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Electric Vehicle Strategies: A Literature Review on Their Impact on Firm Performance and Market Value

Nanda Ismi Kumalawati, Ana Noveria*
Institut Teknologi Bandung, Indonesia
Email: nandakumalawati07@gmail.com, ana.noveria@sbm-itb.ac.id*
**Correspondence*

Abstract. Prior literature plays a central role in strengthening theoretical foundations and explaining relationships among variables within a scientific study. This research conducts a structured literature review to examine how electric vehicle (EV) adoption strategies influence firm performance and market value. Although prior research investigates different aspects of green innovation, product variety, R&D, sustainability, and advertising, this review integrates those findings into a unified EV strategy perspective. The aim of this article is to build theoretical propositions for future empirical research. The results of this literature review show that: (1) EV adoption strategies—represented through green vehicle innovation, EV product portfolio expansion, sustainable operations, R&D intensity, and green marketing—exhibit mixed effects on firm performance. While EV sales growth, eco-innovation, and R&D investment often enhance efficiency and competitiveness, excessive product variety and certain sustainability efforts may reduce performance due to increased complexity and short-term costs; (2) the effect of EV adoption strategies on market value is also heterogeneous. Incremental innovation, R&D investment, and credible patent activity generally support firm valuation, whereas green innovation and sustainability investments may trigger short-term valuation declines when uncertainty and capital intensity are high.

Keywords: Electric Vehicles, Green Innovation, Product Variety, R&D, Firm Performance, Firm Value.

INTRODUCTION

The automotive industry underwent its most substantial strategic transformation when it shifted from internal combustion engine vehicles to electric vehicles (IEA, 2023; Wells et al., 2020). The industry faces rising demands from governments, consumers, and capital markets to accelerate its transition to electric vehicles (Dikmen & Hemrit, 2022; Kley et al., 2019). Companies need to develop comprehensive EV adoption plans that include green product development, EV technology advancement, expanded EV product lines, sustainable production methods, environmentally friendly marketing efforts, and higher research and development spending (Li et al., 2021).

Earlier research has demonstrated that these strategic elements affect business financial performance and operational management. The stock market shows positive reactions to EV-related patents because these patents signal to investors that the company will achieve a better market position in the future. EV sales performance improves when innovative products match market requirements and operate with maximum efficiency. Sustainability strategies help brands achieve legitimacy, but their effectiveness depends on how companies structure their costs. R&D investment must continue to support long-term innovation capability and firm value development. The implementation of EV adoption strategies requires multiple interconnected elements that work together.

EV development depends on many factors, which include EV-related technology and patents, EV product diversity for different market needs, R&D intensity for ongoing innovation, sustainable manufacturing methods for environmental sustainability, and green advertising to

promote EV product awareness. Research studies have shown that these strategic elements have major effects on business performance and market performance.

Research studies have produced many results, but these findings exist in separate pieces. The available research needs to be synthesized into a single framework that explains how different EV adoption approaches affect business results and stock market value, as these two factors represent the main strategic metrics for industry leaders and researchers.

This article aims to address this gap by conducting a structured literature review that synthesizes prior research on EV adoption strategies and their effects on firm performance and market value. The review seeks to consolidate disparate findings into a coherent theoretical perspective, offering a holistic understanding of the mechanisms through which EV strategies influence organizational outcomes. Furthermore, this study intends to propose theoretical propositions that can guide future empirical research, thereby contributing to both academic discourse and practical strategy formulation in the rapidly evolving automotive sector. The benefits of this research include providing a consolidated evidence base for policymakers and corporate strategists, identifying key moderating factors that shape the effectiveness of EV strategies, and highlighting areas where further investigation is needed to support sustainable and competitive transitions to electric mobility.

