Economic Impact of Electric Vehicle Adoption on Emerging and Developed Economies

Jalagam Sandeep, MA. (Ph.D. UG NET & JRF\SRF)

Department of Economics, Osmania University, Hyderabad
sandeep.jalagam@osamaia.ac.in
Telangana

How to Cite this Article:

Sandeep, J. (2026). Economic Impact of Electric Vehicle Adoption on Emerging and Developed Economies. International Journal of Creative and Open Research in Engineering and Management, 02(03). https://doi.org/10.55041/ijcope.v2i3.265

https://doi.org/ 10.55041/ijcope.v2i3.265

Abstract

Electric vehicles (EVs) have taken center stage in the global shift towards sustainable energy systems and their economic growth has a huge implication in both developing and advanced economies. The research evaluates the economic effect of EV adoption based on secondary data sources in the international arena that include the International Energy Agency, World Bank, and IMF. The discussion takes into consideration the important indicators such as GDP growth, employment trends, energy usage, and infrastructural development. Results show that developed economies have the advantage of having well-developed infrastructure, effective policy backing, and greater purchasing power, resulting in quick EV market adoption and favorable economic results including more investments, creating jobs in new industries, and less reliance on fossil fuels. Conversely, emerging economies have difficulties like high start-up expenses, poor charging systems, and dependence on foreign technologies, which are a setback in adoption and cause economic susceptibility. Nonetheless, such economies also offer the opportunities of development based on local production and development of the policy. The paper shows that special policy measures, infrastructure investments, and planning are critical to achieving fair and sustainable economic gains. In general, the adoption of EV can lead to long-term economic change, yet its effects in various economic conditions are different.

Keywords: Electric Vehicles (EVs), Economic Impact, Emerging Economies, Developed Economies, Sustainable Development

Introduction

The development of electric vehicles has become an essential part of global clean energy movement as climate issues grow increasingly concerning and fossil fuel is becoming depleted(Literature Review .Pdf, n.d.; Udendhran et al., 2025). Modern EVs developed out of early 20th-century prototypes and are now taking advantage of lithium-ion battery development and renewable integration, as sales are expected to increase exponentially, growing to over 10 million units in 2022 compared to the 2.1 million in 2019 due to policies such as the Paris Agreement and net-zero commitments(Ka et al., 202 This transition will reduce greenhouse gas emissions and energy dependence, but it depends on its mass adoption during the development of technologies and infrastructure(Oyedotun et al., 2017).

The economic effects of EV adoption are important to study because they affect the increase in GDP, employment, and fiscal policies. EVs stimulate employment opportunities in the manufacturing and charging station industry but will threaten to displace fossil fuel industries(Americo et al., 2024; Udendhran et al., 2025). The well-established subsidies, established grids, and high consumer purchasing power in the developed economies such as Europe and the US make uptake rapid and the net effect of the development includes the generation of value of up to 1.5 trillion globally in 2030(Martins et al., 2024). Emerging economies, in their turn, encounter even more significant hurdles: high initial expenses (40-50% higher than ICE cars), the lack of charging infrastructure, and the dependence on foreign batteries to worsen the affordability and chain-of-origin aspects of the latter(Purwanto & Irawan, 2023; Sathyan et al., 2024; Tsoekeo

The issue is in the presence of limited comparative studies of these divergent effects, which inhibit the provision of specific policies that will contribute to fair transitions(Dall-Orsoletta et al., 2022; Onat and Kucukvar, 2022). This is the gap that is the subject of this study.

Objectives: Assess macroeconomic effects of EV adoption; Compare emerging vs. developed economies; Propose policy recommendations.

Research Questions: What are key economic impacts in each context?

How do infrastructural and policy differences shape outcomes?

What strategies optimize benefits?

