The Business Dynamics of Solar Power Engineering in Sri Lanka: Economic Viability, Investment Opportunities, and Policy Challenges

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Abstract

The global transition toward renewable power generation leads to a drastic transformation of worldwide energy systems while solar energy becomes crucial in this process. The implementation of solar power in Sri Lanka creates valuable business prospects which deliver economic advantages that reduce fossil fuel use and decrease energy expenses as well as strengthen environmental sustainability. The rising power demand together with escalating environmental issues has led to increasing solar power use across residential buildings as well as commercial facilities. The feasibility of solar power adoption expanded because of technological developments that produced high-efficiency photovoltaic (PV) panels and battery storage solutions. The study investigates Sri Lanka's solar power and engineering domain from a business standpoint by analyzing economic feasibility alongside investment advantages and regulatory framework and technology advancements. This analysis investigates solar energy investment opportunities through money-related benefits and market hurdles which involve state assistance programs as well as net metering frameworks together with solar panel market supply chain influence. Public-private partnerships form the main focus of the study because it analyzes their contribution to expanding solar infrastructure and their involvement in creating optimized solar energy distribution networks via smart grids. The research evaluates market developments combined with financial aspects and regulatory frameworks to demonstrate solar energy business prospects while resolving key integration-related difficulties and funding barriers and regulatory limitations. The paper examines both social economic benefits from rising solar adoption through new renewable energy jobs and its positive effects on bringing electricity to rural areas. At the same time this research examines Sri Lanka's status in the neighborhood solar market as well as opportunities for international alliances to advance solar technology. This research delivers complete business perspectives about Sri Lankan solar power therefore benefiting investors as well as policymakers and industry participants interested in leveraging the region's renewable energy resources.

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Introduction

The developing nation of Sri Lanka requires reliable sustainable energy solutions which are affordable to address its expanding energy requirements. The nation depends on importing fossil fuels which has caused electricity rates to rise and made it economically unstable because of worldwide fuel price volatility (World Bank, 2023a). Sri Lanka holds extensive solar energy potentials within its tropical climate even though policies have been launched by the government to develop renewable power generation.

Solar energy, as a renewable resource, offers a pathway to energy security and economic growth. Solar power implementation supports the economic resilience of the nation by diversifying energy sources while reducing carbon emissions according to (Jayawardena and Silva 2021). Sri Lanka's National Energy Policy and Strategies of 2022 identifies renewable energy as vital while aiming to obtain 70% of national electricity through renewable sources by 2030 (Ministry of Power and Energy, 2022).

The solar industry in Sri Lanka experienced substantial growth during recent years because the nation gained from improved solar panel performance and better battery storage systems and international financing opportunities for renewable energy projects (Gunawardena et al., 2021). The government's "Soorya Bala Sangramaya" (Battle for Solar Energy) initiative has encouraged households and businesses to install rooftop solar panels, with net metering, net accounting, and net plus schemes designed to integrate distributed solar power into the national grid (Central Bank of Sri Lanka, 2022a).

Despite this progress, challenges remain. The adoption of solar power remains limited due to initial installation expenses and insufficient public knowledge about available fund incentives as well as prolonged bureaucratic approval processes (Fernando, 2022). Solar power delivery relies on solid energy storage systems and enhanced power grid developments to maintain reliability (Ranaweera, 2022b).

An analysis of solar power and engineering explores business possibilities through investments and policy definitions together with technological advancements. The analysis examines how solar projects perform financially and demonstrates the partnership dynamics between public authorities and private organizations and discusses supportive government measures which create beneficial conditions for developing solar energy businesses. The research investigates key obstacles and possibilities to

offer critical insights that assist stakeholders who want to capitalize on solar potential for sustainable Sri Lankan economic development.

