, and packaging. Therefore, adherence turns out to be a strategic benefit, but not a legal requirement. In the case of small and medium enterprises (SMEs), a compliance with green standards will help them to form alliances with the multinational corporations, and the global value chains. Green entrepreneurs make a business model sustainable so that their business can be relevant, gain trust among various stakeholders and make the global business ecosystem transparent, ethical and environmentally responsible.

Value Addition and Product Differentiation

Green entrepreneurship provides value addition and product differentiation to the business through incorporation of sustainability in the design, production, and branding of products. Eco-innovation allows businesspeople to convert waste into useful sources, use biodegradable packaging or develop energy-saving substitutes - thus, adding value and distinctiveness to the product. Green value addition does not end at functional benefits but it has emotional and ethical appeal to the environmentally conscious consumers. It enhances brand loyalty and enables companies to charge a high price as they can counter the issue of sustainability. To illustrate, organic clothes, solar powered appliances and recycled building materials are some of the examples of how eco-friendly innovation creates market differentiation. Also, open and responsible sourcing increases brand recognition and customer confidence. This distinction becomes a major competitive force in the saturated markets. Green entrepreneurs increase the market potential by integrating environmental and social considerations in the product value chain, which has the additional benefit of enabling sustainable consumption trends that are characteristic of the global green economy.

Innovation and Upgrading

The focus of green entrepreneurship in boosting sustainable development is innovation and improvement of technology. Green entrepreneurs are constantly testing new methods of eco-processing, energy sources that are renewable, and digital technologies that will have the least environmental imprints. Businesses decrease emissions, save resources and improve productivity through the adoption of clean production methods and smart technologies. The industry transformation is also triggered by innovation of materials, energy systems and circular business models which compel other competitors to do the same. Moreover, cooperation with research institutes and green incubators or accelerators are two additional approaches that help an entrepreneur to optimize technologies and bring impact. Infrastructure upgrading, both technical and managerial allows firms to access progressively higher-value segments and green value chains at the global level. This over time leads to systemic change, as industries change into sustainability based competitiveness. Finally, green entrepreneurship is an innovative opportunity that will bridge the economic growth and the ecological care, proving that the sustainability of the environment can be used as a driving power towards the ongoing improvement, modernization, and the inclusiveness of the industrial development.

Resilience and Long-term Competitiveness

Green entrepreneurship improves resilience and competitiveness in the long term by integrating sustainability in the business strategies and lessening the risk of exposure to the environmental, regulatory, and market risks. By using eco-efficient practices, reliance on volatile resource markets is reduced, and the effects of disruptions linked to climate change are reduced. Green business is more capable of responding to consumer changes, increased environmental standards, and technological changes. In addition, the investments in renewable energy, waste management, and the circular production systems enhance the continuity of operations and resource security. Such practices over time create brand strength, investor and stakeholder confidence. Sustainability-driven innovation, ethical governance, and adaptive capacity are the key to long-term competitiveness, rather than cost-cutting. Green entrepreneurs, therefore, are building a better and stable economy of tomorrow that is future-proof: the ecological equilibrium and the business growth support one another. Green entrepreneurship is a way of ensuring that the competitiveness in the modern world does not come at the expense of the prosperity and the survival of future generations by balancing profitability and planetary health.

Spillovers and Regional Development.

The positive spillovers and regional development created by green entrepreneurship include local innovation, employment and sustainable industrial ecosystems. By embracing the green technologies and practices, the entrepreneurs will allow transfer of knowledge and skills to other firms, suppliers and communities nearby, which will have a multiplier effect. These spillovers attract regional innovation clusters on renewable energy, waste recycling, organic agriculture and eco-tourism. What comes out is a regional economy which is more diversified and sustainable and which is less reliant on polluting industries. In addition, green businesses tend to work together with local governments, universities, and civil society, in order to create environmental friendly infrastructure and other community based projects. This kind of initiatives will bring in green investments, enhance the wellbeing of the people, and increase environment awareness among the people. New green jobs and cleaner local economies in turn can be enjoyed by rural and underdeveloped areas. Therefore, green entrepreneurship is a driver of inclusive regional development - the interplay between economic development and environmental stewardship and social equity on the community scale.

