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Research Article

A Study On Impact Of Electric 3-Wheeler Aftermarket On Non-Electric 3-Wheeler Aftermarket

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Abstract—this study examines the impact of electric 3-wheeled vehicles aftermarket, on the aftermarket of non-electric 3-wheeled vehicles, which includes vehicles powered by petrol, diesel, CNG, and LPG. As electric vehicles (EVs) gain popularity due to their environmental benefits and government incentives, there is a growing concern about how their increasing presence may affect the traditional non-electric vehicle aftermarket. The analysis explores several key factors, including changes in demand for spare parts, maintenance services, and ancillary products in the aftermarket. It also investigates potential shifts in the supply chain, profitability and business models of aftermarket service providers. This study aims to explore and analyse the potential consequences of the growing electric 3-wheeler market on the established non-electric 3-wheeler vehicle aftermarket. Understanding these impacts is essential for stakeholders, including manufacturers, service providers, consumers, and policymakers, as they navigate the evolving automotive landscape and make informed decisions. The practical study and analysis is also done for the stake holders.

Keywords— #last mile mobility, #automotive aftermarket, #three wheeler aftermarket, #e-mobility aftermarket, #evolution, #impact, #commercial vehicles, #spare-parts

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I. INTRODUCTION

The 3w falls under commercial vehicle category and is generally classified as passenger and goods. A 3w vehicle can also be classified based on fuel types such as diesel, petrol, CNG, LPG or electric etc. Further these can also be classified as electric and non-electric. Non-electric three wheelers run on petrol, diesel, LPG or CGN. In recent years, the automotive industry has witnessed a significant shift towards sustainable and environmentally friendly technologies, driven by the growing concerns over climate change and rising fuel costs. One prominent development in this landscape is the increasing adoption of electric vehicles (EVs), including 3-wheeler electric vehicles, which offer a

cleaner and more efficient alternative to traditional internal combustion engine (ICE) counterparts.

While the transition to electric 3-w vehicles holds promises of reduced emissions and lower operational costs, it also raises questions about its impact on the aftermarket of non-electric 3-w vehicles, encompassing those powered by petrol, diesel, compressed natural gas (CNG), and liquefied petroleum gas (LPG). The aftermarket plays a crucial role in the automotive ecosystem, comprising a vast array of businesses and services that support vehicle maintenance, repairs, and the supply of spare parts.

The introduction of electric 3-w vehicles into the market has the potential to disrupt the traditional demand and supply dynamics within the aftermarket.

As EVs have fewer moving parts and require less frequent maintenance compared to their ICE counterparts, the demand for certain types of spare parts and maintenance services may experience a shift. This, in turn, could affect the revenue streams of traditional aftermarket businesses that primarily cater to non-electric vehicles.

Additionally, the emergence of electric 3-w vehicles may lead to new players entering the aftermarket, specializing in EV-specific components and services. This could create both challenges and opportunities for existing non-electric vehicle aftermarket participants, as they may need to adapt their business models to accommodate the changing market demands.

Furthermore, as the EV market expands, economies of scale and advancements in battery technology may drive down the overall cost of electric 3-wheelers, potentially influencing consumer preferences and purchasing decisions. If electric 3-wheelers become more affordable and widespread, this could impact the sales of non-electric 3-wheelers, further shaping the dynamics of the aftermarket.

II. DEFINITIONS

- **Three wheeler / 3 wheeler / 3W** – The Vehicles which has three wheels. Generally people call as auto or auto-rickshaw, unless otherwise mentioned these are three wheelers those run on petrol, diesel, CNG

- **Electric three wheeler / e-3W** – The auto which runs on battery; this does not require petrol, diesel, CNG etc

- **Aftermarket** – Once the vehicle is sold and has completed manufacturers' warranty, this is taken care by the aftermarket consisting of spare parts dealers, suppliers, mechanics, painters, denters etc. The market for parts, accessories, and services that are sold after the original sale of a product. In the automotive industry, the aftermarket includes products and services such as replacement parts, customization options, and maintenance and repair services for vehicles.

- **Impact:** The effect or influence that one thing has on another. Here, impact can refer to the consequences of an action,

- **Non-electric vehicle:** A vehicle that does not rely on electricity as its primary source of power. Non-electric vehicles typically use internal combustion engines fuelled by gasoline, diesel, or other traditional fuels.