Literature Review

Researchers have done plenty of studies on the technology of solar energy in Sri Lanka, but less attention has been given to boosting the solar industry through changes in business and policies. While (Gunawardena et al. 2021) focused on market trends, they missed the chance to consider the roadblocks that stop new solar businesses from progressing. Just like (Choi et al., Jayawardena and Silva 2021) brought up financing approaches but didn't look into the specific hurdles for SMEs using them. There is little discussion in previous research about problems that may make policy ineffective, for example, problems with paying out subsidies and the unpredictability of feed-in tariffs. Nonetheless, the available literature does not clearly explain why solar power projects depend less on public-private partnerships, even though they have achieved success elsewhere.

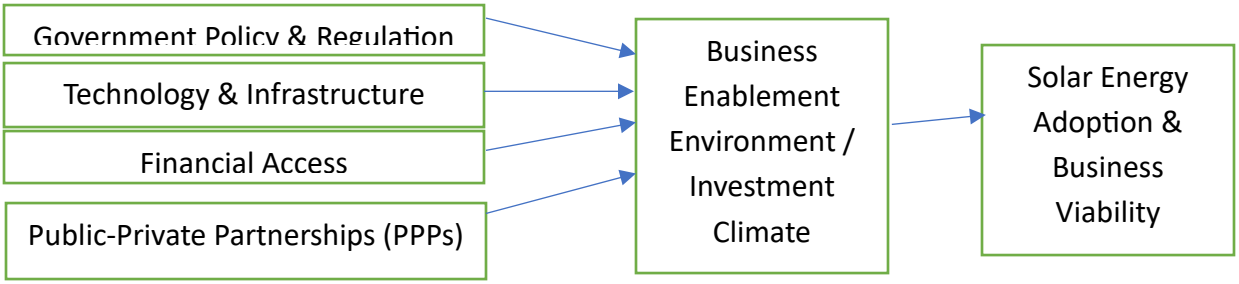
This research extends these gaps by discussing the role of investment regulation, how businesses are run and what incentives help banking institutions to grow economically and socially in Sri Lanka.

Figure 1: Conceptual Framework for Solar Energy Development in Sri Lanka.

The framework shows how the government's actions, technical abilities, reach to finances and the role of both public and private sectors all support solar businesses and make solar energy suitable for Sri Lanka.

Independent Variables (IVs) Mediator Variable (Optional/Intervening)

Dependent Variable (DV)



Independent Variables (IVs)

These are the key influencing factors:

1. Government Policy & Regulation

Policies, subsidies, permits, net metering rules, energy strategies

2. Technology & Infrastructure

Availability and cost of solar panels, battery systems, smart grid integration

3. Financial Access

Availability of loans, SME financing, tax incentives, green investment flows

4. Public-Private Partnerships (PPPs)

Joint ventures, infrastructure financing, R&D collaboration, rural electrification programs

Mediator Variable (Optional/Intervening)

Business Enablement Environment / Investment Climate
(Includes regulatory certainty, ease of doing business, investor confidence)

Dependent Variable (DV)

This is the ultimate outcome the framework is trying to explain or predict:
Solar Energy Adoption & Business Viability

Level of uptake across residential, commercial, and rural sectors

Market expansion, economic feasibility of solar projects

SME participation and private sector scaling

Research Gaps

The business potential of solar power in Sri Lanka and its investment risks and financial incentives lack sufficient research despite previous technical feasibility assessments (Fernando, 2022; Gunawardena et al., 2021). The research field regarding solar entrepreneurship and regulatory hurdles that affect it lacks comprehensive studies (Jayawardena & Silva, 2021). According to the Ministry of Power and Energy (2022) the research on how public-private partnerships drive solar industry growth in Sri Lanka remains insufficiently investigated. Recent research fails to explore either international cooperation's effect on solar expansion or

technological advances that could boost the solar industry (World Bank, 2023b). As a research effort this study establishes a complete business-oriented framework to understand Sri Lanka's solar sector.

Theoretical Framework

Even though the study doesn't discuss a specific theory, adopting (Rogers' 2003) Diffusion of Innovation Theory would help clarify the adoption of solar technologies in Sri Lanka. In addition, this theoretical approach can show how agencies and standardized rules either aid or restrict the adoption of solar energy. It is proposed that experts use an inclusive framework that integrates economic, regulatory and technological factors to improve evaluation of the future.