Tamil Nadu: Regional Context and Rationale for Focus

Tamil Nadu is an industrially diversified state with strengths in textiles, engineering goods, automotive components, chemicals, electronics, and agriculture — many of which are export-oriented. It also leads in renewable energy capacity in India. Key reasons Tamil Nadu is a critical case:

Export Base and Infrastructure

Good export foundation and favourable infrastructure are critical towards growing green entrepreneurship and attaining sustainable development. Good transport, logistical and energy infrastructure can strengthen production and global trade of green products. The ports, renewable energy grids, and digital trade platforms increase the competitiveness of the globe in terms of minimizing the cost of operation and carbon footprint. Export-led growth is also achieved through the development of green industrial parks, eco-zones, and sustainable supply chain and maintaining environmental compliance. In addition, waste recycling, renewable energy, and green technology innovation infrastructures motivate the local business to comply with international standards on sustainability. The existence of a sound export ecosystem is a sure way of attracting foreign capital and making a country a pioneer in the green economy. Thus, enhancing the green infrastructure and export potential facilitates inclusive economic development, technological enhancement, and value chain integration in

countries, which coincides with the national competitiveness with long-term environmental and social sustainability objectives.

Existing Green Assets

Sustainable green entrepreneurship is built on the current green resources, including renewable energy capacity, natural, environmentally friendly technologies, and human capital with skills. The utilization of such resources helps companies to be innovative and grow operations that have reduced environmental effects. As an example, a foundation to the development of green industries is offered by solar and wind energy infrastructure, sustainable agricultural operations, and well established systems of waste management. Additionally, energy efficiency policies, green finance policies and environmental education policies enhance these assets by enabling an enabling ecosystem of entrepreneurship. Having known and leveraged the current assets minimizes resource wastage and duplication of efforts. It is also appealing to investors who want to take part in sustainable business and to increase the national preparedness to the global green transition. With these advantages, economies will be able to step accelerate the transition to low-carbon growth, generate work in the green economy, and develop value chains based on sustainability, resilience, and inclusive development.

Market Potential

The demand of green entrepreneurship in the market is only growing fast because of the increasing environmental awareness, climate-related commitments worldwide, and the preference of consumers to the sustainability products. Green markets have become renewable energy, sustainable packaging, organic food, electric cars and green tourism. This change provides enormous possibilities to entrepreneurs to come up with new innovative environmentally friendly technologies, which fulfill the local and global demand. There is increasing government and corporate investment in green procurement and carbon-neutral supply chains, which increase market prospects further. Besides, the availability of green finance and online marketplaces can help the small and middle-sized businesses to expand their reach across borders. Green entrepreneurs are able to set high prices and win repeat business by matching products with trends of sustainability. Finally, the emerging market potential of green goods and services does not only lead to economic diversification, but also helps to attain Sustainable Development Goals (SDGs) by means of responsible consumption and production.

Developmental Need

The green entrepreneurship developmental need becomes apparent due to the pressing need to focus on the economic growth and environmental conservation and social inclusion. Environmental problems like pollution, global warming and destruction of biodiversity have been enhanced by the rapid industrialization, urbanization and depletion of resources. Green entrepreneurship presents a sustainable direction towards these problems through the promotion of innovation, adopting clean technology, and the circular economy. It creates green jobs, decreases poverty, and promotes fair growth in the region. Specifically, developing countries should consider making green entrepreneurship part of their development agenda, which will guarantee their resilience in the long-term and energy security. This transition should be fostered by using public-private alliances, skills training, and policy inducements. The fulfillment of these developmental needs does not only enhance the quality of the environment, but also economic competitiveness and social wellbeing. Therefore, green entrepreneurship should not be treated as an environmental campaign, rather it must be a developmental necessity towards inclusive and sustainable development.

Sustainable Textiles and Apparel

The green entrepreneurship is crucial to the sustainable textile and apparel industry as it attempts to solve environmental and social issues in the fashion industry. The textile manufacturing process is a resource-intensive activity, which uses a significant amount of water, energy, and chemicals. Sustainability credentials are also enhanced by ethical labor and open supply chain practices. The market is increasingly taking environmentally-friendly clothing, with demand in the apparel sector growing across the world. Incorporating innovation with responsible sourcing and manufacturing, entrepreneurs will be able to add value, differentiate the brand, and compete with exports. This industry can therefore have a role to play in sustainable development in terms of green employment, lessening pollution, resource conservation, and aligning fashion to the wider sustainability objectives and ethical consumerism in the world.

