Manufacturing of Electric Motorcycle

Contents

Manufacturing of Electric Motorcycle

Introduction

In the current era, sustainable technology plays an important part in the solving of different technology-based problems. Many organization in the market are majorly focused on implementing such sustainability in its operating activities and also creates dilemmas for people that are trying to contribute to the sustainable development projects. There are different categories of sustainable technologies like environmental technology, organic agricultural, renewable energy, environmental economics and sustainable living (Weaver, Jansen, Van Grootveld, Van Spiegel, & Vergragt, 2017). In this paper, there is a brief description of an organization who manufactures different electric motorcycles, but its management faced different technology-based problems.

This paper is based on giving some valid suggestions to the sustainability manager on how to implement the circular economy concept to the electric motorcycle manufacturing company. In the current era, there is a need to make some sustainable technological development projects because this type of durable technology helps to retain in the environment for the long run. In the electric market, sustainability majorly demands on the development of technologies and its related energies in the environment.

There are many technologies which can reduce, re-use and then recycle the product and material in order to make the industrial ecosystem. The reason is that there are many cases where the

waste of one part of the system, can be a raw material of another part of the system. Most of the electronic machinery based companies are now changing their products and related design in ways that give environmental based projects as a working safety and other quality and cost of the products. The material revolution, increased quality factors and other energy technologies are considered as one of the effective methods of developing sustainable technology.

This type of technology increased the energy efficiency in the transportation system of the countries. Most of the companies are playing an important part in the establishment of fuel-efficient working based new automobiles and then develop the urban mass transit-related arrangement. The company can make some development in the energy propulsion and storage in the form of fuel-cell, electric and hydrogen system in the manufacturing process. This paper is informative in sustainable technological development and circular economy concept point of view.

Different parts and application of circular economy

A circular economy is opposite to the old method of linear economy where the companies make different strategies in order to use the resources for a long time span (Circle Economy, 2016). It is considered as an efficient economy because it extracts the maximum value from this economy and then regenerate and recover the material and products at the completion of the service life. In the current scenario, where the electric motorcycle based manufacturing company is unable to reuse or recycle of its resources to being a sustainability manager, it’s a responsibility to makes different technical decisions regarding the conversion of the traditional technology to the sustainable ones. Like in order to manufacture the sustainable electric motorcycle, there is aneed to consider the following components like;

- Electrical parts, e.g. batteries, circuit boards, wires, switches and motors that are used in the manufacturing of the electric motorbikes.
- Structural parts, e.g. seat assembling, wheels, chassis, suspension and other related parts that help to make a proper structuring of such new and durable bikes.
- Miscellaneous parts, e.g. the bodywork, tyres, upholstery and transmission and other ones.

These above parts are considered as one of the major parts in the manufacturing of such vehicles that are environmentally friendly like do not emit any pollution and remain durable for a long period of time. Being a manager, it is important to critically consider which type of raw material and technology will be used in such a device and for that purpose proper planning is required to it. In this case, the major aim is to drive such components that boost the sense of the circular economy in the market. The major sensing factors of the circular economy are given below like;

- Preserve
- Priorities
- Rethink
- Use
- Collaborate
- Incorporate
- Design

These above are seven major key factors in the establishment of the circular economy concept in the environment. In this case, there is a need to firstly rethink about the existing business model

and then preserves the extent that already exists. After this, collaborate with the creation of joint values, incorporate with the technology and then design the future of the company.In the end, there is a stage to prioritize the regenerative resources and then use the waste as a resource of the company. On the basis of these steps, it becomes easy to make certain changes in the manufacturing process of this file. In this case, there is a need of such a manufacturing process where all the supplied goods and raw materials are accurately assembled in the right way. Because in the general manufacturing process most of the goods and mechanical raw materials are wasted in the manufacturing of such electric motorcycles.

In this circular economy, the major aim is to drive a long lasting design that can be effectively maintained, refurbishing, recycling, repair and can be reused again. Through this, it becomes easy for a manager to overcome pollution and other waste management related issues in the manufacturing place. Like in this case, different electrical, structural and miscellaneous parts are supplied from the manufacturing centres for the assembling of all these parts to make an electric motorcycle, but there are certain factors that badly impact the effective working of the sustainable electric motorbikes in the market. Like in case of its material, sometimes the bad quality of the material is used by the manufacturing company that enable the user to recycle all of the components of a new product.

In the future environment, this sustainability based concept become common in most of the developing and developing countries in order to overcome the pollution level in the organization. There are certain factors that impact the sustainability factor of the circular economy like material, technology, consumption power, cost related factors and many others. In the modern era, the concept of the sustainability is widely spread in most of the electric motors and other

technology based companies like building layer by layer, by considering material as a services, the circular city, feeding a waste-free culture, China's waste ban, marine plastic and make a Zero-Waste to Landfill (ZTWL) (Khalamayzer, 2017). All of the above factors have a ripple effect on sustainable economies.