Problem Statement

The country faces many constraints in using solar energy such as high prices to build solar projects, unclear regulations, little financing for SMEs and inadequate grid facilities. Even though the government offers solar incentives, the inconsistent way they are actually applied has led to low effectiveness. Consequently, people do not have much faith in the industry which has prevented solar from reaching its planned goals in the country.

Objectives of the Study

The primary objectives of this research are:

1. To evaluate the economic feasibility and investment potential of solar power in Sri Lanka (Jayawardena & Silva, 2021).
2. To determine the main financial and regulatory obstacles to the widespread use of solar energy (Fernando, 2022).
3. To evaluate how public-private partnerships and governmental policies contribute to the growth of the solar energy market (Ministry of Power and Energy, 2022).
4. The analysis focuses on technological advancements which boost the integration of solar power into grid systems and increase its efficiency (Gunawardena et al., 2021).
5. To investigate funding options and business models that can help Sri Lankan solar companies expand (World Bank, 2023b).

Methodology

Managerial Economics uses descriptive research, drawing its data from things like government publications, journal research and international agency reports. No primary data collecting is involved. As a result, it is recognized as qualitative policy analysis and review. Because the research is aimed at examining investment, regulatory and policy data available to the public, no surveys or interviews took place. Yet, more can be gained from triangulating the results with input from experts and information from actual solar projects.

Research Questions

This study aims to answer the following research questions:

1. What are the major economic benefits and investment opportunities in Sri Lanka's solar energy sector? (Jayawardena & Silva, 2021).
2. What regulatory barriers and financing obstacles prevent solar power from further growth within Sri Lanka? (Fernando, 2022).
3. What government policies together with incentives impact the expansion of the solar industry? (Ministry of Power and Energy, 2022).
4. What solutions from technological advancement can boost the generation and integration capabilities of solar power into the nationwide power grid? (Gunawardena et al., 2021).
5. What Business models combined with financing strategies which can lead to better solar energy adoption by businesses alongside households are which? (World Bank, 2023a).

Significance of the Study

The research delivers important findings which support stakeholders from policy circles and investor groups as well as entrepreneurship sectors and other parties in Sri Lanka's solar energy field. The research findings help generate a well-established solar energy market through investment assessment together with identified problems and recommended policies (Fernando, 2022). The research results direct businesses into developing investment strategies and steer government agencies toward policy development as well as promote international solar technology team-ups (World Bank, 2023b). The investigation aligns with Sri Lanka's power sector objectives by supporting its pursuit of energy

security together with decreased carbon emissions through solar energy adoption (Ministry of Power and Energy, 2022).

Limitations of the Study

1. Data Availability –The limited availability of updated financial and technical reports negatively affects the analysis because the study depends on secondary sources (Gunawardena et al., 2021).
2. Regulatory Changes- Government policies together with energy regulations might implement changes that could affect the validity of certain study findings (Ministry of Power and Energy, 2022).
3. Technological Advancements –Rapid technological changes in solar energy have the potential to cause research findings to become obsolete while newer solutions appear on the market (Fernando, 2022).
4. Market Volatility –Market volatility controls solar investment sustainability because exchange rate changes and worldwide energy pricing affect economic conditions that limit the applicability of research findings according to (World Bank. 2023b).
5. Scope – The research examines Sri Lanka as its main scope thus it provides limited findings that cannot be applied to regions with unique economic and legislation and environmental frameworks (Ranaweera, 2022).

Apart from other challenges, these limits also affect the ability of findings to be general and consistent. Gaps in recent empirical evidence can affect how one understands the feasibility of an action. In addition, because the rules are uncertain, plans for future investments are unclear, making it harder to evaluate sustainability issues. Because of these constraints, researchers rely on fresh data from several sources and repeat their investigations.

Empirical Rigor

There are no interviews, surveys or case studies included in this current study. That makes it hard to confirm if a new policy helps or if a proposed business can really succeed. In future, this research could include interviews with solar entrepreneurs and government officials and financial studies of solar initiatives. Consequently, the paper would gain more evidence-based support and be more useful to stakeholders.