Sustainable Agro-processing & Organic Products

Green agro-processing and organic products entrepreneurship ensure the rural development, food security, and the environmental protection. In this industry, green entrepreneurship is based on the reduction of resources, post-harvest wastes, and the transition to ecologically friendly practices in the industry: organic farming, drip irrigation, compost piles. Clean technologies in the processing of agricultural products will provide value to the raw materials

without nutritional or ecological compromise. The use of organic certification and fair-trade is an improved access to the global, niche markets that have health and sustainability concerns. Additionally, carbon footprints are lowered by incorporating renewable energy in food processing like use of solar dryers or biogas plants. Green entrepreneurship in agro-processing, through linking small farmers to sustainable value chains, improves rural livelihoods, and promotes agro-biodiversity-friendly practices. The sector can therefore be a major contributor to inclusive green development, which makes the sector economically viable, environmental and socially empowered to the communities where agriculture is practiced.

Eco-friendly Materials Green Chemicals.

The case of the green chemicals and eco-friendly materials industry can be used as an example of green entrepreneurship being driven by innovation to reduce industrial pollution and promote models of a circular economy. Green chemicals are also based on renewable biomass, biodegradable feedstock and non-toxic materials, unlike the traditional products of petrochemical. These industry entrepreneurs come up with bio-based plastics, natural surfactants, green solvents, and green construction materials that substitute the dangerous chemicals. Such innovations reduce environmental risks, enhance human health, and are in line with international chemicals safety regulations. With the global industries moving towards sustainable sourcing, packaging, textile, and manufacturing materials that are eco-friendly are getting demanded at an alarming rate. One of the ways in which green entrepreneurs can exploit this market is through biotechnology and cleaner production technologies. The industry also promotes industrial symbiosis where one process produces waste that is used by another hence facilitating efficiency and zero-waste production. Finally, green chemistry does not only enhance the sustainability of industry, but it also becomes the force behind competitiveness, innovation, and sound use of resources in contemporary economies..

Eco-tourism and Services

The green service enterprises and the eco-tourism encourage sustainable development through balancing between the economic growth and the environment and community well being. Green entrepreneurs in the tourist sector focus on low impact tourism, protection of natural environments and the interactions with the locals. Their construction of eco-lodges, nature trails, and facilities that are based on renewable energy help them reduce carbon footprints with nature-based experience being offered to conscious travelers. Eco-tourism

helps to preserve biodiversity, and also creates revenue to the rural and indigenous people, enhancing the development of the regions equitably. In addition, the transport, hospitality and recreation sectors have sustainable service models including zero-waste operations and digital sustainability tools that improve visitor satisfaction and ensure ecosystem protection. The need of responsible tourism in the world is increasing, which presents enormous opportunities to green entrepreneurs to create and diversify. Eco-tourism is therefore a means of inclusive development, environmental education and cultural conservation, which would help in balancing economic gain with the ultimate sustainability and social responsibility objectives..

Barriers and Constraints

Finance: Certification & Standards Compliance

One of the greatest obstacles to green entrepreneurship is the inability to secure finance and excessive expenses related to certification and compliance with standards. Green projects tend to be costly in terms of initial capital investments in clean technologies, renewable energy sources, and materials that are friendly to the environment that have a longer payback. The perceived risks and lack of collateral limit access to credit by financial institutions. Moreover, acquiring accolades like ISO 14001, organic certification, or eco-mark certification is a complicated process, regulatory audit, and expensive process, which is a burden to start-ups and small business organizations. Lack of such certifications makes businesses have difficulty gaining access to high-end markets or being eligible to participate in green procurement programs. Moreover, the problem is aggravated by the scarcity of green financing tools such as sustainability-linked loans or carbon credit funds. Accordingly, the lack of financial resources and high compliance cost will deter innovation and scalability to make the shift towards sustainable business models and to allow green entrepreneurs to compete with the rest of the world.

Absorption of Skilling and Technology.