- **Mobility:** The ability to move or be moved freely and easily. In the context of transportation, mobility refers to the ease with which people and goods can move from one place to another using various modes of transportation.

- **Evolution:** The gradual development or change of something over time, often involving a process of adaptation and improvement. In biology, evolution refers to the process by which species of organisms change over successive generations through genetic variation and natural selection.

- **E-mobility:** Short for "electric mobility," e-mobility refers to the use of electric vehicles (EVs) and other forms of electric transportation, including electric bicycles, scooters, and public transit, as a means of

reducing reliance on fossil fuels and lowering greenhouse gas emissions.

- **Last mile mobility:** The movement of people and goods from transportation hubs (such as train stations or bus stops) to their final destinations, typically covering short distances. Last mile mobility solutions aim to address the challenges associated with this final segment of a journey, often incorporating alternative modes of transportation such as bicycles, scooters, or walking.

- **Mobility aftermarket:** The market segment that focuses on aftermarket products and services specifically related to transportation and mobility. This includes components, accessories, and services designed to enhance or customize vehicles, as well as maintenance and repair services for both traditional and electric vehicles.

III.OBJECTIVES

- **Market Analysis:** Evaluate the current market size and trends of both electric and non-electric 3-wheeler aftermarket segments. Identify key players, market dynamics, growth drivers, and challenges.

- **Consumer Behaviour:** Understand the preferences, buying patterns, and satisfaction levels of consumers in both aftermarket segments. Determine factors influencing the adoption of electric aftermarket products/services compared to non-electric counterparts.

- **Technological Comparison:** Compare the technological advancements, innovations, and product offerings in electric and non-electric 3-wheeler aftermarket. Assess the performance, durability, and reliability of aftermarket components for both types of vehicles.

- **Economic Impact:** Analyse the economic implications of the shift towards electric aftermarket products/services on the non-electric aftermarket industry. Assess changes in pricing, revenue streams, profitability, and employment within each segment.

- **Regulatory Environment:** Examine regulatory frameworks, incentives, and policies influencing the development and adoption of electric and non-electric aftermarket products/services. Identify potential barriers or opportunities for market growth.

- **Environmental Impact:** Evaluate the environmental benefits and sustainability aspects of electric aftermarket products/services compared to their non-electric counterparts. Assess factors such as carbon emissions, energy efficiency, and resource utilization.

- **Supply Chain Analysis:** Investigate the supply chain dynamics, sourcing strategies, and distribution channels for electric and non-electric aftermarket components. Identify opportunities for optimization and collaboration across the supply chain.

- **Business Strategies:** Explore strategic responses and adaptation measures employed by aftermarket businesses in response to the emergence of electric 3-wheeler aftermarket. Identify successful business models, partnerships, and competitive strategies.

- **Customer Satisfaction and Loyalty:** Assess customer satisfaction levels, brand loyalty, and

repurchase intentions in both electric and non-electric 3-wheeler aftermarket segments. Identify factors influencing customer loyalty and retention.

• **Future Outlook:** Provide insights into the future trajectory of electric and non-electric 3-wheeler aftermarket industries, including growth projections, technological advancements, and emerging market opportunities. Offer recommendations for stakeholders to navigate and capitalize on market changes effectively.

IV. LITERATURE REVIEW

A. THE 3W AFTERMARKET OVERVIEW

(a) Global scenario:

Three-wheeler mobility depends on the manoeuvrability, affordability, and door-to-door transport. As many developing countries specially in Asia-Pacific and LAMEA require faster and significantly cheaper option for public and goods transport, three-wheeler suites the requirement best.

As per MRFR analysis, the Three Wheeler Market Size was estimated at 20.49 (USD Billion) in 2022. The Three Wheeler Market Industry is expected to grow from 22.23 (USD Billion) in 2023 to 46.23 (USD Billion) by 2032. The Three Wheeler Market CAGR (growth rate) is expected to be around 8.48% during the forecast period(2024-2032).