The Solar Power Industry in Sri Lanka

Current Energy Landscape

The power sector in Sri Lanka relies mainly on hydro energy and thermal power and renewable energy while solar power is becoming increasingly important because of technology cost reductions and government support (Perera & Fernando, 2023).. The "Soorya Bala Sangramaya" initiative has boosted solar adoption, encouraging private and public sector investments (Central Bank of Sri Lanka, 2022a). As of 2023, renewable energy contributes approximately 50% of Sri Lanka's electricity generation, with solar accounting for around 10% (Sri Lanka Sustainable Energy Authority, 2023). Economic instability in the country results from fossil fuel imports because price changes create financial risks so the government seeks development of powerful solar energy systems (World Bank, 2023a).

Traditionally Sri Lanka used hydropower but the country now faces reliability problems since both the climate and rain patterns have grown unstable. The necessity for new energy alternatives has become critical because solar stands out as a viable solution because it becomes less expensive and more scalable (Jayawardena & Silva, 2021). National energy sustainability requires solar power integration directly into the national grid to remove power shortages (Fernando, 2022).

Market Trends and Growth Potential

Both rooftop solar projects and large-scale solar farms have dramatically expanded in Sri Lanka as solar industry capacity has increased. Many businesses together with households select solar photovoltaic (PV) systems because these systems allow them to overcome their high electricity bills (Gunawardena et al., 2021). According to the Ministry of Power and Energy data from 2022 the number of Sri Lankan net-metered installations has exceeded 50,000 (Ministry of Power and Energy, 2022).

The solar energy sector has grown due to the decreasing cost of solar panels and better battery storage technologies and expanded financing opportunities (Ranaweera, 2022). The solar energy market shows ongoing innovation through floating solar installations and combined renewable energy developments (Silva & Wijesinghe, 2023). The market growth in Sri Lanka is accelerated through international solar company presence and joint ventures with local businesses which bring knowledge transfer benefits (World Bank, 2023a).

Table 1: Solar Energy Growth Trends in Sri Lanka (2018–2023)

Year	Installed Capacity (MW)	Number of Installations	Investment Inflows (USD millions)
2018	180	14,500	27.8
2019	230	21,800	38.4
2020	280	31,000	41.2
2021	340	39,200	49.5
2022	420	47,000	56.3
2023	490	53,600	62.7

Sources: (Ministry of Power and Energy 2022); (Central Bank of Sri Lanka 2022a); (World Bank 2023b)

Current government policies about solar adoption include tax benefits and interest-rate discounting green loans along with financial help for solar power implementation. However, regulatory challenges, grid infrastructure limitations, and financial constraints still pose significant barriers to sectoral growth (Central Bank of Sri Lanka, 2022a).

Business Opportunities in Solar Power

Investment and Financial Feasibility

Five years ago, the reduced expenses in solar panels coupled with practical battery storage options position solar energy to be more profitable than before. Business owners find financial backing through green loans and tax incentives from institutions which promote their solar project participation (Jayawardena & Silva, 2021). Renewable energy projects in Sri Lanka receive additional investment attractions through the funding support programs established by the International Finance Corporation (IFC) and Asian Development Bank (ADB) (IFC, 2022).

The government enables financial sustainability through attractive net metering and net plus schemes which let solar energy producers feed surplus power into the electrical grid (Central Bank of Sri Lanka, 2022b). Solar equipment import duties decreases and residential and commercial facilities receive subsidies through programs that have elevated the market rapid growth (Ministry of Power and Energy, 2022).

The incentives to support renewable projects remain challenging to overcome when small and medium-sized enterprises (SMEs) aim to

access project financing for entering the market. The initial expense of developing renewable energy projects joins with extensive regulatory approvals for grid connectivity to prevent investment participation (Fernando, 2022). New funding models that include impact investment funds along with renewable energy crowdfunding solve the financing challenges by filling capital gaps (Gunawardena et al., 2021).

