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''THE ROLE OF EV VEHICLES IN GREEN SUPPLY CHAIN (TATA MOTORS LTD.)''

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Executive Summary

Supply chain administration has been characterized as the "plan, arranging, execution, control, and checking of supply chain exercises with the objective of making net esteem, building a competitive foundation, leveraging around the world coordinations, synchronizing supply with request and measuring execution globally.

The vehicle industry is a column of the worldwide economy, a primary driver of macro-economic development and steadiness and mechanical progression in both creating and created nations, crossing numerous adjoining businesses.

In this venture, we have taken India's driving vehicle producer, Tata Engines Restricted (TML) for examining Supply Chain Administration in Car Industry and found out the taking after.

Tata Engines Constrained items are sold and overhauled through a organize of authorized merchants and benefit centers over the residential showcase, and a arrange of wholesalers and nearby merchants in worldwide markets.

The company screens the execution of its merchants and merchants and gives them with back to empower them to perform to the desires. Any under-performance by the merchants or wholesalers seem antagonistically influence TML's deals and comes about of operations.

The company depends on third parties to supply crude materials, parts and components utilized in the make of items. Moreover, for a few of these parts and components, the company is subordinate on an only source.

The company's capacity to secure supplies in a fetched viable and convenient way is subject to different components, a few of which are not inside its control. Whereas the company oversees its supply chain as portion of the merchant administration handle, any critical issues with supply chain in the future may influence the comes about of operations.

Impact of normal catastrophes and man-made mishaps, unfavorable financial conditions, decrease in vehicle request, need of get to to adequate financing courses of action, seem have a negative monetary affect on the Company's providers and merchants, in turn impeding convenient accessibility of components, or increments in costs of components. In overseeing a complex supply chain, the Company has created near connections with both coordinate and backhanded providers. The Company proceeds to create long-term vital connections with providers to back the improvement of parts, innovation, and generation facilities

INTRODUCTION

ROLE OF E.V IN GREEN SUPPLY CHAIN

Talking almost the framework that is utilized from ages for the development of products and populace from one put to another, distinctive modes are utilized to travel places. These modes incorporate – aviation routes, roadways, railroads and conduits. In antiquated times, when the fossil fuel was found that made a difference the combustion that makes a difference in creating vitality, the researchers at that point came up with combustion motors that can be fuelled by the fossil fills to change over warm vitality into active vitality to move the vehicles from one put to another.

Reference - www.wikipedia.com

In early times, the populace was less and hence utilizing these powers appears no hurt to the environment, but gradually and slowly, the affect of utilizing these fills begun to appear up, in terms of consumption of fossil fills as these powers are non-renewable powers which is moreover driving to worldwide warming as the temperature of the soil has been ceaselessly tends to be rising each year which is too causing the emergency of snow on both the posts and moreover causing a rise in the water level of the seas on the soil surface. These fossil fills require to be mined which in result causes deforestation of the wildernesses that too leads to increment the green house gasses in the climate driving the consumption of Ozone Layer that diverts the hurtful UV beams of the sun to reach the soil surface..

Source: www.googleimages.com

As we are in the 21 century, dealing with the problems of high global temperatures, scarcity of water, increase of drought affected areas, global warming, and increase of carbon footprint, government from all the countries are now making decision to tackle this global problem such as shifting the dependency of power on renewable resources rather than the conventional sources of energy that is non renewable. We have a population of 7.2 billion on the face of the earth, this leads to higher level of pollution to the earth's atmosphere that contributing to larger amount of carbon footprint in the environment leading to the depleting condition of the earth's atmosphere leading to less of fresh air to breathe and sustain in the nature.

Internal combustion engine (ICE) vehicles have long been the go-to for many logistics firms' fleets of delivery vans and trucks. However, these cars are far more costly to maintain, generate more carbon dioxide to the atmosphere, and have a major negative impact on air quality.

The use of electric cars in the delivery fleet is becoming more popular among businesses. As the logistics business and electric transportation grow more intertwined, EVs have shown to be a good financial investment. Companies' usage of environmentally friendly cars to transport commodities, goods and packages has increased significantly thanks to government incentives and other economic considerations.

Logistics electric vehicles may be used for a wide variety of hauling and delivery purposes. Due to their great manoeuvrability and tiny carbon footprint, EVs show to be very useful for last-mile deliveries. They are helpful in dense urban cores, urban areas, and interior environments because they provide pollution-free movement and significantly reduce carbon emissions.

Electric vehicles (EVs) have the potential to give considerable additional esteem for businesses by means of encouraging persistent reserve funds in operation and upkeep, expanding the productivity of conveyance services' directing, and permitting for the advancement of the services' brand. Numerous coordinations firms have seen EVs as an brilliant and long-term economical speculation as they look for to progress conveyance administrations in terms of adequacy, proficiency, and dependability.

All animals that are display on the soil surface needs new discuss to pick up oxygen from the discuss and discharge carbon dioxide to total the cycle of the breath. Since increment in the contamination in the environment making wellbeing issues to the nature as a result the humankind and other manifestations on the soil surface are presently confronting the antagonistic influences of these marvels. 30% of the entirety

defilement of the soil is coming from the utilization of fossil powers inside the transportation division that transmits vapor on burning the vitality that makes it more dangerous for the earth's carbon level.

There is a require to get it that why we require to diminish the carbon level in the climate, it is since the carbon gas is a great conductor of warm and this abundance carbon in the environment traps more warm that come from the daylight and makes the earth's temperature. By lessening the carbon impression in the climate, we may bring down the levels of carbon in the air that can makes a difference in recapturing the cleaner discuss for the nature. Moreover there are a few more ways by which we can increment the oxygen level of the soil is by expanding the manor on the earth's surface as plants are the as it were source of new oxygen that they make through the handle of photosynthesis.

In a consider it is established that as it were in India, there are 20 million vehicles are there on the streets of India, and nearly 99% of the add up to vehicles are either running on the customary powers such as gasoline or diesel, or on CNG or LPG, but this needs to be changed over into 20-30% from 99% to fueled by renewable powers such as power or sun oriented control. As these vitality is accessible in plenitude in nature that can be utilized as these vitality radiates zero emittions when they are utilized as the powers to run the engines and work is done. In created nations, individuals have begun picking for the cleaner vitality such as electric vehicles to utilize the economical source of vitality that is show on the soil, though nations that are still creating are confronting issues to build the foundation that can offer assistance in appropriation of a modern innovation such as charging stations , less expensive items on offer from the automakers that can legitimize the estimating that can be reasonable for both common man and moreover for the utilization of commercial purpose.

