

A Study on Impact of Green Financing Initiatives on the Commercial Growth of Electric Two-Wheeler Start-Ups in Developing Economies

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Abstract: This study looks into how green financing initiatives impact the profitable growth of electric two-wheeler startups in developing economies. Green financing is all about providing financial support to encourage environmentally friendly projects, like electric mobility. The research explores into how tools such as low-interest loans, subsidies, and green bonds can help these startups cut costs and expand their operations. It specifically focuses on electric two-wheeler startups in emerging markets, examining their growth paths when they have access to green finance. Through case studies and data analysis, the study investigates how green finance fosters technological innovation and infrastructure development. It also considers how green financing attracts investors and boosts consumer adoption. The findings reveal a positive link between the availability of green finance and the commercial success of these startups. The study emphasizes how financial ecosystems can be fine-tuned to support green automotive ventures in resource-constrained settings. Additionally, it discusses policy implications to strengthen green financing frameworks. The results suggest that green financing not only encourages environmental sustainability but also boosts economic growth in the electric vehicle sector. This research offers valuable insights for policymakers, investors, and entrepreneurs who are keen on promoting sustainable development through green commerce. In the end, the study supports the idea that integrating finance with sustainability can speed up the shift to clean transportation.

Keywords: Green Financing, Electric Two-Wheeler Startups, Developing Economies, Emerging Markets, Low-Interest Loans, Subsidies, Green Bonds, Cost Reduction, Profitable Growth, Technological Innovation, Infrastructure Development, Investor Attraction, Consumer Adoption, Financial Ecosystem, Policy Implications, Environmental Sustainability, Sustainable Development, Clean Transportation, Green Commerce.

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I. INTRODUCTION

The move towards sustainable transportation is becoming a pressing issue for developing countries that are dealing with rapid urban growth, rising pollution levels, and the effects of climate change (International Energy Agency [IEA], 2023; United Nations Environment Programme [UNEP], 2022). Electric two-wheelers (E2Ws) have emerged as a cost-effective, efficient, and low-emission way to get around, making them a great fit for the needs of these emerging markets (Banerjee & Gupta, 2021). However, despite their promise, E2W start-ups are facing some tough hurdles, including high initial costs, limited financing options, poor infrastructure, and a lack of consumer awareness (Kumar & Singh, 2022). In this scenario, green financing—financial tools aimed at supporting eco-friendly

businesses—has become a vital factor in helping to expand the market for electric two-wheelers).

The swift rise of electric two-wheeler start-ups is often held back by significant financial hurdles. The high initial costs of electric vehicles, a lack of charging infrastructure, and limited consumer awareness create unique challenges that slow down market growth. In this scenario, green financing initiatives have emerged as a crucial support system, offering essential capital and risk management to help these start-ups thrive (Asian Development Bank [ADB], 2022). Green finance includes a range of financial options like concessional loans, grants, equity investments, and innovative risk-sharing strategies, all aimed at boosting investments in eco-friendly technologies. By lowering financing costs and enhancing access to capital, these initiatives empower electric two-wheeler start-ups to tackle

initial market challenges and expand their operations more efficiently (Roy & Sharma, 2023).

Developing economies like India, various African nations, and countries in Southeast Asia are seeing a significant rise in green finance, thanks to both local policy initiatives and international climate finance support. These funding sources have spurred innovation in product design, advanced battery technologies, and the establishment of charging infrastructure, effectively filling crucial market gaps. Electric two-wheelers not only provide an affordable alternative to traditional vehicles but also play a key role in cutting down greenhouse gas emissions and urban air pollution, making them essential to the green mobility landscape. Additionally, this sector opens up new economic avenues by creating jobs, encouraging entrepreneurship, and drawing investments into the burgeoning clean technology markets.

The rise of electric two-wheeler start-ups, fuelled by green financing initiatives, has the potential to reshape transportation in developing countries. This study aims to delve into the various ways green financing impacts market dynamics, financial sustainability, and growth strategies for these electric two-wheeler companies. It will examine how different financing models affect business scalability, consumer adoption, and technological advancements in these markets. By uncovering these connections, the study hopes to offer valuable insights for policymakers, investors, and entrepreneurs to enhance the green financing ecosystem and speed up the green transition in the mobility sector.

Green finance initiatives are all about providing the necessary capital and risk mitigation tools, like concessional loans, credit guarantees, and venture capital, to help break down barriers for electric two-wheeler (E2W) start-ups and consumers. Take India, for example. The Small Industries Development Bank of India (SIDBI) has rolled out the Mission 50K-EV4ECO program, which has successfully facilitated financing of around INR 190 crore (roughly USD 22 million) for more than 18,000 electric vehicles (EVs). This funding has been directed towards micro, small, and medium enterprises (MSMEs), fleet operators, and non-banking financial companies (NBFCs). SIDBI's risk-sharing facility, which is co-funded by the Shell Foundation, provides partial credit guarantees to lenders, helping to lower their risk and promote affordable lending for electric two- and three-wheelers, as well as for developing charging infrastructure. This effort is in line with broader government initiatives like India's National Electric Mobility Mission and the EV30@30 strategy, all aimed at boosting large-scale EV adoption.