SMEs encounter problems getting capital because they usually lack collateral, don't have a long credit history and are charged high interest rates. To address these challenges, we rely on different financial ways like leasing, paying as you go solar and blending public and private money. Partnerships between the government and fintech companies can open the way for expanding clean energy to everyone. In addition, platforms built for digital crowdfunding in renewable energy can help people avoid relying on banks and encourage entrepreneurship among the public (Silva & Wijesinghe, 2023).

Entrepreneurial and Business Models

Businesses have multiple options for solar operations such as solar panel leasing together with power purchase agreements (PPAs) and net metering plan implementation. The implementation of microgrids functions as profitable energy entrepreneurial pursuit (Ranaweera, 2022). Third-party ownership stands as a highly profitable business choice which lets investors fund the installation of solar systems for businesses and homes with extended payment terms (Silva & Wijesinghe, 2023). Customers avoid upfront expenses because this system lets them access solar energy and simultaneously generates stable income for investors.

Decentralized solar solutions and solar-as-a-service models alongside peer-to-peer energy trade platforms use blockchain technology to facilitate transactions between energy producers and end-users (Perera & Fernando, 2023). Certain solar-based technologies including water irrigation programs and water heating systems are developing into sustainable business ventures because they serve high-demand sectors in Sri Lankan agriculture and hospitality (Jayawardena & Silva, 2021).

The success of solar power projects that unite multiple businesses and household entities has started to expand in different communities. The reduced financial responsibilities for members support extensive solar energy uptake according to the (World Bank 2023b). The national rural electrification initiatives develop new commercial prospects for micro-entrepreneurs who want to launch solar-based power stations and lighting solutions for remote regions (Ministry of Power and Energy, 2022).

More affordable solar technologies provide a new market opportunity for businesses alongside their production of components that

include portable solar chargers, solar lanterns and smart home solutions with solar integration (Central Bank of Sri Lanka, 2022a). The new technologies are extremely useful for regions which have limited power supply access and underdeveloped service territories.

Challenges Facing the Solar Industry in Sri Lanka

Regulatory and Policy Barriers

The government of Sri Lanka has initiated solar investment support policies yet the country faces major roadblocks from unclear regulations and slow approval procedures (World Bank, 2023a). A non-unified framework for renewable energy projects generates market uncertainties which make investors delay projects and avoid long-term investments (Ministry of Power and Energy, 2022).

The regular changes to feed-in tariff and net metering policy regulations generate unpredictable conditions for businesses considering solar power investments (Central Bank of Sri Lanka, 2022a). Regulatory procedures for obtaining sites of substantial solar farm facilities together with environmental examination processes and authorizations have acted as barriers which slow down the deployment of solar power (Gunawardena et al., 2021).

Government policies must include swift approval systems with sustainable time-based incentives and predictable regulatory requirements to bring in national and international investors. The combination of public-private partnerships (PPPs) allows solar project deployment to advance more smoothly because they integrate official backing with business sector operational excellence (Perera & Fernando, 2023).

The main problem with these mechanisms is that many have failed due to uneven rules and slow administration. An example is that long reimbursement times and fluctuating tariffs have caused many private investors to lose interest. Investor hesitation also rises because different regions have varied policies and no national framework (World Bank, 2023a). Such inconsistencies have made it challenging for foreign companies to expand in solar energy in Sri Lanka, because they aren't familiar with the rules.

Grid Integration and Infrastructure Limitations

High solar power penetration faces technical hurdles because the national grid has limited supplying capabilities. Nighttime solar production brings up and down energy supply volatility which generates operational instability for power grids (Fernando, 2022).

The present infrastructure needs advanced management systems like smart grids and demand-response solutions since these enable

efficient renewable energy dispatch (Jayawardena & Silva, 2021). Stable power requirements demand that solar generation integration include lithium-ion battery systems along with pumped hydro storage as energy storage solutions according to (Silva and Wijesinghe 2023).