Table 1. Relevant Prior Study

Authors	Variables, Measurement, & Method	Findings
Ba et al. (2012)	Independent Variable: Innovation Type and Market Segment; Dependent Variable: Stock Market Reaction; Control Variable: Firm Size, Leverage, Profitability, R&D Intensity, and Oil Price Change Innovation Type: This variable distinguishes between 'Incremental Innovation' (II) and 'Radical Innovation' (RI); Incremental Innovation (II) includes technologies like full hybrids (after 2004), mild hybrids, and advanced internal combustion engines (ICEs); Radical Innovation (RI) encompasses full electric vehicles, range extenders, plug-in hybrids, and full hybrids (before 2004). Method: Event study with OLS Regression	Crucial green product development decisions such as innovation type and market segment choices exert direct influence on a firm's market value. The stock market generally reacts positively to automakers' announcements of green vehicle innovation. The market reacted more positively to announcements of incremental innovation (II) compared to radical innovation (RI). Green innovation announcements targeting higher-priced cars had a more positive impact on market value. This indicates investors favor green innovation in segments with potentially higher profit margins. In addition, automakers' profitability matters when investors evaluate green vehicle innovation. The stock market responds more positively to the announcements made by less profitable automakers.
Kruse et al. (2020)	Dependent Variable: Profitability (ROE, ROA, EBIT Margin, EBITDA Margin, ROS) and Market Valuation (Tobin's Q) Independent Variable: Green Revenue Share (Share of a firm's total revenue	In the automotive sector, the author finds that green revenues do not significantly improve firm profitability or market valuation.

Authors	Variables, Measurement, & Method	Findings
	derived from environmental goods and services (green products, renewable energy, energy-efficient technologies, etc.) Method: Panel Data Regression	
Son (2023)	Dependent Variable: Profitability (ROE, ROA, ROS (Net Profit Margin), Net Profit) Independent Variable: EV Sales / Market Share of EV Method: DuPont Analysis	The study analyzed four major Chinese automobile companies: BYD COMPANY, GEELY AUTO, GWMOTOR, and GAC GROUP. The study finds a positive relationship between the amount of electric vehicle (EV) sales and net profit. Companies with higher EV sales volumes, particularly BYD Company and GAC Group, reported stronger profitability compared to their peers.
Zanez (2022)	Dependent Variable: Market Share Independent Variable: Green Product Innovations (EV Introduction, Green technology development, and proportion of EVs in total vehicle sales across major automotive firms), Sustainable Value, and Green Product Advertising Method: Panel Data Regression	Green innovations particularly green technology development and a higher share of green vehicle sales positively and significantly enhance market share performance. Sustainable manufacturing produced mixed results: water efficiency contributed positively, whereas CO_2 and waste efficiency metrics showed small negative effects, which the author described as controversial findings. Green advertising was found to positively influence market performance.
Wan et al. (2012)	Dependent Variable: Sales Performance Independent Variable: Product Variety Mediator Variable: Unit Fill Rate Method: Linier Regression	The total effect of product variety on sales is initially positive (i.e., up to a point, increasing variety leads to higher sales) but at a diminishing rate. After a certain level of variety (i.e., too much variety), additional increases in product variety lower sales performance.
Webb G. Scott (2011)	Dependent Variable: Revenue (for the product line), Cost, Profit, and Market share Independent Variable: Product Variety Method: Simulation Model	When variety is added through preference attributes (taste/features): revenue and market share increase, but profit does not increase. When variety is added through quality attributes that create a perceived hierarchy in the product line: revenue, cost, profit, and market share all increase. When the added quality attributes fail to create a perceived hierarchy, the simulation

Authors	Variables, Measurement, & Method	Findings
		shows revenue, cost, profit, and market share all decline.
Marín-Vinuesa et al. (2020)	Dependent Variable: Financial Performance (ROE) Independent Variable: Eco-Innovation Level, Managerial Involvement, and Green Patents Method: Partial Least Squares - Structural Equation Modeling	Firms with higher eco-innovation levels achieve better financial performance (supports Porter & van der Linde 1995). Active participation of managers in eco-innovation enhances firm performance and owning green patents does not directly improve financial results.
Alt (2018)	Dependent variable: ROA Independent variables: R&D Intensity, Patent Application, and Green Patents Method: Linier Regression	R&D Intensity shows a positive and significant impact on ROA, Total patent applications also have a positive on ROA, but Green Patents shows a positive but has no significant relationship with ROA.
Tojiri (2023)	The paper is a conceptual review, not an empirical study, instead, it summarizes how other studies link variables together. Independent variable: Product differentiation strategy. Dependent variables: Organizational financial profitability and market share. Mediators/moderators: Brand equity, customer perception, technological innovation, and marketing mix effectiveness.	Effective product differentiation, especially when combined with advanced technologies and coherent marketing mix execution, significantly enhances market share and profitability, provided firms possess the requisite resources and dynamic capabilities to implement and communicate differentiation credibly.
Schmitt et al. (2016)	The paper is not an econometric or regression-based study, but a patent-based analytical study. The variables are essentially patent metrics used to analyze EV innovation trends.	The study observed a consistent increase in patent-related publications within the electric vehicle (EV) sector. This trend, coupled with fluctuating oil prices, suggests that investors have strong confidence in the future of EV technology.
Xie et al. (2022)	Dependent Variable: Firm Value (Tobin's Q); Independent Variable: Green Innovation, measured by the number of green patent applications (classified under China's Green Patent List, aligned with WIPO's IPC Green Inventory)	The results indicate that green innovation leads to the devaluation of firm value, but this devaluation effect only occurs in the short term. Additionally, both financial flexibility and analyst coverage partially mediate