In this case of manufacturing the sustainable electric motorcycle, there is a need to make such plan where the high quality electric and mechanical parts are used in the manufacturing of such motorbikes, like such type of bikes can also use for some charging purpose, do not emit any smoke, work with the efficient charging and also have some automatic feature in it. Firstly, it makes a proper plan in its manufacturing process and also made its proper timing schedule. The list of raw material to manufacture these sustainable motorcycles are given below;

- Clutch Cable
- Throttle Cable
- Windshield
- Disk Brake
- Cost Alloy Wheel
- Side Reflector
- Telescopic Fork
- Indicator
- Fog Lamp
- Head Light
- Fender
- Crash bar

- Brake Pedal
- Air Filter
- Exhaust Pipe
- Crash Bar
- Gear Box
- Tail Light
- Saddle Bag
- License Plate
- Luggage Rack
- Bock Rest
- Passenger Seat
- Fuel Tank
- Hand Grip
- Mirror
- Brake Master Cylinder

All these components are frequently used in this electric motorcycle manufacturing that directly effective on the sustainability of circular economy like in the first step, raw material, and its parts & components are a just-in-time delivery system so that no more confusion will be made in the manufacturing process (Chen, Tsai, & Hsieh, 2017). After this, the manufacturing process is started in the weld organizational sector with the fabrication of the computer controlled based frame. In this second step, all the material sections are completely weld together in order to make an automatic, manual and robotic equipment related process.

After this, in the third step of the small resin pellets of plastic are melted in the plastic department and then injected into different moulds at the high temperature and pressure in the injection moulding process. In the fourth step, metal and plastic components and parts are then painted in booths by using the powdercoating process. The work of the powder-costing apparatus is dispersing paint through the pressurized system and by largely spray- painter across the metal frame. The fifth one is to paint on the tow motors or overhead conveyors in the assembling department.

Now the electric engine of the motorcycle is properly arranged. This is the time when this engine is painted effectively. In the sixth step where all the spare parts are effectively fitted as a motorcycle in the assembling line process. After all these steps, the last one is to effectively installbrakes, wheels, exhaust pipes, foot pegs, wiring cables, radio, lights, saddlebags and hundreds of other related parts on the frame of a motorcycle (Denton, 2016).

Future industrial system and life cycle stages

In the future perspective of this electric motorbikes is more attractive and fascinated in the sustainable circular economy. This industrial system will positively impact on the environmental, economic and social sector of a country because through this, the pollution and costrelated problems are effective overcome and the efficiency of the product is also enhanced. In addition, there are many other benefits that will earn by the manufacturing companies after making such sustainable products in the market. As such type of industrial system helps the people to redesign new equipment with the last one, it will definitely reduce the cost of the manufacturing process of such system like in this way; there will no need to make any change in the manufacturing process.

While in addition, the resource conservation related process is also become enhanced that helps the company to earn a large amount of profit from such factors. The quality of machinery is also become enhanced because the life duration of the machinery becomes enhanced. In the future perspective, such new manufacturing design helps to construct an efficient balance between the environmental, social and economic issues related balance and makes different assessing and building related project factor that facilitating the building of sustainable mechanical industry (Redman, 2015).

In this case, there is aneed to manufacture such an electric motorcycle that helps the company to reuse and recycle all the manufacturing process in order to make the product. The reason is that there are many eco-sustainability related factors that badly impact on the working performance of the organization. When the future industrial system of this manufacturing company is considered, it comes to know that the performance of the company will boost in the customer market. In the current era, there is a tough competition between the companies in case of technological and environmental perspectives.

If this electric motorcycle manufacturing company follow the lifecycle design approach in their manufacturingdepartment, then the eco-sustainability based products of its products will become boosted, and the tangible commercial values of the cost and efficiency will become enhance (LeBel, Pelletier, Messier, & Trovao, 2018). This new sustainability based technical innovation is based on two major factors like firstly is to identify the advantageous trends in the product innovation and to make different strategies in order to support the decision making the process of the customer. There is a need to make some technological changes in the manufacturing activities of a company in order to reduce the time to market issue.

It is important for the future life-cycle of the products because it makes the consumer life easier and unpolluted the environment. In the current era, there is a great demand of the customer to make some innovation in the mechanical and electrical portion of the motorcycles, so in order to get a competitive advantage, there is aneed to make such technical changes in the manufacturing process. So in the stages of sustainabletechnology involves different steps like the engine of such motorbikes become the change, and some battery system will apply to it. This sustainable electric motorcycle helps the company to gain a competitive advantage in this case. The efficient battery system will be used in this system like the DC- Direct Current, Electric Motors, Permanent metal, Face Mount, AGM (Absorbed Glass Matt), figuring range and other long term batteries (Kerdlap & Gheewala, 2016).