There is a extraordinary intrigued why I have chosen this theme for the inquire about work since of two major reasons, the to begin with one was rising concern of natural issues that are caused by the transportation division coming about in increment of carbon impression in the climate causing worldwide warming and the moment reason is to give mindfulness of the modern innovation, so that individuals can see the require of the hour to move from customary powers to renewable cleaner fills as the items are more progressed and makes a difference in supporting the environment for the future eras. Talking almost the Indian populace, they are still reluctant in choosing sun based or electric vitality over the ordinary fuel as the framework is missing that would bolster this and makes a difference in building certainty in the Indian populace towards electric vehicles. Here, the major car companies are advertising less electric items to the clients and that to on the higher costs that most of the individuals seem not bear at the minute and feel that customary automobiles are more reliable.

By considering this report, individuals may pick up the bits of knowledge of the concept of electric vehicles that they might utilize for both the individual and the commercial reason to serve a way better future for the purpose of controlling the contamination caused by utilizing routine powers. This report would tell almost the preferences of utilizing the electric vitality that how this vitality might perform superior and diminish the carbon footprint in the atmosphere which could benefit the future generation. It also helps people to understand the positive points that can be helpful in the business so that the cost of the operations can be minimised by using the electric vehicles for the purpose of transporting goods from one place to another. Therefore, it is important for the enterprises to explore new ways by which they can incorporate this in their operations to increase the profits by conserving the atmosphere and leading to a healthy environment to live in.

Source: www.googleimages.com

LITERATURE REVIEW

E.V IN GREEN SUPPLY CHAIN

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- Reference - X. Zhang, J. Xie, R. Rao, Y. Liang, Policy Incentives for the Adoption of Electric Vehicles across Countries. Sustainability 2014, 6, 8056-8078.

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Sonali Goel, Renu Sharma, Akshay Kumar Rathore (Feb, 2021) have said cross breed, Plug in Half breed and Electric Vehicles are competent of expanding the fuel economy of vehicles but with an increment within the fetched of buying compared to conventional vehicles. In common their diminished utilization of petroleum and expanded efficiency offers financial benefits to buyers, society, automakers and policymakers over the lifetime. The later activities and different appropriations by the Indian Government will thrust the e-mobility drive in India. The advancement of an unused concept of vehicle-to-grid can either provide control to the network or can be utilized to charge the battery when non-conventional vitality sources are not accessible. This innovation is an imperative angle of vitality security, renewable vitality, and giving an extraordinary scope to bargain with worldwide warming issues.

- Reference - Sierzchula, William & Bakker, Sjoerd & Maat, Kees & van Wee, Bert, 2014. "The influence of financial incentives and other socioeconomic factors on electric vehicle adoption," Energy Policy, Elsevier, vol. 68(C), pp 183-194

Dr. Arloph Johnvieira, Prof. Shweta Kishore, Mr. Omkar Tupe (2020) have said that with the exhaustion of fossil fills and steady climb in fuel costs, there's a requirement for vitality move in vehicles in India. Govt has taken activity to battle contamination levels by advancing EVs and giving endowments on buy. To boost its generation, Govt has facilitated the FDI standards. Different rising brands are propelling EVs in India. The Government and producers ought to connect their hands to construct the foundation and make positive environment for EVs. The respondents are mindful of worldwide climate conditions and are prepared to alter their inclination from routine to eco-friendly vehicles. Fetched is an imperative calculate whereas considering the buy of EV.

- Reference- Fanchao Liao, E. M. (2017) Consumer preferences for electric vehicles: a literature review. Transport review, 275.

Golam Imran Hussain and Menonjyoti Kalita (2021) have said that not as it were the innovative and financial variables must be given significance; the fulfilment on clients based on social figure must be given break even with significance. The buyers got to be made mindful with respect to the utilization of EV. The social components other than the government are too taking numerous approaches to adopt the EV. The charging framework is one of the most concerns of the EV showcase development. Increasingly open and private segment should come up to set up the charging framework. There are numerous challenges that are being confronted within the starting speculation and appropriation of showcase, but due to the openings the EV advertise will grow. As told by showcase analysts end of transportation of IC will be supplanted by EV. Besides from the later years' deals it can be seen that advertise of EV is developing day by day. Worldwide Vitality Organization (IEA) has anticipated the worldwide stock increase of EVs from 3.7 million in 2017 to 13 million by 2020 and in the long run comes to 130 million in 2030. On the other hand, the deals of EVs are evaluated to have a development of 24% averagely all through the projection period. The deals would increment from 1.4 million in 2017 to 4 million of EVs by 2020 and in time comes to 21.5 million of deals by 2030.

RESEARCH METHODOLOGY

As the concept of Electric Vehicles is a new thing for the people around and it is still a topic that need a lot more intense research and also required that the companies provide information about the EVs to the general public as well as the corporate sector to generate awareness among the population that can start using EVs in their daily use.

PRIMARY RESEARCH

For Primary Research we have taken sample of 10 peoples from different companies and we have provided them the questionnaire and taken their response and then we have prepared the analytical report regarding the data that is shown in later part.

SECONDARY RESEARCH

Since the concept is still new therefore the information used in this report is taken from both primary and the secondary sources such as questionnaire's, research papers published in the journals, magazines and other information that was available on the internet that helped me in framing this information in a constructive manner to be presentable for further study as a secondary data.

OBJECTIVE OF THE STUDY:

The objective of this study is to find out the future of the EVs in the automobile sector and how it can be incorporated into the logistical operations to deal with the rising carbon footprint into the environment.

SCOPE OF THE STUDY:

The scope of this study is to cover all the facts that are related to the EVs and discussing Role of EVs in logistical operations to establish green supply chain.

Questionnaire Used-

Role of E.V Vehicles in Green Supply Chain

BY THIS QUESTIONNAIRE ,OUR OBJECTIVE IS TO KNOW ABOUT THE AWARENESS, UNDERSTANDING, CHALLENGES, ADOPTION, IMPLEMENTATION AND FUTURE EXPECT OF THE E.V IN THE SUPPLY CHAIN

piyush.rao@eggoz.in Switch accounts

* Indicates required question

Email *

Your email address

a. How familiar are you with the role of electric vehicles (E.Vs) in the supply chain?

- ◯ Not at all familiar
- ◯ Slightly familiar
- ◯ Moderately familiar
- ◯ Very familiar

Which of the following best describes green supply chain management?

- ☐ Maximizing profits without consideration for environmental impact
- ☐ Minimizing waste and pollution throughout the supply chain
- ☐ Focusing solely on cost reduction in logistics
- ☐ Implementing stringent regulations on suppliers

Does your organisation have a formal green supply chain management strategy or policy in place?