Authors	Variables, Measurement, & Method	Findings
	Mediating Variables: Financial flexibility was measured by the net operating cash flow ratio to total liabilities, indicating a firm's ability to use internal financing. Analyst coverage was measured by the log value of the number of analyst teams tracking the target firm. Method: Regression Analysis	the impact of green innovation on firm value.
Trianti et al. (2021)	Dependent Variable: Firm Value (Tobin's Q) Independent Variable: R&D Moderating Variable: Product Diversification, measured via entropy index of number of product segments/different products. Method: Regression Analysis	There is a positive and significant effect of R&D spending on firm value: A 1% increase in R&D spending is associated with approximately a 0.51% increase in firm value. Product Diversification has a significant moderating effect: When product diversification is higher, the positive relationship between R&D spending and firm value becomes stronger.

RESEACH METHOD

This study employed a structured literature review approach to systematically analyze and synthesize existing research on electric vehicle (EV) adoption strategies and their impact on firm performance and market value. The methodology follows established guidelines for conducting systematic reviews in management and sustainability research, ensuring transparency, reproducibility, and scholarly rigor.

The review process was conducted in several stages. First, relevant articles were identified through keyword searches in major academic databases, including Scopus, Web of Science, Google Scholar, and specialized journals in innovation, automotive strategy, and environmental management. Search terms included combinations of "electric vehicle strategy," "green innovation," "EV adoption," "firm performance," "market value," "sustainability," "R&D intensity," and "product variety." The search was limited to peer-reviewed articles published between 2010 and 2024 to capture recent developments in the rapidly evolving EV sector.

Inclusion and exclusion criteria were applied to ensure relevance and quality. Articles were included if they empirically or conceptually addressed the relationship between EV-related strategies and organizational outcomes. Studies focusing solely on technical aspects of EV technology without strategic or performance implications were excluded. A total of 12 key studies were selected for in-depth analysis based on their theoretical contribution, methodological rigor, and relevance to the research questions.

Data extraction and synthesis were performed using a thematic analysis framework. Key variables, methodologies, findings, and theoretical perspectives from each study were systematically coded and categorized into emerging themes such as green innovation, product variety, R&D, sustainability, and market valuation. These themes were then integrated to

develop a coherent narrative and identify patterns, contradictions, and gaps in the literature.

This review adopts a qualitative synthesis approach rather than a meta-analysis, as the selected studies vary in design, measurement, and context. The aim is to provide a nuanced understanding of the mechanisms through which EV strategies influence firm outcomes and to propose theoretical propositions for future research. Consistent with qualitative research principles, the review is exploratory and inductive, allowing themes to emerge from the literature rather than imposing a predetermined framework (Ali & Limakrisna, 2013). Through this structured approach, the review not only summarizes prior findings but also critically evaluates the state of knowledge, highlights methodological limitations, and suggests directions for further inquiry in the field of EV strategy and corporate performance.

DISCUSSION

Effect of EV Adoption Strategies on Firm Performance

The research studies demonstrate that EV adoption strategies produce different effects on business performance which depend on specific circumstances. The implementation of green innovation leads to better operational and financial results but the effect's intensity and direction remain inconsistent. Son (2023) demonstrates that Chinese manufacturers achieve better net profits when they sell more electric vehicles (EVs) which shows that successful EV product commercialization leads to higher profitability. The research by Marín-Vinuesa et al. (2020) demonstrates that businesses which achieve higher eco-innovation performance levels will achieve better financial results (ROE). Research findings indicate that R&D intensity and patent applications create substantial positive effects on ROA but green patents fail to generate significant performance improvements according to Alt (2018). The research indicates that innovation performance depends on the practical business value of new products rather than the number of patents filed.