Literature Review

Theoretical Frameworks

The implementation of electric vehicles is supported by such central theoretical approaches as Sustainable Development, the Green Economy, and Energy Transition. Sustainable Development, which is a long-term economic, environmental, and social framework, focuses on long-term prosperity and conservation of ecosystems, as well as, just communities(Valente et al., 8 C.E.). This is in line with the 2030 Agenda and SDGs of the UN, which incorporate the transitions to EVs to tackle the issues of climate change, poverty, and innovation(Valente et al., 8 C.E.). Green Economy model is based on the principles of low-carbon development, resource efficiency, and social inclusion, which places EVs as the facilitators of sustainable prosperity in both developed and developing settings(Herzegovina & Terzić, 2023; Tamasiga et al., 2022). The focus of Energy Transition theories is the transition of the fossil energy sector to renewable energy, and EVs cut the volume of emissions and improved energy security by increasing the battery and storage technology(Americo et al., 2024; Literature Review .Pdf, n.d.).

Global Trends in EV Adoption

The uptake of EV has been increasing globally, with more than 10 million units of EV being sold in the year 2022 (14% of the new car sales) and the figure increasing to 18 percent in 2023(Shamsuddoha & Nasir, 2025; Udendhran et al., 2025). The battery electric cars are the leader with almost 70 percent of the total of about 40 million EVs worldwide, mainly in China, Europe, and the US, but the emerging markets such as India lag behind with infrastructure gaps(Bhardwaj et al., 2025; Hossain et al., 2024; Ka et al., 2026). Norway has been an example of high penetration through policy, but less rapid penetration in developing countries even though the region is projected to need more batteries in 2035 (Shamsuddoha and Nasir, 2025).

Economic Impacts

There are ambivalent macroeconomic impacts of EV adoption. On working, it generates manufacturing and infrastructure employment opportunities but threatens to replace fossil fuel and traditional automotive employment; e.g., France predicts 65,000 jobs would be lost by 2030(Bouillass, 2021; Udendhran et al., 2025). The effects on GDP are positive or neutral in the long run with the new vehicle demand being explained by the impact on value chains, which in this case are lower in EVs compared to ICEs(Seth et al., 2023; Shafiei et al., 2019; Vrontisi et al., 2019). This gives reduced oil imports, grid integration, and reduced benefits on the energy markets, and restructuring advantages to the automotive industry, where emerging economies benefit due to local production(Americo et al., 2024; Oyedotun et al., 2017).

Policy Interventions and Incentives

Such policies as subsidies, tax credit, and investments in infrastructure are critical. Compared to ownership incentives, purchase incentives increase BEV registrations in the long run and in high-GDP countries, the effect is more pronounced(Javadnejad et al., 2023; Martins et al., 2024). The fiscal instruments decrease initial expenditure and overall ownership costs, but sustainability is not the same in low-income regions(Martins et al., 2024; Shafiei et al., 2018; Taamneh and Makahleh, 2025). The multi-period incentives in Europe and US tax credits are an example of success, yet barriers to these incentives such as range anxiety are overcome through specific efforts (Zaino et al., 2024).

Research Gaps

According to literature, comparative secondary data studies are characterized by gaps in the literature in terms of representation of developed countries (e.g., EU, US) and lack of studies of developing contexts susceptible to shocks (Onat and Kucukvar, 2022; Purwanto and Irawan, 2023). Not many evaluate the long-term EV changes of transportation, energy, and equity in emerging markets, as they do not have region-specific LCAs and policy standards(Onat and Kucukvar, 2022; Purwanto and Irawan, 2023; Seth et al., 2023). This paper addresses these gaps by providing cross economy comparisons.

Methodology

The research design used in this study is a secondary data analysis, and the data will be collected using such sources as the International Energy Agency, reports of World Bank, IMF, and reports provided by the government and industry. The important variables considered include EV adoption rates, GDP growth, employment, fuel consumption and emissions. Analytical methods incorporate descriptive statistics to summarize the data, comparative analysis of emerging economies with developed economies, trend analysis to find patterns with time and correlation/regression analysis where possible to investigate the relationship.

Results

Trends in EV Adoption Across Countries

In 2022, the global EV sales hit a record high of more than 10 million vehicles which was 14 percent of new car sales, and in 2023 it reached 18 percent, with battery-only electric vehicles making up approximately 70 percent of the total of about 40 million global EVs stock(Bhardwaj et al., 2025; Hossain et al., 2 China, Europe, and US are the most successful in adoption, with emerging markets such as India following because of the lack of infrastructure(Bhardwaj et al., 2025; Hossain et al., 2024; Ka et al., 2026). In Norway, penetration is realized as a result of intensive policies whereas in the developing territories it is slower compared to the projections of battery demand in the future by 2035(Shamsuddoha & Nasir, 2025).