- ◯ Yes
- ◯ No

Which of the following green practices does your organisation currently implement in its supply chain operations?

- ☐ Sustainable sourcing of raw materials
- ☐ Energy-efficient transportation
- ☐ Waste reduction and recycling initiatives
- ☐ Supplier sustainability assessments
- ☐ Eco-friendly packaging

What are the main challenges your organisation faces in implementing green supply chain practices?

- ◯ Lack of top management support
- ◯ High implementation costs
- ◯ Limited availability of green technologies
- ◯ Resistance from suppliers or partners

How successful do you believe your organisation has been in integrating green supply chain practices?

- ◯ Not successful at all

Which of the following benefits has your organisation realised as a result of implementing green supply chain practices?

- ◯ Cost savings
- ◯ Improved brand reputation
- ◯ Reduced environmental impact
- ◯ Enhanced customer satisfaction
- ◯ Competitive advantage

What future trends or developments do you anticipate in the field of green supply chain management?

- ◯ Increased adoption of circular economy principles
- ◯ Greater emphasis on transparency and traceability
- ◯ Collaboration among supply chain partners for shared sustainability goals
- ◯ Expansion of regulatory requirements for sustainability

How is your organisation planning to adapt or respond to these anticipated changes?

- ◯ Investing in research and development
- ◯ Engaging in dialogue and collaboration with suppliers
- ◯ Not currently assessing supplier sustainability performance
- ◯ Reviewing supplier-provided sustainability reports

Does your organisation have access to sufficient charging infrastructure to support the use of electric vehicles (EVs) in its supply chain operations?

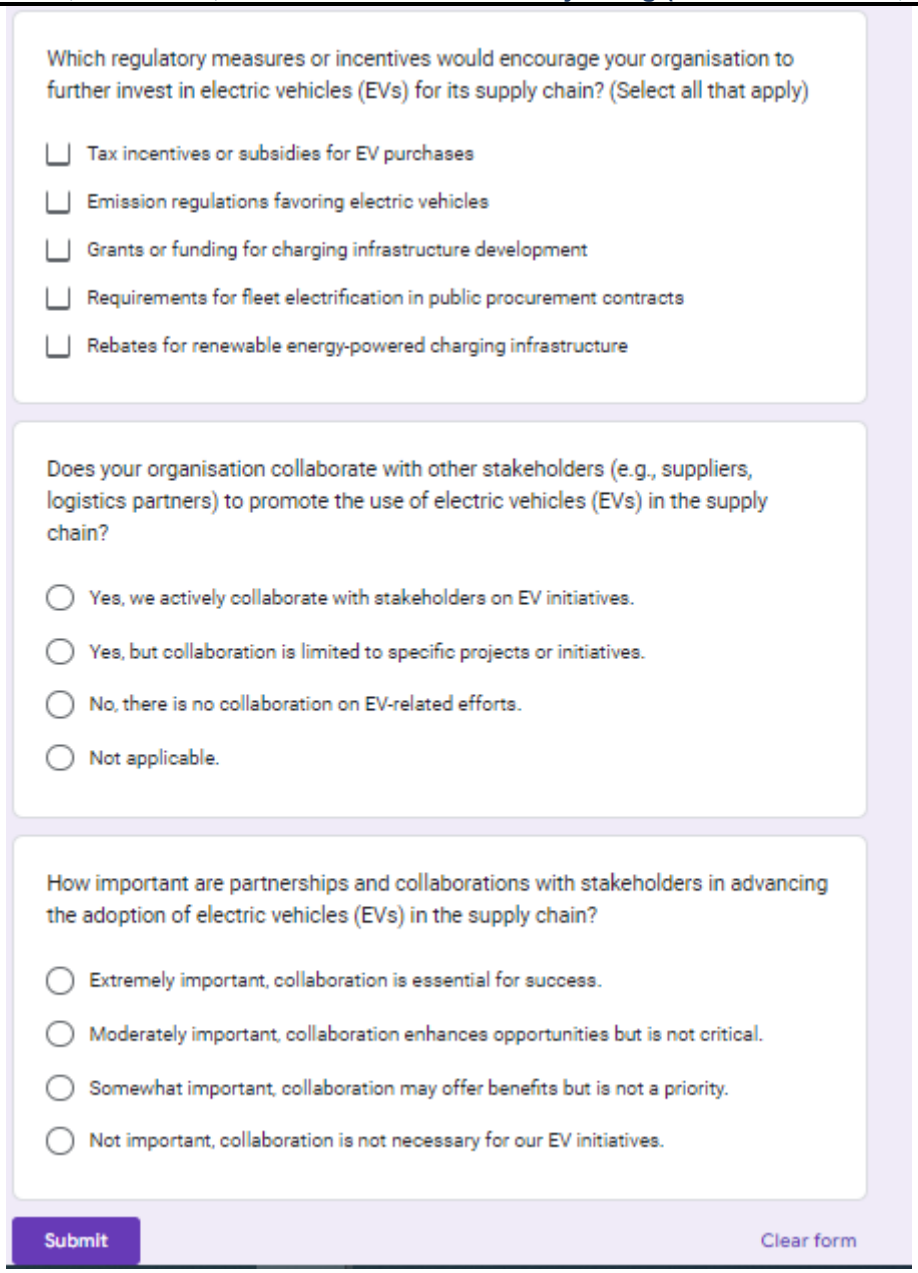
- ◯ Yes, there is ample charging infrastructure available.
- ◯ Yes, but access to charging infrastructure is limited.
- ◯ No, there is inadequate charging infrastructure available.
- ◯ Not applicable.

What types of charging infrastructure are most crucial for supporting the use of electric vehicles (EVs) in the supply chain? (Select all that apply)

- ☐ Fast-charging stations along transportation routes
- ☐ On-site charging facilities at warehouses and distribution centers
- ☐ Public charging stations in urban areas
- ☐ Renewable energy-powered charging stations

To what extent do government policies and regulations influence your organisations decision to adopt electric vehicles (EVs) in its supply chain?

- ◯ Significantly, government incentives and regulations play a major role.
- ◯ Moderately, government policies are considered but not decisive.
- ◯ Minimally, government regulations have little impact on our decisions.
- ◯ Not applicable.