The insufficient efficiency of solar power distribution is caused by losses that occur through outdated electrical grid systems. Upgrading electrical distribution networks through combined solar production facilities leads to more reliable power delivery which in turn stimulates broader solar solution adoption (World Bank, 2023a). The government needs to establish partnerships between international development agencies and private investors to support the development of upgrades to the grid infrastructure and energy storage systems (Asian Development Bank, 2022b).

Financial and Economic Constraints

Solar entrepreneurs face funding accessibility as their main constraint when seeking to launch their projects. The combination of expensive initial funding requirements and limited borrowing solutions stops small and medium businesses from buying solar technology (Silva & Wijesinghe, 2023). Despite providing green loans financial institutions make them difficult to access through strict qualification procedures and high funding costs (Fernando 2022).

The instability of exchange rates combined with import taxes imposed on solar panels and their equipment drives the final installation costs beyond household-budget ranges and business reach (Central Bank of Sri Lanka, 2022b). The problem persists because Sri Lanka lacks modern financial systems which include leasing options combined with pay-as-you-go models along with government-backed loan insurance (Perera & Fernando, 2023).

The Sri Lankan government should adopt specific financial measures that include tax reductions and affordable low-interest loans together with monetary aid to promote solar power investments (Ministry of Power and Energy, 2022). The development of financial partnerships between Sri Lanka and international impact investors along with financial institutions provides the country with additional resources needed for solar project expansions throughout the national territory (World Bank, 2023b).

Policy Recommendations for Enhancing Solar Business Potential

Short-Term Strategic Interventions

- Expand direct subsidies and tax incentives for solar businesses
- Streamline permitting and grid-connection processes

- Enhance access to green loans and credit guarantees for SMEs
- Launch national awareness campaigns to boost investor and public confidence

Long-Term Structural Reforms

- Invest in smart grid infrastructure and energy storage systems
- Foster R&D partnerships with universities and tech incubators
- Support the development of vocational training and certification programs for solar professionals
- Establish a national renewable energy bank or fund to reduce capital market risk for solar entrepreneurs

Technological Innovations

The long-term growth potential of solar engineering and energy storage options develops through advanced research and development measures. Higher education institutions together with research centers should benefit from government-backed funding to develop high-performing photovoltaic (PV) cells as well as improved battery storage technology and grid connection systems (Fernando, 2022).

The implementation of artificial intelligence (AI) and blockchain technology in energy management systems optimizes solar energy distribution as well as trading activities so consumers can participate in peer-to-peer energy markets (Jayawardena & Silva, 2021). The (World Bank 2023b) shows that augmenting investment in floating solar farm and agrivoltaics systems which bring solar panels into agricultural areas enables sustainable energy production potential expansion.

Capacity Building and Workforce Development

To sustain the growth of the industry the solar sector requires financial investments toward developing technical competencies for both engineers and technicians. The government needs to work with educational institutions for introducing specific training programs which focus on solar energy installation combined with maintenance activities and power management expertise (Central Bank of Sri Lanka, 2022a).

The Ministry of Power and Energy should give financial support to vocational training centers which will enable them to certify solar energy professionals (Ministry of Power and Energy, 2022). By running public education projects combined with start-up assistance services the solar sector will generate more entrepreneurial businesses (Ranaweera, 2022).

Sri Lanka can develop an optimal solar energy business sector while drawing foreign capital through the implementation of proposed government policies which will boost both national sustainability and energy system reliability.

Summary of Key Findings

The study reveals that Sri Lanka has significant opportunity for solar energy growth because of reduced technology costs, favorable government policies and expanded collaboration among the public and private sectors. Even so, challenges still exist and these consist of uncertain laws, little financing assistance for SMEs and slow readiness of power lines for solar panels. Although there are some issues, more people are adopting solar energy and proper improvements could quickly expand the trend.

Conclusion

Solar power in Sri Lanka offers businesses an appealing business opportunity that provides affordable sustainable power solutions which scale according to demand. The sector has an essential future function in both fuel reduction and energy stability improvement and economic expansion (World Bank, 2023b). Solar power investments bring about new business opportunities and simultaneously generate employment opportunities while transferring energy technologies to the sector (Asian Development Bank, 2022a).