Economic Impacts in Developed Economies

The EV adoption in developed economies, like Europe and the US leads to net positives, such as the global value of over 1.5 trillion through subsidies, mature grids, and high purchasing power by the year 2030(Martins et al., 2024). The long-term effects on GDP are moderate or neutral, driven by the demand of new vehicles, but EVs do not need services as much as internal combustion engine vehicles(Seth et al., 2023; Shafiei et al., 2019; Vrontisi et al., 2019). The employment changes would be manufacturing gains but the loss of fossil fuels e.g. France projecting 65000 job losses by 2030(Bouillass, 2021; Udendhran et al., 2025). It facilitates grid integration and energy markets benefit due to the decrease in oil imports(Americo et al., 2024; Oyedotun et al., 2017).

Economic Impacts in Emerging Economies

The emerging economies face excessive initial investments, lack of proper charging, and battery dependence on imports, which increases susceptibility(Purwanto & Irawan, 2023; Sathyan et al., 2024; Tsoekeo and Boutueil, 2022). The adoption is slow because of cost and supply chain availability, but local manufacture has a growth opportunity (Americo et al., 2024; Oyedotun et al., 2017). Fiscal incentives have potential but push the budgets of the low-income populations, and uniform policies are being hindered by differences(Shafiei et al., 2018; Taamneh and Makahleh, 2025; Udendhran et al., 2025).

Comparative Analysis of Both Groups

Established markets also show fast adoption and net GDP/employment gains result in strong infrastructure and incentives that lead to long-term BEV registrations(Javadnejad et al., 2023; Martins et al., 2024). The barriers in emerging markets are higher, and the policy effects are weaker because of GDP per capita and renewable energy disparities, which put the risk of having inequitable transitions without customized strategies(Dall-Orsolleta et al., 2022; Onat and Kucukvar, 2022; Purwanto and Irawan, 2023). Comparative secondary data indicates that the developed contexts have been overrepresented, which suggests the necessity of region-specific analyses(Onat & Kucukvar, 2022; Purwanto and Irawan, 2023; Seth et al., 2023).

Sector-Wise Impact of Electric Vehicle Adoption

Sector	Developed Economies	Emerging Economies
Automobile	The restructuring of industries, which provide fewer services; new EV demand promotes growth (Vrontisi et al., 2019)	Increase in the local output, yet there are chances of replacement of the internal combustion engine (ICE) industries (Oyedotun et al., 2017).
Energy	Less reliance on oil imports and enhancement of grid connectivity with renewable energy (Americo et al., 2024; Literature Review, n.d.)	The persistence of its vulnerability caused by energy imports and poor charging infrastructure (Sathyan et al., 2024; Tsoekeo and Boutueil, 2022)
Labor Market	The creation of employment in the EV production and charging systems and losses in the fossil fuel sectors (e.g., 65,000 jobs in France) (Bouillass, 2021).	The assembly and supply chains have employment opportunities, and challenges are associated with skill gaps (Udendhran et al., 2025).

Electrification of vehicles has both beneficial and adverse impacts on the economy. It will change value chains in the automotive sector, increase energy security in the long term due to integration with renewable energy, and create net employment benefits in the long term despite short-term job displacements (Seth et al., 2023; Shafiei et al., 2019; Vrontisi et al., 2019).