ANALYSIS

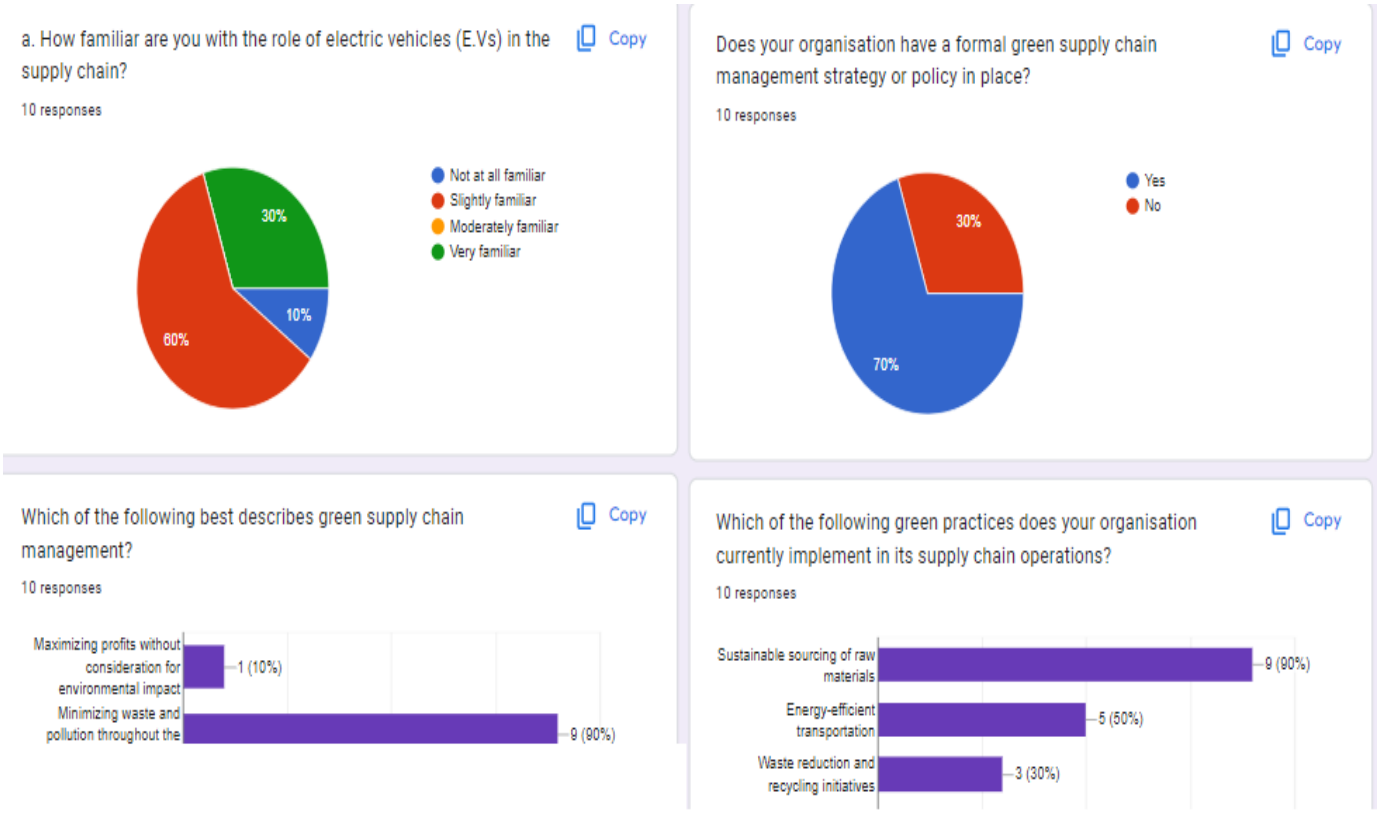
Since this is a secondary data based research and all the data is accumulated from journals, books, newspapers and magazines, we can do the analysis for the same data that has been collected from the journals and the magazines that provided the limited information that was available on the topic of impact of EVs on the logistical activities in establishing the green supply chain.

As the topic is new and the EV technology is still growing and lot of detailed research is still pending to have a proper analysis for the same. I am doing the analysis on the basis of data available and trying to replicate it in a better way for the future research work. Starting with the analysis here are the following points that helps in understanding the process, opportunity and threat for the EVs.

Source: www.googleimages.com

In the above picture, we can see that an organisation is opting towards the new technology into their logistics operations so that the carbon footprint of the organisation can be minimised as the customers or clients are now more focused on the companies that are taking care of their carbon footprint and managing it responsibly.

PRIMARY DATA ANALYSIS



What are the main challenges your organisation faces in implementing green supply chain practices?

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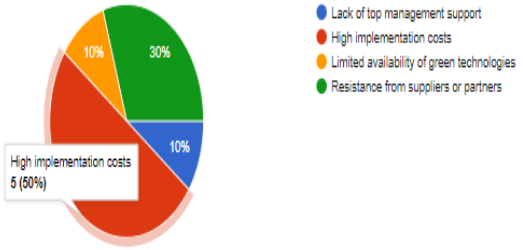

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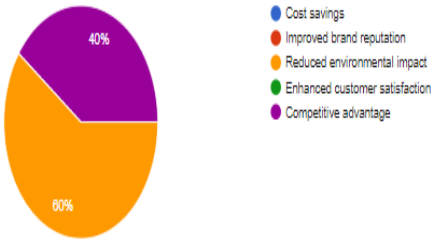

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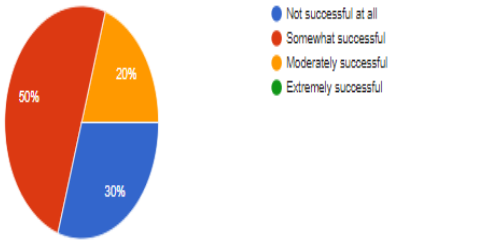

What future trends or developments do you anticipate in the field of green supply chain management?

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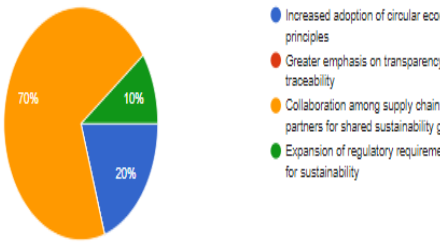

What types of charging infrastructure are most crucial for supporting the use of electric vehicles (EVs) in the supply chain? (Select all that apply)

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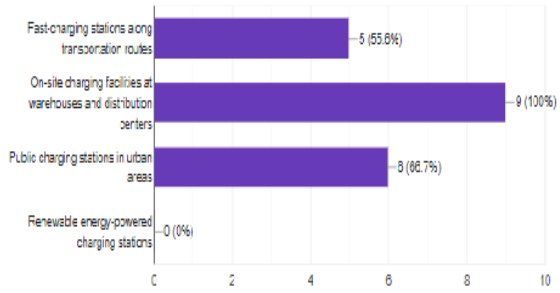

How is your organisation planning to adapt or respond to these anticipated changes?