Source:

<https://www.marketresearchfuture.com/reports/three-wheeler-market-22821>

The aftermarket for 3-w vehicles has been significant on a global scale. 3-wheelers are widely used in many countries for various purposes, such as passenger transport, cargo delivery and last-mile connectivity. The aftermarket for these vehicles encompasses a wide range of products and services, including spare parts, maintenance and repair services, accessories, and customization options.

In the global context, the aftermarket for 3-wheelers has been influenced by several factors:

Growing Demand: The increasing demand for affordable and efficient transportation solutions, especially in densely populated urban areas and developing countries, has driven the sales of 3-wheelers. As the 3-wheeler fleet expands, the aftermarket has also grown to cater to the servicing and maintenance needs of these vehicles.

Technological Advancements: Advancements in automotive technology, such as improvements in engine efficiency, electronics, and safety features, have impacted the aftermarket. Newer components and technologies have been integrated into 3-wheelers, creating a demand for updated spare parts and specialized services.

Regulatory Changes: Evolving emission norms and safety regulations have played a role in shaping the aftermarket. Compliance with emission standards and safety requirements has led to the development of aftermarket solutions that meet these criteria.

Entry of New Players: The 3-wheeler aftermarket has witnessed the entry of new players offering innovative solutions, including online marketplaces for spare parts and services. This has increased competition and provided consumers with more options.

(b) Indian scenario:

As per TechSci Research, India Three-Wheeler Market was valued at USD 3.99 Billion in 2024 and is expected to reach USD 6.72 Billion by 2030 with a CAGR of 9.16% during the forecast period. India three-wheeler market is experiencing substantial growth, driven by expanding urbanization, rising demand for efficient public transportation, and the increased focus on sustainable mobility solutions. Source: <https://www.techsciresearch.com/report/india-three-wheeler-market/3038.html>

Among electric vehicles, the growth of electric three-wheelers is second only to electric two-wheelers. This expansion is largely driven by insufficient transportation infrastructure in smaller cities and the high reliance on three-wheeler auto-rickshaws for mobility, further compounded by fluctuating fuel prices.

In India, three-wheelers play a vital role in the transportation landscape, particularly in urban and semi-urban areas. Widely known as auto-rickshaws, they serve as an affordable and convenient means of public transport for short-distance travel.

The electric three-wheeler segment in India boasts a significant number of manufacturers. There are 242 OEMs producing cargo-focused models and 377 OEMs catering to the passenger segment. Most manufacturers focus on low-speed L3 models, while a smaller number produce high-speed L5 models.

Some of the leading electric 3W manufacturers in India are:

L5 -models – e-auto	L3 models- e-rickshaw
Piaggio	Elle
Mahindra	Mayuri
Altigreen	Captain
Omega	Singham
Kinetic	Godavari
Atul	Lohia
Greaves	Greaves

B. CHARACTERISTICS OF E-3 WHEELER AFTERMARKET

The Indian aftermarket for 3-wheeler vehicles has some unique characteristics:

Large Fleet Size: India has one of the largest fleets of 3-wheelers in the world. They are widely used for public transportation and are an essential part of the mobility ecosystem in cities and towns.

Unorganized Market: The 3-wheeler aftermarket in India is predominantly unorganized, with numerous small-scale repair shops and spare parts retailers serving the demand. While this has allowed for a cost-effective solution for consumers, it also poses challenges in terms of quality and standardization.

Preference for Low-cost Solutions: The price-sensitive nature of the market often leads consumers to prefer cost-effective aftermarket solutions. This has given rise to the availability of spurious and counterfeit spare parts, leading to concerns about safety and reliability.

Shift towards Electric: In recent years, there has been a gradual shift towards electric 3-wheelers in India. Government initiatives and incentives to promote electric mobility have encouraged the adoption of electric rickshaws and other electric 3-wheelers. This has also influenced the aftermarket, creating a demand for EV-specific spare parts and services.

C. KEY DRIVERS TO E-3W AFTERMARKET

The electric three-wheeler aftermarket is influenced by several key drivers, which are instrumental in shaping its growth and development. These drivers include:

Government Policies and Incentives: Supportive government policies, incentives, and subsidies play a vital role in driving the adoption of electric three-wheelers. Measures such as financial incentives, reduced taxes, and favourable regulations for electric vehicles can encourage consumers and fleet operators to choose electric three-wheelers, consequently boosting the demand for aftermarket products and services.