The lack of skills and absorption capacity of technology are huge threats to the existence of green entrepreneurship. There are numerous entrepreneurs and workers who are not experienced in the field of sustainable production, management of renewable energy, recycling of waste, and environmental auditing. This is a competency gap that restricts the successful implementation and use of superior green technologies. Further, eco-innovations have been transferred infrequently between the research institutions and the small and medium enterprises (SMEs) because of low cooperation and high license fees. Vocational education systems and technical training programs usually lack sustainability competencies

and the workforce is thus not equipped to take the new green sectors. There are also no technology incubators and support networks, which further slow innovation diffusion. Consequently, the entrepreneurs are not able to attain efficiency in operation, quality of products, and conformance to international standards. To increase productivity, develop innovation and develop competitive green entrepreneurial ecosystems, strengthening the development of green skills, research-industry connections, and technology extension services are necessary.

Infrastructure & Supply Chain Gaps

Poor infrastructure and incoherent supply chains are some of the main challenges to the scaling of green entrepreneurship. Several areas do not have sustainable energy grids, waste disposal and green industries, and logistic systems that facilitate sustainable operations. Lack of environmentally safe transportation system, recycling of water and storage compounds production cost and inefficiency. Moreover, the supply chains of sustainable raw materials, including organic inputs, recyclable materials, or certified products, are usually underdeveloped, hence, their sourcing is not consistent and is costly. Small green organizations have challenges in access to green logistic providers or carbon-neutral distribution channel. The effect of these gaps is a shortcut in either the domestic or the export competitiveness. In the absence of integrated infrastructure planning, and green value chain development, the businesses would be unable to realize economies of scale, as well as international sustainability standards. Therefore, to facilitate resource-efficient, resilient and globally competitive green business ecosystems, it is essential to strengthen infrastructure by involving the populace in the form of a public-private partnership and encourage green clusters.

Market Information & International Linkages

Weak international connection and little market information restrict the growth and competitiveness of green entrepreneurs. A lot of businesses do not get access to sound research on green markets in the world, consumer preferences, and certification regulations as well as export opportunities. This information asymmetry makes them unable to recognize the possible partners, buyers, or investors. Also, the number of international trade show, networks and sustainability platform participation is minimal because of cost constraints and institutional backing. Small firms cannot connect themselves to global green value chains and cannot transfer technology and knowledge without good linkages. Besides, there is a lack of digital marketing framework and e-commerce preparedness to increase visibility in the

international market. The essential thing is therefore to develop market intelligence systems, export promotion agencies and international collaboration. Increased connectivity with the global networks does not only create new trade openings but also innovation, investment, and sustainable competitiveness of green entrepreneurs.

Policy Fragmentation

The policy fragmentation and the failure to coordinate the various government agencies is a block to the successful promotion of green entrepreneurship. Several independent agencies tend to run environmental and industrial and trade policies and this creates overlapping policies, inconsistent incentives and bureaucratic delays. Lack of a national green entrepreneurship system causes confusion among the entrepreneurs in the area with respect to compliance, funding, and certification. Furthermore, the policy implementation is discontinuous, which diminishes the effectiveness of the green subsidies, tax incentives, and capacity-building programs. The unpredictable state and national regulations also deter investors and this poses a problem on long term planning. The existence of coordination gaps among ministries of environment, industry, and finance also slows down the implementation of the policies. To counter this, governments must adopt an integrated policy that is able to combine the objectives of environmental policies with the industrial and trade policies. Randomized governance, one-window clearances and consistent green business policies are essential in developing a stable ecosystem upon which innovation, competitiveness and sustainable development can be achieved.

Business Strategies for Green Entrepreneurs

Adopt Circular Practices

The green entrepreneur is expected to embrace the circular economy activities that reduce waste, prolong products life, and maximize the use of resources. Circular practices also focus on re-use, repair, redesign, and recycling, as opposed to the traditional linear model of taking, making and disposing of materials, all aimed at creating value continuously. Companies can minimize environmental footprints and also cut costs by incorporating eco-design, modular production and sustainable sourcing. Circularity also promotes industrial symbiosis, where the waste of one business can be used as input in another business, making the ecosystem efficient. The innovative models that entrepreneurs can consider include product-as-a-service, leasing systems or closed-loop supply chains. These measures not only make the processes more competitive and in line with the international sustainability criteria, but also appeal to the environmentally friendly consumers and investors. Besides, circular practices are directly

related to the Sustainable Development Goals (SDGs), especially responsible consumption, climate action, and sustainable industry. Finally, circular entrepreneurship will guarantee the long-term sustainability of the business and become part of a regenerative and low-carbon economy.