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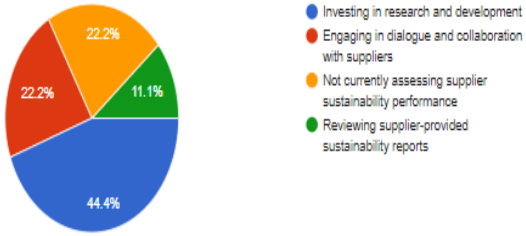

To what extent do government policies and regulations influence your organisations decision to adopt electric vehicles (EVs) in its supply chain?

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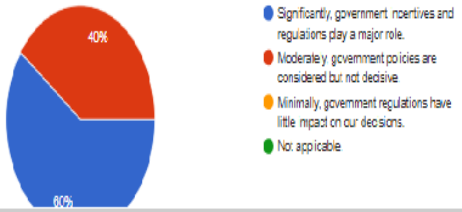

Does your organisation have access to sufficient charging infrastructure to support the use of electric vehicles (EVs) in its supply chain operations?

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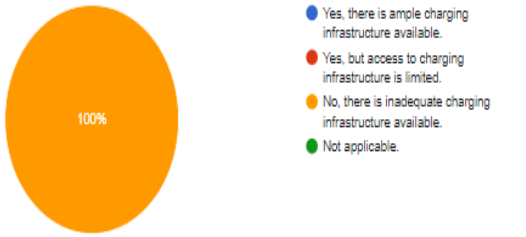

Which regulatory measures or incentives would encourage your organisation to further invest in electric vehicles (EVs) for its supply chain? (Select all that apply)

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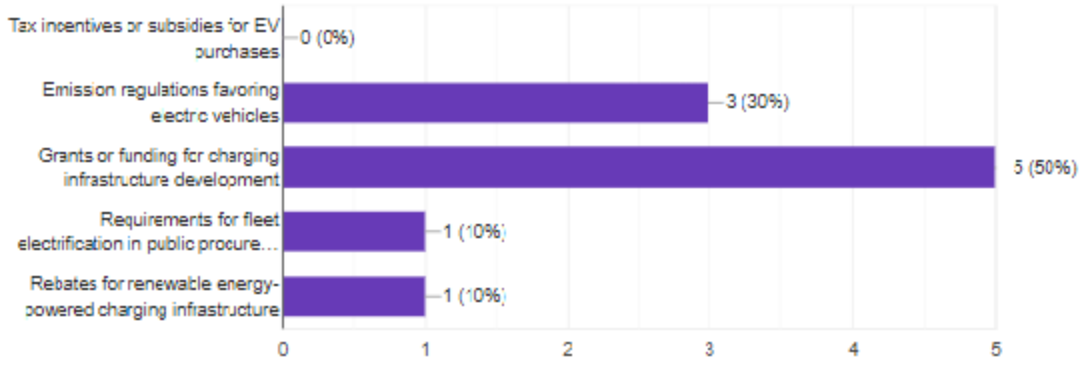

Does your organisation collaborate with other stakeholders (e.g., suppliers, logistics partners) to promote the use of electric vehicles (EVs) in the supply chain?

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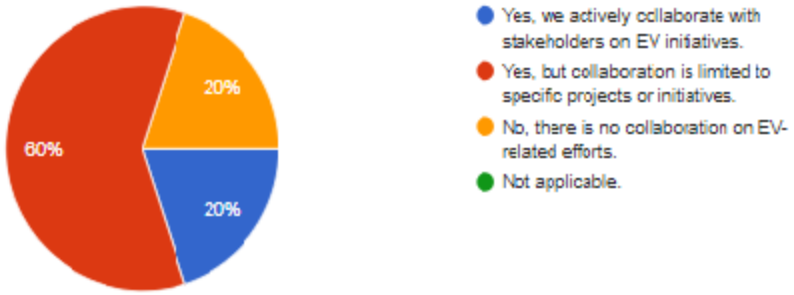

How important are partnerships and collaborations with stakeholders in advancing the adoption of electric vehicles (EVs) in the supply chain?

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Challenges in EVs:

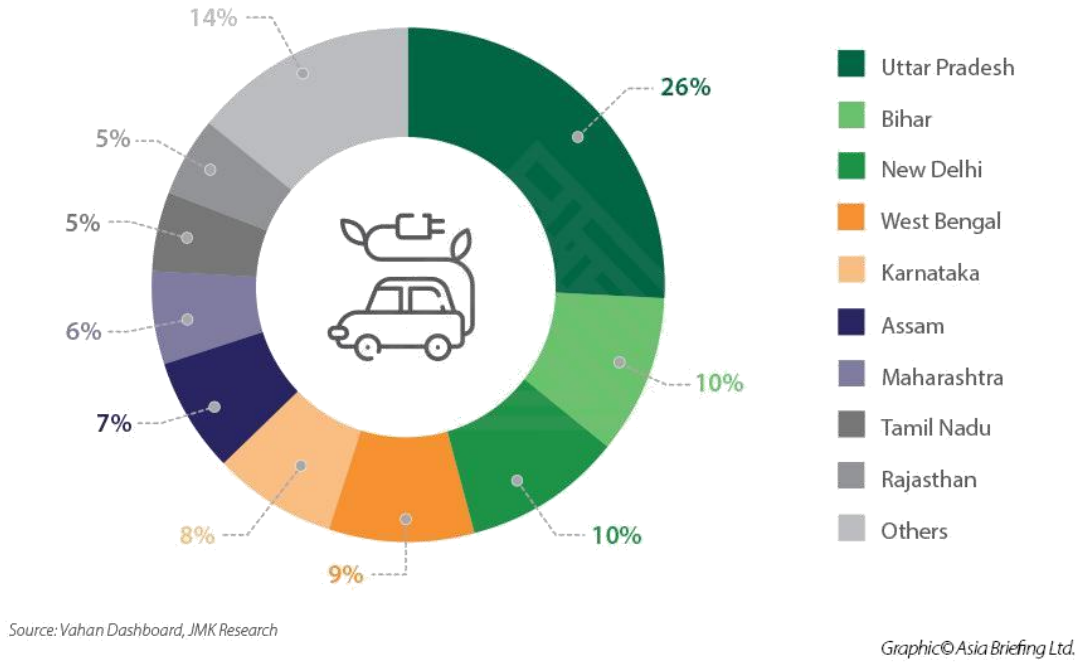
Economic factors:

- ✓ Since India is a developing nation, it is seen that establishing the infrastructure that supports the EV is one of the most challenging thing for any nation in the developing stage.
- ✓ Although gasoline and diesel fuels cost higher and makes it expensive to use as the mode of transportation, here the EV's running cost is minimal as compared to the conventional fuels, but on the same time the cost of buying an EV is much higher as compared to the conventional vehicles hence making it very difficult for the people to choose EV over the conventional vehicles.
- ✓ EVs are running on lithium ion batteries and the cost of maintenance of these batteries are very high as the company need to ensure that the quality is been maintained and maintained the quality results in higher cost of replacements.
- ✓ Technological factors:
- ✓ It is reported that fabricating and improvement of vitality capacity frameworks for the EVs as the system utilises high grade raw materials for delivering the high performance of the vehicles so that the vehicle can be secure and safe for the owners.
- ✓ As of now the one and most dominant technology that is used as the power source in the EVs is the lithium ion batteries, and to develop and maintain these batteries is expensive as the manufacture needs to make the vehicles safe to use and it should not explode while charging or while in the usage.
- ✓ It is seen that the increase demand in the EVs have impacted the power grid systems of the locals as the usage for the charging of the EVs have resulted in more load on the general grid, therefore, before increasing the supply of EVs, the country need to work on the existing power grid so that it can be upgraded to the required demand.
- ✓ Environmental factors:
- ✓ Using the EVs have reduced the emission of greenhouse gases but while charging the EVs, the energy is been produced to charge the EVs are still emitting gases that are not good for the environment. Therefore, it needs to be sorted that the energy generation should also be cleaner and green without having the emissions.
- ✓ Social Factor:

- ✓ This is one of the factors that help in making the people to start adopting the new technology that is better for the future and for the society as it is seen that once the people start making their perception against the adaptation of the new technology. People are worried about the range of the EVs, as they are afraid what if the vehicle goes out of power in middle of somewhere that making a negative impact of the society.

Regional Registered EV Sales Jan-Dec 2020

Reference - Indian Electric Vehicle Market Overview Report 2019-2026, (2019) 1st Edition.



As the above diagram show the information about the registration of the EVs according to the regional registration office of the year 2020. It shows that Uttar Pradesh is the biggest state where the people bought new EVs for their usage and rest other states are also opting for the EVs but still a long way to go for the automakers.

Opportunities that are related to the establishing of the greener technology that helps in making the pollution can be reduced. These opportunities are:

The companies need to establish a new service centres for improving the servicing of the EVs, reducing the time taken for the servicing of the vehicles.

The companies need to scale up the production as this will make the cost of per unit less and can offer cheaper products in the market.

Automobile industry and government need to promote more on the EVs, so that people can change the perceptions of them towards EVs so that they can adapt to the betterment.

EVs should also have longer ranges so the people do not hesitate for choosing EVs for the longer trips.

The charging time for the vehicles should be minimised as far as it can be because one of the drawback of the electric vehicles are that the time they take in charging is higher and people want to have vehicles with less time consuming charging.

There should be adequate infrastructure for the charging of the EVs that need to be taken care of so that people adapt the new technology.

The automobile industry and the government need to work of the new safety measures as the technology is new so the safety norms should be upgraded or new norms should be laid so that the vehicles are safer to use.

As an innovation in the technology, there are lot of things that need to upgrade or change for meeting the support to the new technology. One such thing in EVs implications are upgrading the grid network that is providing the energy in present world scenario, but when the demand increases the government need to upgrade the grid system so that the power handling can be done more efficiently with increasing the load capacity of the system.

On the other hand, government should also try to implicate new ways by which the dependency of power supply should not be restricted to the conventional methods like thermal energy, coal burning, etc. We are living in the 21st century, where technology is getting advance just in a days' time, so we need to find certain ways by which we can generate energy that can power the EVs and also is a cleaner and greener source of energy. As one of the best alternative for this problem is using the solar energy to recharge the EVs and also power the housings and the localities. By using the solar energy, we could state that the energy that is produced is greener and cleaner as while making this energy there were no emissions which makes the usage of EVs impactful.

Now if we talk about implication of EVs in the logistical activities, the management should see the pros and cons of the usage of EVs over the conventional vehicles so that they can incorporate this into their supply chain and also helps in influencing the general public in a way that people can come up to buy the EVs to eliminate the hesitation among the people about the EVs.

Some of the pros/advantages of EVs using in logistical activities are as follows:

Running cost of the vehicles could be minimised as it runs on electricity that is cheapest alternative fuel if compared to the conventional fuels.

Electric Vehicles running on electric motor that has zero emissions in the environment, making the running of vehicles eco friendly.

Maintenance of electric vehicles is very less as the most common parts that need replacements are tyres, batteries, whose lifespan is longer due to technological advancements.

New start-ups are coming up with offering wide range of products.

Some of the cons/disadvantages of EVs in logistical activities are:

Lack of charging infrastructure that is required to charge the EVs in less time as logistics activities are now meant to be time efficient.

Electricity reach in the country is still expanding and there is most part of the country where the power supply is not adequate to charge the vehicles.

At present the vehicles are having less range as compared to the charging time, therefore it is a drawback for the EVs.

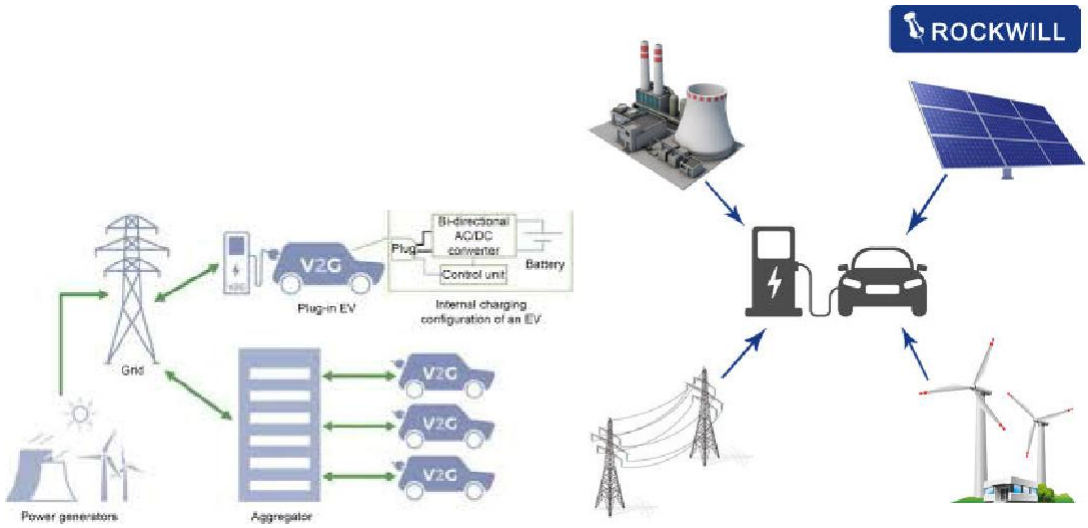
Changing of the batteries cost higher than the actual price of the vehicle at the time of changing the batteries.