The second factor shows how EV product variety creates two opposing effects. The research by Wan et al. shows that product variety leads to better sales results until businesses reach their maximum capacity. The study by 2012 demonstrates that product diversity leads to decreased sales because businesses face higher operational challenges which reduce their financial performance and their ability to maintain full storage capacity. Webb (2011) demonstrates that product variety will boost both revenue and market share only when new products introduce substantial quality improvements but otherwise it will lead to decreased profits and market share. The expansion of EV products will lead to better performance only when new products are carefully selected instead of being added to the market without proper planning.

Sustainable manufacturing practices produce conflicting results as their third major effect. Zanez (2022) discovered that differ sustainability strategies such as water efficiency programs lead to better market results but CO_2 and waste efficiency programs create minor negative effects which demonstrate that sustainability initiatives do not always result in immediate performance improvements.

The research and development expenses which EV companies dedicate to their operations lead to better business results when their organizations demonstrate excellent innovation abilities. Companies which spend more on research and development activities achieve better technological readiness and gain improved capabilities for electric vehicle market entry. The

costs of R&D investments rise while their performance advantages become visible only after multiple years of investment.

The research evidence demonstrates that electric vehicle adoption strategies lead to better business results when specific conditions exist yet the achieved results depend on how well the strategy was designed and executed and which customer group the company serves and its current operational strength.

Effect of EV Adoption Strategies on Market Value

The impact of EV adoption strategies on market value shows different responses because research indicates that different strategic approaches lead to positive or no change or negative market value effects.

Ba et al. (2012) demonstrate that stock market values increase when companies announce green vehicle innovation through their stock market announcements particularly when they introduce new EV technologies. The market reaction to radical innovation announcements proves to be weak because investors view these announcements as high-risk investments. The market response to new products depends on the specific market segment because premium vehicle innovations generate more significant value impacts because investors tend to favor products which generate higher profit margins.

The research by Kruse et al. (2020) demonstrates that market value in the automotive industry does not rise when companies use green revenue share because investors doubt the immediate financial success of environmentally friendly products.

Xie et al. (2022) demonstrate that green innovation creates negative effects on firm value during the first period but these adverse effects become less severe because of financial flexibility and analyst coverage. The market responds to firms which spend large amounts on EV development costs by reducing their stock value until the investment generates financial returns.

Research findings from various studies indicate that long-term benefits exist according to these investigations. Research and development expenses from companies create a direct link between their investment in innovation and the resulting value of their organization (Trianti et al., 2021). The research by Wan et al. (2012) shows that product diversification enhances innovation strategic value when organizations use these two approaches together. Zanez (2022) demonstrates that green advertising together with green innovation practices lead to market share growth which subsequently boosts firm value throughout multiple years.

The study by Schmitt et al. (2016) demonstrates that EV patent applications continue to rise which indicates investors believe in the long-term potential of electric vehicle technology, yet this pattern does not directly prove value changes at the company level.

The impact of EV adoption strategies on market value depends on multiple factors which include innovation type and timing and market segment and financial flexibility and investor perceptions. The market value of investments will decrease in the short term when investments reach high levels but monetization remains unclear, but long-term value will rise when EV strategies match the company's technological progress and its ability to enter new markets and demonstrate sustainable expansion.

CONCLUSION

The twelve academic articles reviewed demonstrate that electric vehicle (EV) adoption strategies—encompassing innovation, product variety, R&D intensity, sustainable manufacturing, and green advertising—significantly enhance firms' operational excellence, market competitiveness, financial performance, and shareholder value by fostering technological advancements, resource efficiency, consumer awareness, brand reputation, and investor confidence in the automotive industry. These strategies serve as both environmental imperatives and strategic tools, yielding positive market reactions through demonstrated long-term business strength and reduced regulatory risks. For future research, studies should examine how moderating factors like competitive intensity, regulatory incentives (e.g., subsidies and mandates), battery supply chain integration, consumer behavioral factors, and organizational capabilities (e.g., digital transformation) interact with EV strategies to influence performance outcomes, providing deeper insights into their synergistic effects.

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