Certify Strategically

The credibility and access to high-end green markets is achieved through strategic certification. The green entrepreneurs must strive to attain the certification in line with their business operations and the target markets instead of acquiring any label they find. Environmental and social responsibility is recognized by ISO 14001 (Environmental Management Systems) certifications, Fairtrade, Organic, LEED or Eco Mark. These do not only guarantee adherence to international standards of sustainability, but they also portend trust and transparency to consumers and investors. Strategic certification assists to differentiate products, make them export ready and allow green procurement programs. Nevertheless, the entrepreneurs must consider the trade-off of costs and benefits where the most market-relevant and long-term beneficial certifications should be considered. This can be facilitated by governments and industry bodies by subsidies, counseling centers, and technical training. The certification of green entrepreneurs provides the opportunity to create a competitive advantage, market credibility and strengthen the position of the entrepreneur in the world chain of sustainable values.

Build Buyer Partnerships

Green enterprises and expansion of international markets require the development of buyer relationships. Through the establishment of long-term partnerships with socially responsible customers, retailers and distributors, the entrepreneurs will be able to secure the stable demand and common interest in sustainability. The synergy-based partnerships provide the opportunity to share product development, technology, and co-branding to increase the visibility and credibility. Small businesses can use the market networks that exist through the participation in green supply chains of multinational companies or export consortia. Entrepreneurs would also need to participate in the sustainability trade fairs, B2B and certification-based buyer programmes to meet conscious consumers and institutional buyers. Open reporting of sustainability indicators, including carbon reduction, fair labor or green innovations, can be used to develop trust and strengthen business relationships. Finally, buyer partnerships establish win-win ecosystems that help both producers and consumers to grow responsibly and increase their competitiveness, market resilience, and their dedication to

sustainable development.

Narrative & Branding

A strong sustainability story and a green branding process can contribute greatly to the gain of market awareness and consumer confidence among green business people. In addition to providing green products, companies need to properly communicate their sustainability process, including their work on the ethical sourcing, circular design, carbon emission mitigation, and community involvement. Real life stories are also an emotional appeal to the consumer and turns environmental responsibility into a brand value. The best ways to demonstrate measurable sustainability outcomes are digital platforms, eco-labels, and transparent reporting that entrepreneurs should employ. Ongoing branding based on green values generates differentiation in the saturated markets and elicits partnerships, investors and loyal customers. It is also effective to correspond narratives to accepted sustainability concepts (SDGs or ESG principles) to increase credibility. In addition, green branding assists in reinventing sustainability as an element of cost, to an element of innovation and quality. Essentially, a good sustainability story makes businesses one of the advocates of responsible consumption and long-term ecological management.

Potential Impact on Exports: Hypotheses and Expected Outcomes

If Tamil Nadu successfully scales green entrepreneurship, expected export-related outcomes include:

1. Greater Export Value per Unit: Tamil Nadu is able to scale green entrepreneurship, it is likely to get a higher export value per unit because of value addition by the sustainability, innovativeness, and because it follows international standards in eco-friendly. The products of certified green producers, e.g., sustainable clothes, organic food, renewable technology parts, etc., are sold at high prices in the global market, which is becoming more concerned with ethical and environmental products. Enterprises have an opportunity to increase productivity and minimize wastes by means of improving the quality of products and adopting clean technologies, which improves the profitability of each export unit. In addition, compliance with international sustainability standards boosts brand image and eases market penetration in premium market segments in Europe, North America and East Asian markets. As Tamil Nadu moves out of the cost-based competitiveness to quality-based differentiation, the export portfolio will show increased margins and better trade performance. Green entrepreneurship therefore

has a direct role on export sophistication and economic upgrading and Tamil Nadu can become a global leader in sustainable trade.