Initial cost of owning the vehicle is on the higher side.

Lack of product offering in the market for the people to choose from. Inappropriate infrastructure to support the EVs.

Source: www.googleimages.com

As the above picture shows that Indian transporters are opting for new alternatives in the options of EVs on the smaller scale which helps in movement of goods in smaller batches. According to the reports, all Ecommerce companies are now looking forward to such alternatives to move their products from one place to another while contributing the least in the carbon emissions in the transport sector.



Source: www.googleimages.com

In the above pictures, we can see that how the power grid works for the charging of the EVs and how the governments need to work on the development of the infrastructure to support the functioning of the EVs.

The epidemic has unintentionally accelerated the transition to battery-powered transportation. People today understand the value of protecting the planet and living sustainably, while also reaping the benefits of lower operating expenses. E-commerce, last-mile delivery, and hyperlocal delivery companies recognise the advantages and are swiftly embracing EVs. They are also forming alliances with mobility industry leaders to fill the gap between supply and demand.

Companies that want to use EVs need to think far ahead. Both the federal and state governments appear to be on board with the idea of introducing EVs into the market. It's possible that recent policy changes and the rise of the startup culture may benefit from current and future market openings. Many online retailers have already declared their plans to switch to an all-electric fleet, so they can reap the advantages of becoming green while also improving their bottom line.

According to the World Economic Forum, people are still worried about their safety.

online shopping will explode in popularity among U.S. Since electric cars have a lower total cost of ownership (TCO) and operating cost, they will become increasingly popular in the business sector as the number of vehicles on the road increases.

The rising price of fuel is another factor pushing companies to consider purchasing EVs. The initial investment in EVs will pay off in the long term thanks to the positive effects on the economy.

Due to the significant contribution logistics expenses make to the total cost of doing business, any savings on fuel and operational costs will be passed on to customers in the form of lower retail pricing. Last-mile

deliveries will increasingly be handled by electric vehicles due to the unprecedented increase in demand for house deliveries.

The upfront cost may be greater, but technological progress and falling battery prices are expected to bring that number down. Demand is being boosted by government and industry collaboration to inform customers, debunk myths, and strategically place electric vehicles. Electrification of transport appears inevitable. Stakeholders will work together to make the switch to EVs as painless as possible by building a viable, cheap, accessible, and dependable ecosystem.

Businesses that offer solutions for the final mile of the supply chain's journey to the customer are enthusiastic about the shift towards environmentally friendly logistics. (Sharma, 2021)

Most electric 2W and 3W have a range of 120–150 km on a single charge and can go for up to 12 hours without recharging. These automobiles have a lower maintenance standard than regular automobiles. Researchers in the automotive industry have shown that electric automobiles are at least 30 percent less expensive than gas-powered vehicles. In addition to the obvious financial benefits of switching to electric cars, the rapid depletion of fossil fuels, the rise in the price of energy, and the detrimental impact of conventional internal combustion engine (ICE) vehicles on the environment all make this transition imperative. For instance, (Gupta, 2021b)

The creation of an EV-friendly infrastructure that might lead to widespread adoption across the country is an urgent economic necessity.

The ecosystem and the efforts of key players give the impression that conditions are good for a radical shift in the mobility industry. Soon, companies that have adopted EVs into their system will be allowed to advocate for them, which might encourage others to do the same.

FINDINGS

As we know that the electric vehicles are just started their first phase as the product offering to the general public as an alternative for the conventional vehicles in the market, it is very difficult to make decisions based on the small amount of information available about the products. It is very important to see the real life experiences of the product that can help in generating confidence in the general public who can shift from conventional vehicles to the new electric vehicles.

While going through the available information in forms of journals, books, magazines, and newspaper articles, it is said that EVs is the future towards which the transportation industry is looking at as the companies and the governments across the globe wants to control the emissions that the conventional vehicles by burning the fossil fuels for running the vehicles. The automobile industry is working on incorporating the new technology in to production of the EVs so the people have more options in the product line to choose from. On the other hand, the governments are offering subsides on the EVs to promote the sales of EVs so that the dependence on fossil fuels can be minimised and a cleaner and greener option can be given to general public to reduce the pollution caused by the transport industry.

While dealing with the EVs, it was found that EVs have their own advantages and disadvantages in the real world scenario, where they have good impact on conserving the environment by having zero emission technology, on the other hand lacks the infrastructure for the support of the EVs to run or function in a proper manner so the EVs can be used on daily basis. As we know that India is a developing nation where making the people to adopt a new technology and especially when it's initial prices are very high, people tend to avoid the take these changes seriously and prefer to use the old conventional technology for meeting their usage requirements, hence transport industry facing the issues that selling less number of EVs as it was projected that is leading to higher production cost for the manufacturers of the EVs. It should be understandable that to reduce the per unit cost price of any product, the manufacture needs to produce in mass so that the product can be delivered as a standard product and also cost of manufacturing can be reduced, but there is no enough demand for such product in the market, therefore, the prices of the EVs are higher than they could actually be selling at.

On the other hand, it was found that the lack of support in the form of charging infrastructure is missing out in the underdeveloped countries, where to run an EV is a difficult task as it is uncertain to know the actual running capacity of the vehicles and due to shortage of recharging stations as recharging takes more time in recharging the batteries of the vehicles once the charge is finished. For the businesses that are into logistics, they need vehicles that are highly performance oriented along with a good range that vehicle can deliver upon a single charge. For businesses, if the material is not moving, it is considered to be a loss of the time which is adding the cost of handling of the product for a longer period of time, hence, disrupting the efficiency of the operations. To counter this, the heavy automobile makers need to develop such technology that can help them

to achieve more efficiency per the charging of the vehicles. Or they need to find some solutions where they can use the solar energy to power the vehicles along with the electric motor of the vehicle.

For businesses to come forward to adapt new EVs in their logistics activities, they need to get the EVs on the cheaper prices so that the initial cost can be minimum to the standards and to facilitate this, the governments need to add some sort of subsidies in these products so the price can be further minimised to the extent where the businesses find these vehicles cheaper than that of the conventional vehicles. It is also seen in the data that businesses are concern about initiating the implementation of green supply chain as the global warming resulting in more pollution so they are looking for the alternatives for the conventional vehicles to reduce the emissions of the vehicles so that the pollution can be minimised from the logistics process.