Environmental Concerns and Emission Regulations: Growing awareness of environmental issues and increasing concerns about air pollution have driven the demand for cleaner and more sustainable transportation solutions. As electric three-wheelers produce zero tailpipe emissions, they align with emission reduction targets set by governments and regulatory bodies, leading to greater market acceptance and a positive impact on the aftermarket.

Advancements in Battery Technology: Improvements in battery technology, including higher energy densities and longer-range capabilities, have enhanced the performance and attractiveness of electric three-wheelers. As battery technology continues to evolve, it is likely to lead to better-performing electric three-wheelers, which will drive increased aftermarket demand for newer and more efficient battery systems and components.

Rising Fuel Prices: Electric three-wheelers offer the advantage of reduced operational costs compared to their non-electric counterparts, particularly when considering the rising prices of conventional fuels. The potential cost savings in terms of fuel expenses drive the adoption of electric three-wheelers, thus creating a demand for aftermarket services and components.

Infrastructure Development: The establishment and expansion of charging infrastructure are critical to the wider adoption of electric three-wheelers. As charging stations become more accessible and prevalent, range anxiety reduces, and consumers are more inclined to

embrace electric mobility, thereby stimulating the electric three-wheeler aftermarket.

Technological Advancements: Ongoing advancements in electric vehicle technology, such as regenerative braking, vehicle-to-grid integration, and connected features, contribute to improved performance, safety, and convenience of electric three-wheelers. These technological enhancements create a demand for specialized aftermarket services and upgrades.

Urbanization and Last-Mile Connectivity: In rapidly urbanizing regions, electric three-wheelers play a crucial role in providing efficient last-mile connectivity solutions. The need for sustainable transportation options in crowded urban areas drives the demand for electric three-wheelers and, in turn, boosts the aftermarket for related products and services.

Competitive Pricing: As electric three-wheelers become more competitive in terms of pricing and total cost of ownership, they become a viable alternative to non-electric three-wheelers. The affordability factor drives market penetration, resulting in a larger customer base and increased aftermarket demand.

Public Awareness and Perception: Growing awareness and positive public perception of electric vehicles contribute to consumer confidence in adopting electric three-wheelers. Favourable perceptions lead to increased sales, thereby influencing the aftermarket growth as more electric three-wheelers enter the market.

These key drivers collectively shape the electric three-wheeler aftermarket, creating opportunities for businesses involved in the supply of spare parts, maintenance services, battery technologies, and other related aftermarket offerings. The successful navigation of these drivers can be crucial for aftermarket players to thrive in the evolving electric mobility landscape.

D. EVOLUTION OF E-3W AFTERMARKET

The following are key aspects that highlight the evolution of the electric three-wheeler aftermarket in India:

Emergence of Electric Three-Wheeler Models: With the government's focus on promoting electric mobility, several manufacturers have introduced electric three-wheeler models into the Indian market. These electric rickshaws and cargo carriers offer an eco-friendly and cost-effective alternative to traditional ICE-powered three-wheelers.

Charging Infrastructure Development: As the demand for electric three-wheelers increased, there was a parallel development in charging infrastructure. Charging stations and swapping stations have been established in cities and towns to support the charging needs of electric three-wheeler operators, enhancing the convenience and practicality of electric vehicles.

Expansion of Spare Parts and Service Networks: To cater to the growing number of electric three-wheelers on the roads, manufacturers and third-party suppliers have expanded their spare parts and service networks. This includes authorized service centres and aftermarket shops specializing in electric vehicle components and repairs.

Adaptation of Repair and Maintenance Services:

Electric three-wheelers have different components and systems compared to their ICE counterparts. As a result, mechanics and service providers have had to upskill and adapt their knowledge to handle electric vehicle repairs and maintenance.

Incentives and Subsidies: The Indian government has introduced various incentives and subsidies to promote the adoption of electric three-wheelers. These include financial incentives for purchasing electric vehicles, tax benefits, and reduced registration fees, all of which have encouraged more operators to switch to electric three-wheelers and thereby contributed to the growth of the aftermarket.

Standardization and Safety: As the electric three-wheeler market matures, there has been a growing focus on standardization and safety. Industry stakeholders, including manufacturers, aftermarket suppliers, and policymakers, are working towards establishing guidelines and regulations to ensure the quality and safety of electric three-wheeler components and services.