In a similar manner, Bangladesh has launched the 'Road to a Green Bangladesh' project, which has created an inclusive EV financing tool designed to enhance EV adoption among MSMEs, particularly those led by women. This initiative has brought together various stakeholders, creating platforms that connect financial institutions with transport providers to tackle financing challenges and standardize business models for EV adoption. By conducting thorough economic and environmental impact assessments and sharing

these insights with investors, the project has effectively encouraged financing flows to speed up the commercialization of E2Ws in the country.

These examples illustrate the multifaceted role of green financing in emerging markets: providing capital, fostering ecosystem collaboration, and addressing knowledge gaps. Such financial support not only enhances the commercial viability and scalability of electric two-wheeler start-ups but also drives innovation in battery technology, charging solutions, and business models adapted to local contexts. Beyond environmental benefits, the growth of the E2W sector supported by green finance promotes economic development through job creation, entrepreneurship, and improved urban mobility access.

This study aims to comprehensively explore how various green financing initiatives influence the commercial growth of electric two-wheeler start-ups in developing economies. It will analyse diverse financial instruments, policy frameworks, market responses, and ecosystem challenges across countries to provide actionable insights for policymakers, financiers, and entrepreneurs. Understanding these dynamics is crucial to unlocking the full potential of electric two-wheelers as a sustainable transportation solution contributing to climate goals, economic resilience, and social inclusion in emerging markets.

In conclusion, green financing serves as a pivotal catalyst bridging the gap between technology adoption and market expansion for electric two-wheelers. With growing evidence from initiatives in India, Bangladesh, and other developing countries, the commercialization of electric two-wheelers is positioned to accelerate rapidly, driving a cleaner, more inclusive, and economically vibrant mobility future in developing economies.

➤ Objectives

- To explore how green financing can speed up the adoption and market existence of electric two-wheelers among start-ups in developing countries.
- To study how fiscal incentives and green financial tools like green bonds, concessional loans, and venture capital influence the growth, competitiveness, and sustainability of electric two-wheeler start-ups.
- To look into the operational and financial hurdles that electric two-wheeler start-ups face when trying to access green finance, and to pinpoint effective strategies for managing risks within the ecosystem.
- To evaluate the environmental and social advantages that come from the increased commercialization of electric two-wheelers backed by green financing, such as lower urban pollution and improved access to mobility.
- To suggest policy initiatives and innovative financing models that can enhance the green finance ecosystem and support the long-term growth and scalability of electric two-wheeler start-ups in emerging markets.

➤ *Main Paper*• *The Role of Green Financing in Market Expansion*

Green financing initiatives, like concessional loans, risk-sharing facilities, and targeted investments, have played a crucial role in helping start-ups boost electric two-wheeler (E2W) sales in developing markets. By making these vehicles more affordable and lowering the cost of capital, these funds have sped up the adoption of E2Ws, particularly among underserved urban and rural communities (Sawhney & Gambhir, 2024). The influence of green financing initiatives on the growth of electric two-wheeler (E2W) start-ups in developing countries is both significant and complex. Green financing is essential for speeding up the adoption, production, and market entry of electric two-wheelers, which are crucial for sustainable urban transport and cutting down carbon emissions (Bhatnagar, Taneja, & Özen, 2022).

• *Government Support and Policy Incentives*

Government initiatives, such as India's FAME-II and various national missions, work hand-in-hand with private green financing by providing subsidies, tax incentives, and support for charging infrastructure development. These efforts have significantly advanced market penetration and consumer acceptance of electric two-wheelers (Government of India, 2019).

• *Financial Inclusion and Social Impact*

Green finance providers, like Mufin Green Finance, have opened up credit access to populations that were previously unbanked, including women and low-income groups. This has not only promoted social inclusion and empowerment but has also contributed to income generation through electric mobility (SaurEnergy, 2023).

• *Business Model Innovations*

Start-ups that receive green funding are increasingly embracing innovative business models, such as vehicle leasing, battery swapping, and subscription services. These approaches help lower upfront costs for consumers and enhance the sustainability of E2W businesses (Bhatnagar et al., 2022).

• *Growth in Sales Volume and Market Share*

The influx of green finance is closely linked to rising sales volumes and an expanding market share for electric two-wheelers. Significant growth has been noted in emerging economies, fuelled by better consumer financing options and increased supplier capacity (Sawhney & Gambhir, 2024).