Discussion

Interpretation of Findings

The results highlight a contrasting trend in EV adoption, as developed economies such as China, Europe, the US, and Norway attained a very high rate of market penetration, up to 18% of all new cars in the world in 2023, dominated by BEVs, owing to strong policies, developed grids, and high purchasing power(Bhardwaj et al., 2025; Hossain et al Conversely, developing countries like India are behind because of the lack of infrastructure, affordability, and dependency on importing batteries(Bhardwaj et al., 2025; Hossain et al., 2024; Ka et al., 2026; Purwanto and Irawan, 2023; Sathyan et al., 2024; Tsoekeo and Bout The economic effects show net positivity or neutrality on the developed settings due to the creation of $1.5 trillion of values, the decrease in oil imports, and grid synergies, but counterbalanced by the automotive restructuring and the decreased service inputs to EVs(Americo et al., 2024; Martins et al., 2024; Oyedotun et al., 2017 High initial expenses and financial demands are increased vulnerabilities to emerging economies, though they have growth prospects through local production(Americo et al., 2024; Oyedotun et al., 2017; Shafiei et al., 2018; Taamneh and Makahleh, 2025; Udendhran et al., 2025). Sectoral analysis points to changes in labor (manufacturing/charging gains vs. fossil fuel losses, e.g., 65,000 French jobs at risk by 2030(Bouillass, 2021; Udendhran et al., 2025)) and energy security benefits and changes in the value chain of automotive (Literature Review .Pdf, n.d.; Seth et al., 2023; Shafiei et al., 2019; Vrontisi et al., 2019). Altogether, the comparison of data reveals the existing equity gaps, as developed regions continue to grow, and emerging ones face the risk of inequitable transition without specific approaches(Dall-Orsoletta et al., 2022; Javadnejad et al., 2023; Martins et al., 2024; Onat and Kucukvar, 2022; Purwanto and Irawan,

Comparison with Previous Studies

These findings are consistent with the previous studies that show a moderate long-run GDP/employment neutrality or benefits of EV demand, mitigated by specific EV value chains that need fewer services than ICE vehicles (Seth et al., 2023; Shafiei et al., 2019; Vrontisi et al., 2019). Research such as Vrontisi et al. focus on sectoral differences in new markets because of production changes(Vrontisi et al., 2019), which reflects previous restructurings in the automotive sector and employment forecasts in France(Bouillass, 2021). The sustainability of fiscal incentives in high-GDP countries(Javadnejad et al., 2023; Martins et al., 2024) confirms the policy evaluations by Martins et al. on the EU level(Martins et al., 2023), and weaker impacts in low-income regions reflect sustainability issues(Béresné and Maklakari, 20 According to Ka et al., policy/infrastructure structural discrepancies between developed and developing countries(Ka et al., 2026) are literature gaps in emerging contexts, and Shamsuddoha cites demand-side obstacles such as awareness(Shamsuddoha and Nasir, 2025). Not only does global surge confirm the transformative potential of renewables in combination with macro impacts (Shafiei et al., 2019), but Iceland's negligible macro impacts also confirm, unlike other Asian countries, that India faces cost/infra challenges that are specific to India(Sathyan et al., 2024).

Role of Policy and Infrastructure

Subsidies, tax incentives, multi-period incentives are important policies that accelerate the registration of BEVs and are more effective in high-GDP regions through cost-cutting and alleviating range anxiety(Javadnejad et al., 2023; E. C. S. Martins et al., 2024; H. R. Martins et al., 2023; Rygh The examples of Europe/US models are successful, but new markets require tailored fiscal instruments in the conditions of budgetary limitations(Béresné and Maklakari, 2023; Ka et al., 2026; Taamneh and Makahleh, 2025). Infrastructure, such as charging networks, grid upgrades and integration of renewables are essential; lack of them increases emerging lags(Ka et al., 2026; Sathyan et al., 2024; Shamsuddoha and Nasir, 2025; Tsoekeo and Boutueil, 2022), and V2G/smart charging increases stability(Sarda et Individualized strategies, partnerships between the government and the private sector, and decentralized networks are critical to the fair uptake(Ka et al., 2026; Zaino et al., 2024).