E. IMPACT OF E-3 WHEELER AFTERMARKET

The increasing presence of electric three-wheeler vehicles in the market can have various impacts on the aftermarket for non-electric three-wheelers (those powered by petrol, diesel, CNG, and LPG). Some of the key impacts are as follows:

Shift in Demand for Spare Parts: As electric three-wheelers have fewer moving parts and require less frequent maintenance compared to their non-electric counterparts, the demand for certain types of spare parts in the non-electric three-wheeler aftermarket may decrease. Components like engine-related parts, fuel system components, and exhaust-related parts may experience reduced demand.

Reduced Demand for Maintenance and Repair Services: With the advent of electric three-wheelers, the requirement for traditional maintenance and repair services in the non-electric three-wheeler aftermarket could decline. Electric vehicles typically have simpler drivetrains and fewer fluids to manage, leading to lower maintenance needs, thus impacting the revenue streams of traditional repair and service businesses.

Competition from Electric Vehicle Specialists: As electric three-wheelers become more prevalent, specialized aftermarket service providers catering specifically to electric vehicles may emerge. These specialists may capture a portion of the non-electric three-wheeler aftermarket, offering services and spare parts specific to electric vehicles.

Impact on Ancillary Businesses: The non-electric three-wheeler aftermarket includes various ancillary businesses, such as auto parts retailers and mechanics. The shift towards electric three-wheelers could affect their businesses, potentially leading to the need for diversification or adaptation to cater to the evolving market demands.

Transition of Existing Businesses: Existing businesses in the non-electric three-wheeler aftermarket may need to adapt their operations to accommodate electric vehicles. This might involve upskilling their

workforce, incorporating electric vehicle servicing into their offerings, and sourcing electric vehicle spare parts.

Pricing and Profitability: The emergence of electric three-wheelers and their aftermarket could influence the pricing and profitability of non-electric three-wheeler products and services. Increased competition and shifting consumer preferences might impact the pricing strategies of non-electric three-wheeler aftermarket participants.

Demand for Conversion Services: Some owners of non-electric three-wheelers may explore the option of converting their vehicles to electric power. This could give rise to aftermarket businesses specializing in conversion services, thereby affecting the dynamics of the non-electric three-wheeler aftermarket.

Government Policies and Incentives: Government policies promoting electric mobility, such as subsidies for electric vehicles and charging infrastructure development, can accelerate the adoption of electric three-wheelers. This, in turn, may influence the demand for non-electric three-wheelers and their aftermarket.

It is important to note that the extent of these impacts will depend on various factors, including the rate of adoption of electric three-wheelers, the availability of charging infrastructure, consumer preferences, and regulatory support for electric mobility. The non-electric three-wheeler aftermarket participants will need to closely monitor these developments and strategize accordingly to navigate the changing automotive landscape.

According to a CRISIL ratings analysis of 220 manufacturers, representing one-third of the automotive components market, the transition to electric vehicles (EVs) presents both opportunities and challenges for domestic component makers.

In FY22, the penetration of components in electric three-wheelers stood at approximately 5.5%. By FY27, CRISIL projects this penetration to rise significantly, reaching an estimated 31-35%.

By FY28, EV batteries are expected to contribute 60-65% of total EV component revenue, while drivetrains and electronics are each anticipated to account for 10-15%. Other components will make up the remaining 5-10%. This shift creates a significant opportunity for component manufacturers to expand and diversify their revenue streams beyond the internal combustion engine (ICE) vehicle market.

The revenue landscape is expanding beyond components for internal combustion engine (ICE) vehicles. By FY28, the EV component market is projected to reach ₹72,500 crore, with two-wheelers making up 64% of this market, followed by passenger vehicles at 28%, and the remainder consisting of commercial vehicles, including three-wheelers.

Suppliers specializing in engine and powertrain components may face challenges due to the shift to EV technology. Parts such as alternators, fuel injection systems, radiators, gearboxes, clutches, pistons, liners, engine blocks, and exhaust systems are at risk of reduced demand as EVs do not require these components.