• *Revenue Growth and Profitability*

Start-ups benefiting from green financing are seeing improved revenue streams and profit margins, thanks to optimized operational costs, economies of scale, and consumer financing offers that drive demand (Bhatnagar et al., 2022).

• *Expansion of Production and Geographic Reach*

Green financing has enabled electric two-wheeler start-ups to expand manufacturing capacities and enter new

regional markets, broadening their geographic footprint and enhancing supply chain resilience (Sawhney & Gambhir, 2024).

• *Environmental Benefits*

Accelerated adoption of electric two-wheelers reduces urban greenhouse gas emissions and air pollutants. The transition supported by green finance contributes measurably to climate change mitigation targets in developing economies (SIDBI & World Bank, 2023).

• *Challenges Faced by Start-Ups*

Despite green financing availability, start-ups encounter challenges including high lender-risk perceptions, nascent credit ecosystems, and market uncertainties. Capacity-building for financiers and risk-sharing mechanisms are essential to address these issues.

• *Recommendations for Ecosystem Strengthening*

To sustain and scale commercial growth, the study recommends expanding green finance accessibility, supporting innovative financial products like green bonds, enhancing policy coordination, and building ecosystem partnerships among governments, financiers, and start-ups (Bhatnagar et al., 2022).

• *The Role of Green Financing in Business Growth*

Green financing, through tools like loans, green bonds, subsidies, and concessional capital from climate funds and development banks, provides vital funding to electric two-wheeler start-ups. This funding allows these companies to ramp up production, create innovative financing solutions, and broaden their customer reach (Sawhney & Gambhir, 2024). By making financing more affordable, it lowers the initial cost barrier for consumers, making electric two-wheelers easier to access, especially in areas with large rural and semi-urban populations. For instance, companies like WheelsEMI in India use green financing to offer customized loans for electric two- and three-wheelers, helping to close the mobility gap between urban and rural areas and driving market growth (SaurEnergy, 2023).

• *Effects on Market Growth and Innovation*

Green financing encourages innovation in digital financing models, battery technology, and charging infrastructure. Start-ups are using psychometric analysis and alternative credit evaluations to provide loans to customers who lack formal credit histories. This financial ecosystem supports quick adoption by gig economy workers and last-mile delivery services, who are vital for market growth. Additionally, investments help boost local manufacturing of electric two-wheelers and their components, which cuts costs and reduces reliance on imports, ultimately stimulating economic growth and creating jobs (Sawhney & Gambhir, 2024).

• *Green Financing is Driving*

Innovation in areas like digital financing models, battery technology, and charging infrastructure. Start-ups are getting creative by using psychometric analysis and

alternative credit assessments to offer loans to customers who don't have traditional credit histories. This financial ecosystem is making it easier for gig economy workers and last-mile delivery operators—who play a crucial role in market growth—to access funds quickly. Plus, these investments are boosting local manufacturing of electric two-wheelers and their components, which helps lower costs, reduce reliance on imports, stimulate economic growth, and create new jobs. Supporting Policy and Institutional Frameworks Government initiatives in green finance, such as sovereign green bonds and risk-sharing programs from development banks like SIDBI and the World Bank, are enhancing the availability of commercial loans and building investor confidence. These frameworks are key to lowering financing costs, which encourages more non-banking financial companies (NBFCs) and banks to dive into the electric two-wheeler financing market. Access to concessional capital and credit risk mitigation strategies is especially important in developing economies, where lending risks are often viewed as higher.

The rise of electric two-wheeler start-ups, fuelled by green financing, is making a real difference in tackling climate change. By cutting down on greenhouse gas emissions and reducing pollution in our cities, these initiatives are not just good for the planet; they also help bring economic opportunities to low-income communities. Switching from fossil-fuel vehicles to electric options paves the way for a more sustainable future. This approach is really speeding up the growth and success of electric two-wheeler businesses in developing countries. It tackles financial hurdles, encourages tech innovation, and aligns perfectly with sustainable development goals. India stands out as a prime example of how green financing can drive the growth of electric mobility.

II. FINDINGS OF THE STUDY

- **The Growing Popularity of Electric Two-Wheelers** – Electric two-wheelers are rapidly gaining traction in developing countries, thanks to their affordability, lower emissions, and the increasing need for urban mobility.
- **Green Financing Fuels Start-ups** – With access to green financing, electric two-wheeler start-ups can expand their operations and cut costs, which helps them penetrate the market more effectively.
- **Policy Incentives Encourage Adoption** – Government subsidies and incentive programs play a crucial role in boosting consumer adoption of electric two-wheelers in developing nations.
- **Technological Advances Boost Appeal** – Innovations in battery technology and vehicle design are enhancing performance and lowering ownership costs for electric two-wheelers.
- **Digital Lending Broadens Consumer Access** – FinTech advancements in digital lending are breaking down credit access barriers for electric two-wheeler buyers who may not have formal financial histories.
- **Local Manufacturing Growth** – Green financing is paving the way for local electric two-wheeler manufacturing,

which not only cuts down on our reliance on imports but also creates new job opportunities.