Economic Opportunities vs. Challenges

The opportunities are huge: EV transitions stimulate the creation of 1.5T of value, local assembly, oil imports decrease, and renewable synergies, which promote the net creation of labor in the long term(Americo et al., 2024; Martins et al., 2024; Oyedotun et al., 2017; Seth et al., 2023; Shafiei Production localization benefits the emerging economies(Ka et al., 2026; Oyedotun et al., 2017). Among these are the initial costs which strain the low-income budgets(Béresné and Maklári, 2023; Purwanto and Irawan, 2023; Sathyan et al., 2024; Taam Restructurings are negotiated through subsidies in developed regions(Martins et al., 2024), but universal policies are prone to cause inequity unless region-specific LCAs/benchmarks(Onat & Kucukvar, 2022; Purwanto and Irawan, 2023; Seth et al., 2023). The net effects are positive in the long-term (Seth et al., 2023; Shafiei et al., 2019; Vrontisi et al., 2019), depending on gap-bridging policies.

Policy Implications

Government Incentives and Subsidies

There should be specific subsidies, tax credits and multi-period incentives by governments to reduce the initial cost of EVs especially in the emerging economies with limited fiscal capabilities. The countries with a high GDP can afford strong programs and the low-income areas require tailor-made fiscal instruments to improve affordability and overcome range anxiety.

Infrastructure Development

Consider the development of charging networks, grid upgrades, and decentralized stations by the partnership of companies with the government. The inclusion of vehicle-to-grid (V2G) and smart charging will improve the stability to meet the shortfalls that complicate uptake in the emerging markets.

Skill Development and Employment Transition

Invest in a workforce training on EV assembly, battery production, and charging maintenance to compensate fossil fuel losses of jobs. The mismatch of skills can be addressed by regional specific programs, which will generate net employment in the manufacturing and renewable sectors.

Energy Policy Alignment

Integrate renewable ambitions and energy security aims with EV strategies, decreasing oil imports and increasing local production. Individualized policies guarantee fair transitions, with a reduction of vulnerabilities in new settings.

Recommendations

Strategies for Emerging Economies

To deal with high initial costs and dependence on imports, emerging economies should focus on affordable EVs by providing incentives to local manufacturers and gradual subsidies. Individual fiscal instruments, such as progressive tax rebates, can make it more affordable and range anxiety can be met through decentralized charging.

Strengthening EV Ecosystem

Establish strong ecosystems through investing in local battery manufacture, training of employees on EV maintenance and integrated supply chain. This will minimize vulnerabilities and generate employment in assembly and renewables and innovations that are specific to local requirements.

Public-Private Partnerships

Use public-private cooperation to ensure infrastructure rollout (grid upgrades and smart charging networks) is quick. Collaborative funding is faster, risk-sharing, and equitable access in underserved regions.

Long-term Sustainability Measures

Enact EV lifecycle assessment, encourage recycling and streamline policies with renewable energy objectives. This will be long-term economic and job transfers, and environmental benefits with continuous monitoring and adaptive regulations.

Conclusion

Summary of key findings

This research demonstrates that the adoption of electric vehicles provides small long-term macroeconomic neutrality or increases in GDP and employment, and this is affected by the unique EV value chains that require less services than internal combustion engine cars do. Subsidies and tax credits are effective policies to increase the registration of battery electric vehicles, especially in high-GDP countries, but the lack of infrastructure is a drag on the development of emerging markets. The benefits such as the creation of employment in the local assembly and the decrease in oil imports are accompanied by a number of difficulties such as high initial investments, skills gaps, and the displacement of jobs in the traditional automotive industries.

Economic significance of EV adoption

The economic potential of EV transitions is significant, with the creation of localization in manufacturing, synergies of renewable energy and reduction in fossil fuel reliance potentially bringing forth a value worth 1.5 trillion. Although the first shocks can cause the loss of jobs, including the planned losses in existing auto manufacturing centers, the net employment increases will be observed in the long term in the production of EVs, battery manufacturing, and the supply chain. At the local level, affordable gaps can be addressed by tailored fiscal incentives and public-private collaboration to promote inclusive development and energy security in low-income communities.

Future scope of research

It is suggested that future research is needed to bridge the gaps in the emerging market scenario like comparative lifecycle appraisal of different economies and the effects of policies on the local supply chains. Studies of scalable decentralized charging, reskilling programs in the workforce and connecting to renewable grids will be significant. The longitudinal study of net socioeconomic outcomes after transition with equity-based standards would inform greater adaptive and region-specific solutions to the sustainable EV ecosystems.

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