The sector continues facing hurdles including regulatory obstacles and monetary restrictions together with infrastructure limitations. Potentially invested funds remain blocked because of policies that change frequently and long approval processes and high capital costs alongside limited financing access create major barriers for small and medium enterprises (SMEs) trying to enter this market (Gunawardena et al., 2021). The successful integration of solar energy needs combined action between public authorities and private companies together with worldwide partners who will establish proper conditions for solar adoption (Ministry of Power and Energy, 2022).

Strategic policies such as improved subsidies coupled with simplified regulations and modern financial schemes should be implemented to drive the solar industry's expansion (Silva & Wijesinghe, 2023). National solar power adoption will benefit from technological progress where smart grids and AI-managed energy resources and modern battery systems enhance solar integration possibilities (Jayawardena & Silva, 2021). Sri Lanka will become a regional leader in renewable energy

when the country develops its research field along with skilled staff members.

The total power potential of solar requires joint efforts from entrepreneurs, investors and policymakers to achieve fulfillment. The sustainable expansion of solar energy infrastructure relies heavily on public-private partnerships together with foreign direct investments and knowledge-sharing initiatives according to (Perera and Fernando 2023). The pursuit of renewable energy goals in Sri Lanka will succeed through efforts that create economic development as well as preserve the environment and secure national energy self-sufficiency.

The solar power industry in Sri Lanka can take a central role in national energy transformation through proper implementation of supportive policies alongside technological advancements and strategic financial initiatives. The transformation to renewable energy operations will yield economic advantages and help fight global warming and defend sustainability for future ages (Central Bank of Sri Lanka, 2022b).

It would be interesting to study changes artificial intelligence (AI) could make in solar grid optimization and predictive maintenance. Experts should analyze personalized approaches for installing rural solar energy, consider the gender aspects of adopting solar power and measure the climate resistance of related installations. Looking at what other developing economies are doing could show possible improvements for Sri Lanka's solar efforts.

Research Limitations and Methodological Considerations

Though the study highlights promising opportunities, investment rules and economic aspects of solar in Sri Lanka, some boundaries need to be noted for a proper understanding.

All of the data used in my research comes from published academic sources, policy documents and reports from institutions. As a result, there isn't any direct input from stakeholders, surveys or cases to support its findings. Because the study does not have these data, it is unable to understand implementation issues within the sector or the points of view of investors.

Besides, the research study does not take advantage of a comprehensive theory. If the Diffusion of Innovation Theory or Institutional Theory was used, the research would have given more insight and better analysis of solar power adoption in Sri Lanka. The findings can be generalized further with the help of theoretical contributions.

Without specific research design, sample selection and data analysis, the methodology becomes difficult to follow. These gaps can weaken the accuracy and academic worth of research in business and energy.

In addition, the research is limited to studying Sri Lankan contexts. Consequently, findings can be important to national governments, but may not be applied directly in other countries where rules and economies are very different. Because technologies in renewable energy are evolving quickly, what we learn now may not stay relevant for long.

Directions for Future Research

For extending the value of this study and increasing its usefulness, future research in some directions is recommended.
To move forward, programs should use interviews, studies in the field or surveys to collect primary data from policymakers, solar entrepreneurs, utility providers and financial institutions.

• A good way to provide clear explanations and make the findings more general is to include Diffusion of Innovation Theory, Technology Acceptance Models or Institutional Theory in your approach.

Clarifying the research design components, for example which data you are utilizing, how the sample is determined and the methods for analyzing results, helps promote transparency and strict academic standards.

• By studying how other emerging economies develop or by looking at how solar energy changes over time, we can learn more about regional good practices and what's driving the transitions.

• A diagram that connects investment, regulations, technological growth and market outcomes should be built to structure and analyze future work in solar energy in Sri Lanka.

Thanks to these changes, extra studies are able to make sure their conclusions bring new information, theoretical ideas and positive impacts to Sri Lanka's energy sector.

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