In the future manufacturing process, renewable energy sources like solar energy and electrical energy will be used in it. For that purpose, LCA and LCC indicators will be used in order to overcome the pollution related products and services. The traditional source of operating activities is completely changed with the new sustainable technology. The duration of the life cycle of such a product will become changed because the electrical and mechanical process of the operating activities will become change. Most of the environmental related problems are overcome by using effective marketing strategies in it (Li, Zhao, & Brand, 2018).

This motorcycle manufacturing company should consider this factor in order to the effective manufacturing process as the natural gas (CCGT), solar (residential PV), nuclear power (PWR), coal powder (subcritical pulverized) and wind (offshore) (Eccarius & Lu, 2019). It is an important part because it plays an important part in the effective working of this electric motorcycle in the future. This approach is also favourable for the effective working of the

company because many environmentalrelated factors are critical analyses and solved. In the future span of 2020 to 2070, this approach of combining the technology and electrical energy in the production of motorbikes then the pollutionrelated factors can become reduces (Cox & Mutel, 2018). In this case, the attempt to reduce the depletion of the ozone layer can be reduced. Because in this he carbon emission in the burning of plastic, smoke and other related factors can be removed and the efficiency of the technology can be enhanced.

In this case, in order to drive an effective and efficient electric motorbike, the renewable source of energy will be used in the operating and manufacturing activities of acompany. Such a model is known as a socio-technical system that focus on developing the efficient operating system of the environmental-based motorbike in the manufacturing company. This is an effective method of appling the effective technology in the manufacturing process of the Electric Motorcycle of a company because all the performance of company is based on its products and related services.

Short & long term steps, and policies & standards

The sustainable energy based technology are mostly deployed in order to generate efficient electricity, power transportation system, cool and heat building and other machine related sectors. In this motorbikes, mostly the solar and other electrical energy is used in order to charge the bikes in the operating activities (Caliwag & Lim, 2019). This is a general sustainable transport initiative that reduces the pollution rate and improves the mobility factor in its operating activities. The potential tool of this manufacturing is based on life-cycle assessment, ecosystem. Risk assessment, environmental justice, integrated assessment models and the current and future scenario tools. The major components of this electric motorcycle are Chassis, Wheel, Tires, Engine, Final Drive, Instruments, Transmission and Tires. So a long term manufacturing

process is required in order tomanage all of the mechanical equipment in it accurately. Under these, each step, some short span of manufacturing steps are used in it.

The engine is considered as one of the major steps to manufacture electric motorcycles in the manufacturing department of the company. The items that are required in this engine manufacturing is rocker arm, exhaust part, cylinder head, combustion chamber, cooling fin, piston, push rod, valve lifter, engine mounting bolt hole, crank shaft, timing gear, nonreturn value, mounting lug, oil pump, crankcase, oil passageway, camshaft gear, spark plug lead, inlet port, oil feed pipe, screw and lock nut tappet adjuster. The fitting is considered as one of the major parts of the manufacturing process because all of the workings of the motorcycles is based on this factor. In order to assemble each part of the raw material, a certain time is required in it, which is known as short time space manufacturing process. But the combination of this short time span results in a long term manufacturing process. At the end of this assembling process, a quality controlbased inspection will be made by the mechanic's team who will make a visual inspection of the painted finish part of the motorcycle and other outer parts are also fitted with it. after this, the proper setting of all the spare part of the motorcycle is made by the manufacturing department team. The accelerator of such device will have an accelerator from 0-60 mph. Then a dyno test will be made for making the trial of braking, accelerator, wheel alignment, shifting, taillight and heading (Dog, 2019). They are conducted in order to consider and critically analyze the working and function of the new electric motorbikes. After this dyno test, a final inspection of all the operating and travelling activities of the electric motorbikes are considered. After the confirmation of the operating activities of this new motorcycle, now it becomes stored in the boxed of crates and then shipped it to the customer. In this case, being a facilitating manager, it

is the major responsibility to conduct a complete inspection of allthe operating activities. In the overall process, the 6-12 months are required for it because in this stage all the process like purchasing of the raw material and machinery from the suppliers, the manufacturing process and then inspection and packing process is required in it. There are many technology related issues that are faced by the manufacturing companies of the country because any negligence directly impact the performance level of the company.