2. **Market Diversification:** Export diversification: scaling green entrepreneurship can be used as a way of diversifying markets in the exports of Tamil Nadu. The state, which now depends on such industries as traditional textiles and automotive parts, can diversify the economy with the new markets of renewable energy equipment, environmentally-friendly materials, organic food products, and environmentally-friendly tourism services. Tamil Nadu has a chance of exploiting the greener markets in Europe, Japan, and Middle East by following the international trends of green trade and by following the preference of the consumers. This diversification acts to minimize dependency on the old type of exports and unstable markets and makes the trade structure more balanced and solid. Moreover, through green certification and branding Tamil Nadu will be able to market its exports as quality and sustainable to increase global coverage and stability of export performance in different regions and product lines.
3. **Less Trade Risk:** A robust green entrepreneurial ecosystem minimizes the trade risk through enhancing compliance, resilience, and flexibility within a dynamic global trade environment. Carbon border adjustments, sustainability reporting standards and eco-labeling demand are fast becoming adopted in the international markets. Early integration of green standards among the exporters of Tamil Nadu will help it in adapting to such changing rules and regulations without facing fines, export bans, and ostracism in the market. Green entrepreneurship also spreads the sources of sourcing and energy, decreasing sensitivity to price fluctuations in resources and supply chain upheavals. Furthermore, sustainable production leads to an improvement in the reputation of the company socially and environmentally, reducing reputational risks and increasing buyer confidence. Exporters reduce the risks associated with environmental shocks and policy changes by incorporating climate resilience into business, e.g., by adopting renewable energy or reducing waste. Therefore, green entrepreneurship can be scaled to guarantee long-term security in trade, and make sure that the exports of Tamil Nadu will be compliant, credible, and competitive in the new green economy of the world.
4. **Long term Competitiveness:** Green entrepreneurship will enhance the long term export competitiveness of Tamil Nadu because it will encourage innovation, efficiency and sustainable brand positioning. By investing in renewable energy, circular production, and

eco-design, companies will be able to reduce costs of production, energy autonomy and resource utilization. All these have the benefits of constant prices and dependability in the foreign markets. In addition, sustainability in business strategies will distinguish the business as responsible and future-oriented in terms of its export business, which will create buyer loyalty and preference in the market. Green innovation also triggers sustained modernization, ensuring that industries remain in line with the world trends in technology and the carbon-neutral goal. The competitiveness is even enhanced by institutional support like green industrial parks, export promotion policies and financial incentives. In the long run, Tamil Nadu can develop into a sustainable production hub that will lure green foreign direct investment (FDI) and international alliances. Therefore, the transformation of the state to green entrepreneurial economy is guaranteed to remain competitive and lead in the development of sustainable international trade.

5. **Employment & Skills Upgrading:** Green entrepreneurship in the state of Tamil Nadu will be scaled to produce high quality jobs and skill upgrading in various fields. The green industries (renewable energy, sustainable production and eco-tourism) require technical, managerial and digital expertise. This opens the prospects of reskilling workers and introducing sustainability in vocational training and higher education. With companies embracing cleaner technologies and circular designs, new job descriptions are going to be created in waste valorization, carbon auditing, sustainable design, and green finance. In addition, green entrepreneurship creates decentralized and community-based jobs, in particular to youth and women, in organic agriculture or handicrafts. The move to green industries that are skill-intensive increases workforce productivity and salary security. Therefore the export competitiveness of Tamil Nadu will be supported not just on technological innovation but also on a viable and sustainable workforce - such that this economic growth is in tandem with both environmental conservation and social development.

Analysis and Findings

Sustainable development is now an important initiative in the global business, and there is a need to ensure that there is a balance between economic growth and environmental management, as well as social responsibility. Green entrepreneurship in this regard has been noted as a strategic tool that helps the firms to innovate, maximize resource utilization as well as increasing competitiveness with minimum ecological footprint. Green entrepreneurship is not only a way of achieving sustainable development, but also helps them to enhance their

competitiveness in the international market especially when it comes to exporting. Many dimensions of green entrepreneurship, including resources efficiency, adherence to environmental standards, product differentiation, and innovation, are very significant in promoting business development and accessing to the market. Also the external effects of green entrepreneurship activities such as regional growth, knowledge spills and long term resilience serve as examples of why sustainable business models have the potential to generate share economic and social value.