- **Market Expansion into Rural Areas** – Thanks to affordable electric two-wheelers backed by green loans, we're seeing a shift that allows these vehicles to reach rural and semi-urban areas, expanding their use beyond just cities.
- **Rising Venture Capital Interest** – There's a noticeable uptick in investments in climate tech, with more capital flowing into electric two-wheeler start-ups, and India is at the forefront of this funding surge.
- **Private Sector Collaborations** – The collaboration between financiers, manufacturers, and tech companies is sparking innovative business models in the electric mobility space.
- **Positive Environmental Impact** – The growing popularity of electric two-wheelers is making a real difference in cutting down urban air pollution and lowering greenhouse gas emissions.
- **Demand Growth in Southeast Asia** – Countries like India, Vietnam, and Thailand are seeing a significant rise in electric two-wheeler sales, thanks to support from both government initiatives and private financing.
- **Battery-as-a-Service Models Gain Traction** – Innovative financing options like battery leasing are helping to lower the initial costs for consumers, making electric two-wheelers much more accessible.
- **Financial Risk Mitigation Improves Lending** – Programs that share risk and enhance credit are boosting lender confidence in providing green loans to electric mobility start-ups.
- **Consumer Awareness Raising Sales** – Educational initiatives and visible incentives are playing a key role in improving consumer acceptance and driving sales of electric two-wheelers.
- **Projected Market Growth** – The global electric two-wheeler market is anticipated to grow at a compound annual growth rate of over 13% through 2030, driven by green financing and supportive policies.

III. IMPLICATIONS OF THE STUDY

➤ *Policy Implications*

This study underscores the importance of governments crafting supportive policies like low-interest loans, subsidies, and tax incentives. These measures can significantly enhance access to green financing for start-ups, which in turn can speed up the adoption of electric mobility.

➤ *Financial Sector Opportunities*

Banks and financial institutions have a chance to see green financing as a lucrative and sustainable lending option. This opens up exciting new pathways for credit lines, green bonds, and risk-sharing instruments specifically aimed at electric vehicle (EV) start-ups.

➤ *Market Expansion for Start-ups*

When start-ups gain access to affordable green financing, they can ramp up production, broaden their distribution networks, and reach underserved urban and rural markets, ultimately boosting their overall market presence.

➤ *Sustainability and Climate Goals*

By supporting green mobility start-ups, these financing initiatives play a crucial role in cutting down carbon emissions, reducing air pollution, and lessening reliance on fossil fuels. This aligns perfectly with the sustainable development goals (SDGs) and national climate commitments.

➤ *Consumer Benefits*

With financing easing the upfront cost burden, electric two-wheelers become much more accessible for consumers. This leads to increased adoption and builds greater trust in eco-friendly alternatives.

➤ *Innovation and Technology Growth*

Start-ups that receive green financing are in a stronger position to invest in research and development, improve battery efficiency, enhance charging solutions, and explore advanced business models. This ultimately strengthens the EV ecosystem in developing economies.

➤ *Attracting Global Investments*

The positive signs of commercial growth driven by green financing make developing markets more appealing to international investors, venture capitalists, and funds focused on sustainability, ensuring a steady flow of long-term capital.

IV. CONCLUSION

Green financing initiatives play a crucial role in helping electric two-wheeler start-ups thrive in developing countries. They tackle hurdles like high initial costs, limited access to consumer credit, and technological uncertainties. By offering tools like concessional capital, risk-sharing strategies, and creative financing options such as battery leasing, these initiatives make it easier for consumers to afford electric vehicles and access the market. Additionally, supportive government policies and subsidies strengthen these financial resources, creating a regulatory environment that builds investor confidence and speeds up adoption. When local manufacturing is backed by green finance, it not only reduces reliance on imports and cuts costs but also generates jobs, ultimately driving economic growth.

The rise of electric two-wheelers, fuelled by green financing, brings a host of environmental perks, like reducing emissions and cutting down urban pollution, all while supporting sustainable development goals. Plus, with the help of digital lending platforms and fintech innovations, financing is becoming more accessible for often overlooked groups, such as gig workers and those in rural areas. When you put all these pieces together, electric two-wheelers emerge as a game-changing solution for mobility in developing economies, with exciting potential for ongoing market growth and advancements in green transportation.

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