Nearly half of component manufacturers are diversified across multiple segments, which helps mitigate risks. Many are actively pivoting to include EV components and non-automotive products in their offerings. Distributors, dealers, and retailers are also adapting by expanding their portfolios to incorporate EV parts, unlocking significant opportunities for business growth. Mechanics are upgrading their skills and acquiring knowledge about EV maintenance, with many EV manufacturers supporting this transition through training programs. Educational institutes are also

introducing specialized courses in EV repairs and maintenance to address the growing demand.

V. RESEARCH METHODOLOGY

The study was undertaken to find out the impact of e 3w aftermarket on non-electric 3w aftermarket. Sample of 25 seasoned dealers from metro cities, those deal in 3w spare parts is selected. A Questionnaire of 17 questions was prepared and sent to these dealers by Google forms. The Steps are tabulated below:

Particulars	Research Methodology
Population	3W-parts dealers
Research design	Descriptive research design
Sampling Unit	Major Cities - Ahmedabad, Mumbai, Pune, Bangalore, Chennai, Kolkata, Delhi
Sampling size	Top 25-Three wheeler parts dealers in India from major metro
Sampling method	Non Random
Data collection method	Personal survey method-Google forms
Data collection instrument	Structured questionnaire

VI.DETAILED FINDINGS: DATA COLLECTION AND ANALYSIS

Out of 25 top 3w parts dealers in India, The 23 dealers, responded on Google form, the questionnaire contained 17 questions, each contributing 4.3% to the total sample. The samples also categorize dealers by years of experience, with 39.1% having over 25 years, indicating a seasoned industry presence. The third question shows the geographic distribution of dealers, with most located in major cities like Delhi and Hyderabad (17.4% each). The questions are classified

in 4 groups: market dynamics (MD), business implications (BI), policy influences (PI), and strategic responses (SR) within the aftermarket sector. This data provides a diverse and experienced sample, crucial for assessing market dynamics, business implications, policy influences, and strategic responses within the aftermarket sector.

H1: Market Dynamics are significantly influenced by Business Implications, Policy Influence, and Strategic Response in the 3-wheeler vehicle aftermarket industry.

Table1: Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					
					R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.131 ^a	.017	-.138	1.65080	.017	.111	3	19	.953	2.154

a. Predictors: (Constant), SR, BI, PI

b. Dependent Variable: MD

The model summary indicates the relationship between the dependent variable, Market Dynamics (MD), and the independent variables: Business Implications (BI), Policy Influence (PI), and Strategic Response (SR). The R-squared value of 0.017 suggests that only 1.7%

of the variability in Market Dynamics is explained by the independent variables. The Adjusted R-squared is negative (-0.138), implying that the model does not fit well. The Durbin-Watson statistic is 2.154, indicating no significant autocorrelation in the residuals.

Table 2: ANOVA^a

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.907	3	.302	.111	.953 ^b
	Residual	51.778	19	2.725		
	Total	52.685	22			

a. Dependent Variable: MD

b. Predictors: (Constant), SR, BI, PI

The ANOVA table assesses the overall significance of the regression model. With an F-value of 0.111 and a significance (p) value of 0.953, the model is not statistically significant, indicating that the independent

variables (BI, PI, and SR) do not collectively explain a significant portion of the variance in Market Dynamics. The residual sum of squares (51.778) and mean square (2.725) show the unexplained variance by the model.

Table 3: Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	7.679	3.237		2.372	.028
	BI	.008	.168	.011	.046	.964
	PI	-2.814E-5	.187	.000	.000	1.000
	SR	.136	.255	.128	.533	.600

a. Dependent Variable: MD

The coefficients table provides detailed insights into the individual contributions of the independent variables. The constant (intercept) has a significant value of 7.679 (p = 0.028). However, the coefficients for Business Implications (BI = 0.008, p = 0.964),

Policy Influence (PI ≈ 0.000, p = 1.000), and Strategic Response (SR = 0.136, p = 0.600) are not statistically significant. This implies that none of the independent variables significantly predict Market Dynamics in this model.