Table: 1- Friedman Test

Factors	Mean	Std. Deviation	Mean Rank
Resource Efficiency and Cost Competitiveness	3.62	.987	4.02
Compliance and Market Access	3.40	.957	3.70
Value Addition and Product Differentiation	3.36	.994	3.56
Innovation and Upgrading	3.17	1.107	3.23
Spillovers and Regional Development	3.14	1.212	3.28
Resilience and Long-term Competitiveness	3.13	1.218	3.21
No. of Respondents	150		
Chi-Square	25.571		
difference	5		
Asymp. Sig.	0.000		

Friedman test was done to determine significant variations between statuses of different factors in determining the goals of exacting sustainable development based on green entrepreneurship and its effects on exports. The findings show that the Chi-square value is 25.571 with 5 degrees of freedom and an asymptotic significance level of 0.000 which means that the difference between the factors is statistically significant. Two of six factors considered (Resource Efficiency and Cost Competitiveness) were the most ranked (Mean Rank = 4.02) implying that the quality of resource efficiency and cost competitiveness are the most important processors that the entrepreneur associates with green entrepreneurship and export performance. They are followed by Compliance and Market Access (Mean Rank = 3.70) and Value Addition and Product Differentiation (Mean Rank = 3.56), that underline the significance of meeting the environmental standards and providing unique and eco-friendly products to attain competitiveness in the global markets. The other factors, on the other hand, like Innovation and Upgrading (Mean Rank = 3.23), Spillovers and Regional Development (Mean Rank = 3.28), and Resilience and Long-term Competitiveness (Mean Rank = 3.21)

were of a relatively lower rank, yet, still significant. This indicates that although green entrepreneurship plays a role in innovation and sustainability of the region, short term export benefits are more attached to cost effectiveness and market conformity.

The findings show that the green entrepreneurship is more effective in increasing the potential of export due to the efficiency of resources, compliance with regulations, product differentiation, which contribute to sustainable economic growth.

Enablers and Policy Recommendations

1. Specific Financial Tools: It is important to develop specific financial tools to make green entrepreneurship and sustainable industrial development faster. Conventional sources fail to finance ventures that are environmentally driven as they seem to be risky and have long gestation periods. To defeat this, financial interventions like green bonds, sustainability-linked lending, carbon credit schemes, and concessional financing schemes are some of the specialized instruments that governments and financial institutions should introduce. Access to capital can be enhanced by setting up special green venture funds and credit guarantee schemes to the small and medium enterprises (SMEs). Also, the considerations of the environmental, social and governance (ESG) factors in the financial review systems would assist in directing investments into sustainable businesses. Combinations with the public can also help in mobilizing finances of renewable energy, waste management, and other circular economy initiatives. Through fiscal incentives, such as tax rebates, interest subsidies, and green insurance, financial ecosystems can de-risk investment, bring in private money, and create an inclusive, long-term green growth.

2. Shared Infrastructure/ Incorporation: Incubation and shared infrastructure support are essential in the process of cost reduction and innovation in the green entrepreneurship. Creation of green industrial and eco-parks and common facility centers can help small firms to renewable energy, waste treatment and logistics systems to share the cost. Green incubators and accelerators have the potential to mentor, prototype, and provide networking opportunities to entrepreneurs and turn sustainable ideas into scalable businesses. Enterprise co-location promotes industrial symbiosis, waste of one process is used as input in another, leading to resource efficiency. People can also set up such shared facilities through the facilitation of public-private partnerships (PPP) by governments and development agencies, particularly in green sectors that are emerging, such as recycling, bioenergy and sustainable textile. Moreover, the incubation program can connect the entrepreneurs to investors, research and export market. Shared infrastructure and incubation form a platform of inclusive,

resilient, and environmentally responsible industrial development by reducing entry barriers and establishing ecosystems of innovation.

3. Certification Support and Market Intelligence: Certification support and market intelligence is a key tool that green entrepreneurs will need in order to compete in the local and global market. The governments and industry organizations must develop the facilitation centers of green certification where the firms will be assisted to adhere to the international standards of sustainability like the ISO 14001, Fair-trade and organic labeling. Making certification easier, subsidizing, and technical advice can help attract more SMEs in the process. At the same time, the export preparedness will be enhanced by the development of market intelligence systems that will give real-time information about the international green market demands, trade policies, and purchasing specifications. It is possible to collaborate with trade promotion councils, embassies, and digital platforms to share market information and match entrepreneurs with international buyers. In addition, consumer confidence may be increased by encouraging eco-labels and national branding of certified green products. Collectively, certification and market information systems facilitate transparency, competitiveness, and trust- green entrepreneurs are able to enter international markets and exploit opportunities of trading sustainably.