Some EVs manufacturing companies around the globe are working on manufacturing heavy duty trucks and vehicles that can be used so that the businesses could also be benefited from the advance technology that can help in reducing the pollution as the reports and research shows that the majority part of the fossil fuel is used in transporting goods from one place to the other, therefore, commercial vehicles should need to be electrified first so that the pollution that is happening because of the conventional vehicles.

Some prominent companies that are working on the projects of heavy duty electric vehicles are Tesla motors, Volvo motors, Mercedes Automakers, Tata Motors for Indian demand, Ford Motors and many others. Apart from heavy duty vehicles, some companies need to build small electric vehicles for the city transports that can be agile in city traffic along with working on electric motors to reduce the emission.

Nowadays, all the ecommerce organisations are working closely on how to deliver the product to the clients in an optimised manner so they are looking forward to these EVs so that the cost of operating can be reduced at the same time there should be control over the emission of the carbon into the atmosphere. So all the ecommerce firms, such as Amazon, Flipkart, etc. are using the EVs as the delivery vehicles so that cost can be minimised to have bigger profits at the same time dealing with the regulations of having minimised carbon footprint in the environment.

SUGGESTIONS

After going through the detail research about the topic that I have chosen, I would like to add some suggestions from my side so that these points can be undertaken by the relevant individual who is referring this report for any sorts of information to do their research. Below listed are some points of the suggestions that can be considered:

Government should allow more subsides on the EVs so that both business and citizens can adapt to the new greener technology to change the method of travelling and transportation.

Automakers should find alternatives for the raw materials used in making the batteries of the electric vehicles so the dependency on only one supplier should be eliminated to have free flow of raw material without any disruption.

Government and automobile industry need to provide more information about the EVs and also tell customers about the usage and advantages of EVs over the conventional vehicles so the people can change their perceptions about the EVs and start to buy more of EVs.

EVs initial and servicing cost should be lowered so that people can see EVs as an affordable alternative against the gasoline or diesel powered vehicles.

Automakers should develop some technology that offers two options in the single product such as a hybrid option of petrol or diesel along with an electric motor so that the range should not be a hindrance in customer buying new EVs about the range they offer against the charge.

Government need to work more aggressively on building the infrastructure that support the charging of these EVs when they are not in home charging so that people can charge their EVs anywhere according to their need.

General public should be included in events that can spread a general cause of providing information on the issue of global warming and then they could set EVs as one of the prominent way by which we can reduce the pollution caused by the transportation sector.

Government should regulate the production of electric energy that should also be from greener sources like tidal energy or solar energy which can be turned into electric energy without letting huge carbon into the atmosphere which can lead to change in the global warming.

People should be aware and be concerned about how the earth is behaving due to the use of excessive fossil fuels as energy as these fuels are depleting and also causing green house gases effects in the earth's environment.

New technologies and ideas should be praised and rewarded so that we have new technologies to tackle the problem of carbon footprint and global warming.

LIMITATIONS

Since we know that this is a new topic, we have to focus more on the pre published data that is available on the internet or in the journal or the books or the newspaper or in the magazines. Therefore, the data is limited and this is one of the biggest limitations of this report, first I decided to prepare a questionnaire from which I can gather the information about the EVs from the general public around me but after the interactions, I came to know that the people are very less aware about the topic and most of them are not majorly concern about the issues related to fossil fuels powered vehicles. Below mentioned are some limitations of the topic related to the adaptation of EVs in daily usage:

People feel that electric vehicles are complex in nature and very expensive to replace a part when the part is damaged or not functioning properly.

People are concerned about the charging duration the vehicles have as the vehicles takes 7-8 hours of charging to get the batteries juiced up fully with a less range.

People feel that conventional fuel vehicles are less complicated and are easy and cheaper to own and maintain during the lifespan of the vehicle.

It is seen that some of the electric products are catching fire through the conduction of heat in the batteries making the product questionable about the safety rating of the vehicles in the long run.

Since the concept is still new and only very few portion of the market is been covered by the EVs, the data is limited on the long term reliability of the products the companies are offering.

Unless government put up stiff regulations in usage of fossil fuel vehicles, people will still be using more of the conventional fuelled vehicles rather than shifting their priorities to the electric vehicles. Above listed are some of the major drawbacks in this field of expansion of EVs market and here fore, certain steps should be taken on how to prevent the increase of global warming while reducing the carbon footprint in the atmosphere.

CONCLUSION

After doing this report on the topic ”THE ROLE OF EV VEHICLES IN GREEN SUPPLY CHAIN (TATA MOTORS LTD.)”, I have done research on the topic through the medium of secondary data that is available on the internet or in the journals or in the books, newspapers and magazines, we can get to know that although it sounds great as an idea of having EVs in the near future or the future of the transportation industry is EVs but when it comes to reality the things are not in the favour of the sayings. In reality, the new technology has lot of scope for the improvements in terms of product offerings, battery backups, charging time issues, and lot of other issues are there which needs to be taken care of while deciding the future of the transportation industry.

As we know that people are very hesitant in buying the new products that offers the full time electric running vehicles, only the city commuters or those who have a travel less than of 100 kms a day are turning to be the prominent customers of these products, where as people living in villages or having less facilities in terms of electric supply to the village or the area, people over there are still focusing more on the conventional fuelled vehicles for their day to day operations. People are also concerned about the facts that if the EVs charge gets over in the middle of the journey then how they manage to take their vehicle to the destination.

As discussed in the above sections about the issues related to the power grid system on which the developing countries are working leads to the concern about the fact that what will happen if the load of the consumption increases on the system and the system might get damaged, so there is a need to develop a new system or make up-gradations to the existing one. There are other facts that cannot be denied such as the usage of EVs will bring down the levels of carbon in the atmosphere which is responsible for the heat trapping in the atmosphere which is leading to global warming that causes depletion of fresh water sources as glaciers and snow available on the earth surface., resulting in the concern for the low laying coastal cities and villages that they could get drown in the ocean.

If there is a complete developed infrastructure in place then people can be assured that the external support is available to them, and they can look forward to a new technology that is greener, cleaner and safer to use. There is a lot of scope for the automakers of EVs to keep adding more kilometres to the range of the vehicles on single charge so that people can be more confident while using EVs on longer trips. Also, these automakers should work on the technology that can help these vehicles to charge faster than the time they are taking at present so that they can be seen as the alternative products against the conventional fuelled vehicles.

At last I would like to conclude this report by saying that there is still a lot of scope of improvement in the new technology in the EVs, and this is a very initial phase to come to direct conclusions where this technology having good and bad both sides to deal with. Now the main challenge of the automaker is to make this technology used in such a way that the good things are more in number than that of the bad ones.

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