In this case, the major components are based on three major parts are required in it like structural parts, miscellaneous parts and electrical parts. All of these parts are assembled in a certain time span. There are many case studies regarding the development of sustainable motorcycles in the market while the majority of them are based on improving the power related supply of motorcycles. Like there is a case study where different challenges are faced by such electrical motorcycle in the manufacturing process like integrated issues of the Lithium-ion battery. During making such equipment, there is a need to critically consider the power related issues because they badly impact the performance level and the market share of the electric vehicles in the market. There is a case where the different challenges like cost, reliability performance and safety related factors are faced by the manufacturing companies. Such type of issue is directly linked with the energy storage system in the EVs. Some outstandingcharacteristics of this system are high voltage, low self-discharge rate, high energy density, long cycle life, discharging rate related capability and high charging.

But in the emerging environment, this Lithium-ion battery is not performing well in the market due to different non-performing factors. So, in order to overcome it, there is a need of different battery chemistry, proper electric connection, cell packaging, proper thermal management,

assembling and the maintenance process. So, in order to drive an efficient electric motorcycle, there is a need to make a different cell packaging of Lithium Phosphate Iron Cell as an energy storage system in the engine machinery (Bernard, Ye, & Tay, 2015).

In this case, also, there is a need to implement the EVs battery pack in the mechanical body of the motorcycles. Because this is a new and sustainable form of energy that will boost the performance level of the motorcycle in the future environment and other environmental related issues can also become resolved in it. The numerous optimization method is used in the battery pack performance level. The electric cell balancing, the effective thermal management system and its leakage and resistance related connections boost the performance level of this electric motorcycle in the customer market. So being a manager, there is aneed to make such cost cutting strategies and other mechanical and technical approach in order to make an efficient electrical structure in it.

Conclusion

After critically analyze the current situation of the electric motorcycle manufacturing company where there is no reusable technology used by the company, it is concluded that there is a need of such sustainable technology in the manufacturing process where all the parts like structural, electrical and miscellaneous are effectively assembled to form an electric motorcycle, This factor directly impact the environmental related factor of an organization like no more pollution will generate by the motorbikes, the less energy is required for it and the company become able to gain a competitive advantage in the market. This paper is informative in der to make an effective manufacturing process of electric vehicles within the specific time span. In the future perspective, it is quite an effective way to combine energy and technology in one place. This

combination is completely resembled with thecircular economy related concepts where the material becomes usable for the people.

References

Bernard, L. H., Ye, Y., & Tay, A. (2015). Integration issues of Lithium-ion battery into the electric vehicles battery pack. *Journal of Cleaner Production* .

Caliwag, A. C., & Lim, W. (2019). Hybrid VARMA and LSTM Method for Lithium-ion Battery State-of-Charge and Output Voltage Forecasting in Electric Motorcycle Applications. *IEEE Access*.

Chen, H. S., Tsai, B. K., & Hsieh, C. M. (2017). Determinants of consumers' purchasing intentions for the hydrogen-electric motorcycle. *Sustainability, 9(8)*, 1447.

Circle Economy. (2016). *Making Sense of the Circular Economy, The 7 Key Elements.* Retrieved from Circle Economy: https://www.circle-economy.com/the-7-key-elements-of-the-circular-economy

Cox, B. L., & Mutel, C. L. (2018). The environmental and cost performance of current and future motorcycles. *Applied energy, 212*, 1013-1024.

Denton, T. (2016). *Electric and hybrid vehicles.* Routledge.

Dog, D. (2019). *How to Build a 96-Volt Electric Motorcycle.* Retrieved from Instructables workshop: https://www.instructables.com/id/How-to-build-a-96-Volt-Electric-Motorcycle/

Eccarius, T., & Lu, C. C. (2019). Powered two-wheelers for sustainable mobility: A review of consumer adoption of electric motorcycles. *International Journal of Sustainable Transportation*, 1-17.

Kerdlap, P., & Gheewala, S. H. (2016). Electric motorcycles in Thailand: A life cycle perspective. j*ournal of Industrial Ecology, 20(6)*, 1399-1411.

Khalamayzer, A. (2017, 12 29). *8 ripple effects of the circular economy in 2017.* Retrieved from GreenBiz: https://www.greenbiz.com/article/8-ripple-effects-circular-economy-2017

LeBel, F. A., Pelletier, L., Messier, P., & Trovao, J. P. (2018). Battery Pack Sizing Method-Case Study of an Electric Motorcycle. *2018 IEEE Vehicle Power and Propulsion Conference (VPPC)* (pp. 1-6). IEEE.

Li, P., Zhao, P., & Brand, C. (2018). Future energy use and CO2 emissions of urban passenger transport in China: A travel behaviour and urban form-based approach. *Applied energy, 211*, 820-842.

Redman, C. (2015). The Impact of Motorcycles on Air Quality and Climate Change: a Study on the Potential of Two-Wheeled Electric Vehicles. *scholarship.claremont.edu*.

Weaver, P., Jansen, L., Van Grootveld, G., Van Spiegel, E., & Vergragt, P. (2017). *Sustainable technology development.* Routledge.