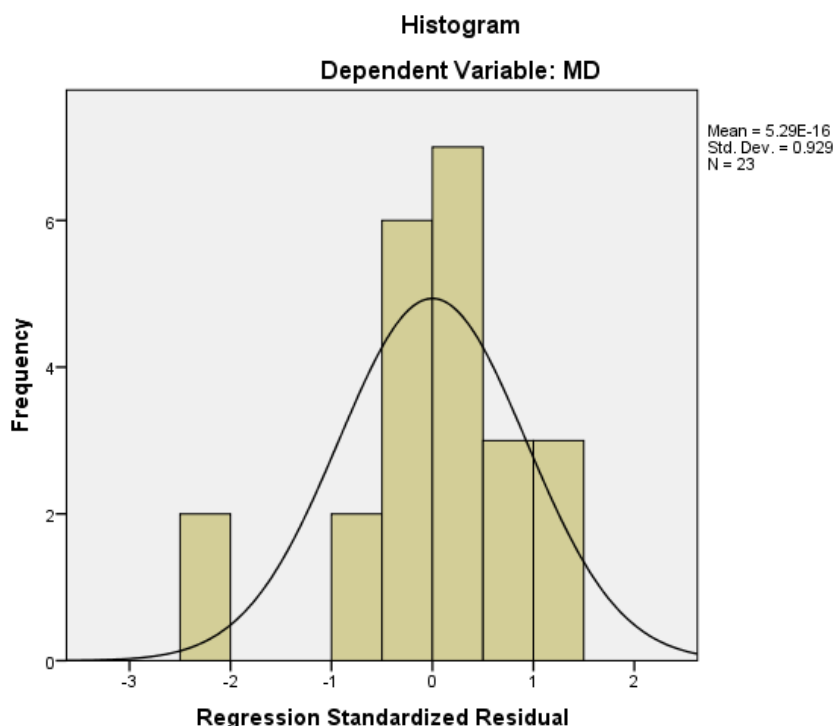


Figure 1: Histogram

The histogram in Figure 1 visualizes the distribution of the dependent variable, Market Dynamics (MD). The x-axis represents the range of MD scores, while the y-axis shows the frequency of observations within each range. This histogram helps in assessing the normality and spread of the data. If the data is normally distributed, it should resemble a bell curve, indicating most observations cluster around the mean. Any skewness or deviations from normality can highlight potential issues in the data distribution, impacting the reliability of statistical analyses like regression. The histogram is a useful tool for preliminary data exploration and validation.

The regression analysis aimed to determine the influence of business implications, policy influence,

and strategic response on market dynamics. The model summary revealed an R-squared value of 0.017, indicating that only 1.7% of the variability in market dynamics is explained by the independent variables. The adjusted R-squared value was negative, suggesting a poor fit for the model. The ANOVA results further confirmed this, with a non-significant F-value of 0.111 (p = 0.953), indicating that the model does not significantly explain the variation in market dynamics. The coefficients analysis showed that none of the independent variables (business implications, policy influence, and strategic response) had a statistically significant impact on market dynamics. This suggests that other factors not included in the model may play a more critical role in influencing market dynamics

within the 3-wheeler aftermarket industry. The histogram provided a visual representation of the market dynamics data distribution, highlighting its spread and normality.

Overall, the study underscores the complexity of market dynamics in the 3-wheeler aftermarket and indicates that, presently, there is a very less impact of e-3w aftermarket on non-electric 3w aftermarket.

VII. CONCLUSION:

While the impact on the non-electric 3-wheeler aftermarket is not significant, presently, it is essential to note that the extent of these effects will vary depending on factors such as the rate of electric vehicle adoption, government policies, technological advancements, and consumer behaviour. The non-electric 3-wheeler aftermarket participants will need to stay adaptive, forward-thinking and responsive to changing market dynamics.

To thrive in this evolving landscape, stakeholders in the automotive industry, including manufacturers, service providers, and policymakers, should collaborate and strategize effectively. By embracing the opportunities presented by electric mobility and addressing the challenges proactively, the automotive ecosystem can progress towards a sustainable and efficient future for both electric and non-electric 3-wheeler vehicles.

Although the EV aftermarket is still in its early stages, it is evolving rapidly and presents substantial business opportunities. This transformation has a profound impact on component manufacturers and channel partners, prompting investments in EV production lines and R&D to adapt to changing market demands.

These developments are driving higher manpower requirements, creating new job opportunities for youth and professionals alike.

The growth of the electric three-wheeler aftermarket, in particular, has been notably positive and encouraging, signalling a bright future for this segment.

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