4. Skill Development & Technology Transfer: Technology transfer and skill development are essential facilitators of sustainable green business. Government policies and programs such as incorporation of green skills into the national education, vocational training, and entrepreneurship programs is a sure way to have future-ready workforce who have the capacity to handle clean technologies and sustainable production systems. The transfer and adaptation of eco-innovations could be provided through collaboration between universities, research and industries. Governments ought to promote centers of excellence and hubs of green technology that offer technical support and education in renewable energy, waste management, eco-design as well as energy efficiency. International collaboration and exchange programs should be encouraged to speed up the learning and exposure to best practice. Moreover, digitization and open-access knowledge platform can make technology more democratic to startups and SMEs. The skill and technology gap can be closed, allowing entrepreneurs to be innovative and more productive, as well as compete on an international level, and that sustainability is one of the factors that drives employment as well as industrial change..

5. Trade Diplomacy & Green Export Promotion: Trade diplomacy and proactive green export promotion is critical in utilizing green entrepreneurs into global value chains. The governments ought to incorporate the sustainability goals in bilateral and multilateral trade agreements, whereby green products will enjoy more favorable access in the market, less tariffs, and uniform standards. Specialized green export promotion councils may also help the entrepreneurs in finding the new markets abroad, conducting trade fairs, and finding the sustainable buyers. Also, the presence of the diplomatic missions in other countries may be strategic in terms of presenting the green innovations of the country and business relationships. Export subsidies on certified eco-products, branding campaigns like Green Made in can be used to improve visibility and credibility. Competitiveness is further enhanced by regional collaboration in such issues as the carbon trading and renewable energy exchange. By active trade diplomacy, countries will be in a state of becoming the champions of sustainable production and export, promoting the environment, as well as economic development

6. Data, Monitoring, and Incentive Alignment: Effective green entrepreneurship policy implementation requires robust data systems, monitoring frameworks and incentive alignment. Stable information on resource utilization, emissions, green financing, and market performance assist policymakers to come up with evidence based interventions. Creating national green entrepreneurship observatories or sustainability dashboards can monitor the developments towards environmental and financial goals. Transparency and accountability are made through regular monitoring, and policy gaps are discovered through impact assessment. Rewards like subsidies, tax incentives and recognition systems ought to be directly tied to specific sustainability goals, but not generic performance indicators. The coordination of cross-ministerial effects can be used to co-ordinate incentives in different sectors so that there is coherence between the environmental, industrial and trade policies. Secondly, embracing digital tools in monitoring and reporting helps improve efficiency and access by the populace. When data-driven governance is aligned with well-organized incentives, it would promote good entrepreneurship, minimize resource allocation, and make sure that sustainable development goals are met in an effective and fair way.

Conclusion

Green entrepreneurship would provide an interesting path through which Tamil Nadu can balance economic growth, environmental management, and improved export competitiveness. To achieve this potential, concerted efforts are required: finance and certification of SMEs, mutual investment in infrastructure, specific skilling, promotion of trade with a focus on sustainability. Through policy, industry and financial convergence on green agenda, Tamil Nadu can develop sturdy export sectors that can help in national and global sustainable development agenda. On the other hand, such aspects as Innovation and Upgrading (Mean Rank = 3.23), Spillovers and Regional Development (Mean Rank = 3.28), and Resilience and Long-term Competitiveness (Mean Rank = 3.21) had much lower ranks, but they were also important. This implies that although green entrepreneurship leads to innovation and sustainability of the region, short-term export benefits are more closely linked with cost-effectiveness and market conformity. In general, the findings suggest that green entrepreneurship can boost the export potential by increasing the resource efficiency, compliance with regulations as well as product differentiation to achieve sustainable economic growth. Knowing the relative significance of these aspects is invaluable to policy-makers and business executives who have to achieve sustainable development of the industrial sector and encourage environment-friendly activities. This paper discusses the most important factors of green entrepreneurship and their impacts on export competitiveness and can help to understand how the sustainable strategies may be properly implemented in the business processes to attain the economic and ecological goals..

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