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Automotive Design

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The Eco-Friendly Aston Martin Of 2060

This research paper is written to raise the issues that we will face in the future and ways we could overcome them by means of technology materials and design by using these three areas I hope to design an innovative vehicle that will help the environment and bring the thrill of driving back.

Pollution

Pollution in our urban cities and transport are having a devastating effect on human health." Emission from vehicles especially automobiles is responsible for about two third of air pollution in the urban area." (Bhandarkar, 2013). pollution caused by transport accounts for a third of pollutants in the air see (Fig 1) the types of toxins released range from carbon dioxide nitrogen oxide and many more.

This causes respiratory problems in young and old it also effects the environment and nature vehicle emissions are ground level, so it harms life directly more so than direct air pollution Air pollution in the UK is rising and so does the demand for hospital support "a health emergency". (BBC News 2019). every year there are admissions to hospitals due to cardiac arrest's this percentage of people being those coming into hospital by ambulance, so the NHS are at the forefront of this issue of pollution and its effects on the citizens of the UK.

Recent research into pollution show that there is more admissions to A & E due to high emissions from the main cities like Manchester Southampton and many more overpopulated areas of the country and effects many age groups resulting in asthma strokes and cardiac arrests "However, health studies show clear links with a much wider range of health effects," (Dr Heather Walton 2019) this wider range of health conditions caused by a consequence of high emissions could lead to terminal conditions like cancer and low birth rate for those living in major cities.

transport in cities and traffic account for a large majority of emissions and effects on health "We are already working hard to reduce transport emissions and are investing £3.5 billion to clean up our air." (The Department for Environment 2019) cutting emissions will provide people in urban environments with cleaner air to breath and reduce the smog in our cities the investment by the government will help to further reduce that pollution.

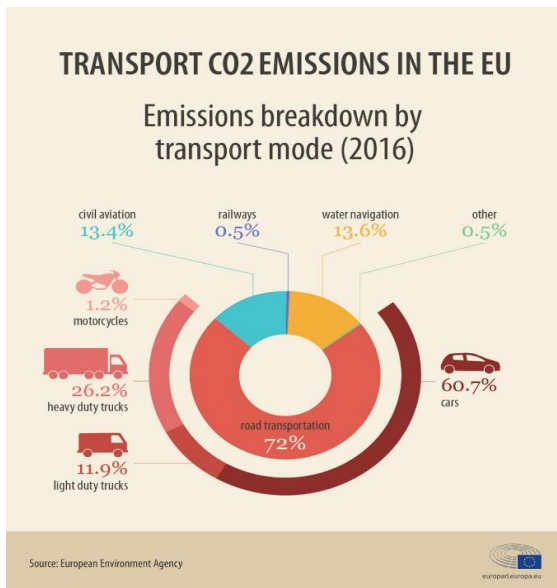


Figure 1: Evolution of CO2 emissions in the EU by sector (1990-2016)

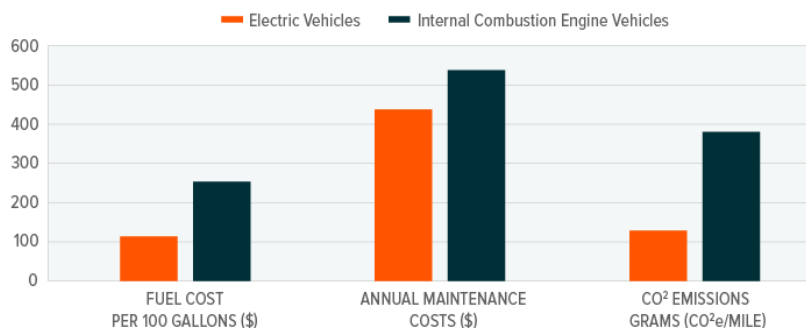
Solution Electric cars

Pollution caused by petrol and diesel cars are high electric powered vehicles also referred to as EVs are lower but produce some environmental impact “unscientific conspiracy theory” (Dr. Markus 2019) electric powered cars do produce some negative effects due to the production of the vehicles but in its lifecycle will be more helpful to the environment than fuel powered transport.

It has been discovered that electric vehicles have lowered pollution by 43% which is considerably more eco-friendly than conventional powered cars “in all cases examined, electric cars have lower lifetime climate impacts see (Fig 2) than those with internal combustion engines” (ZEKE HAUSFATHER 2019) EVs are making the planet cleaner and are benefiting the environment and human health.

Electric cars are beneficial to the planet but still causes some damage, but this could be lowered “A battery can be used for other purposes very effectively - but we need to establish what 'whole life' is for a battery,” (Jim Holder, and dw 2017) to lower its impact many engineers and universities are working on ways to recycle batteries if people can make their car last longer than the damage to the environment after the cars life cycle has ended will be lower.

ELECTRIC VEHICLES vs. INTERNAL COMBUSTION ENGINE VEHICLES



Fuel cost comparison data from the U.S. Department of Energy, as of 3/10/2018. Compares the national average cost of 100 gallons of gasoline to the cost of electricity for a similar amount of fuel, called an eGallon. Annual maintenance costs sourced from Kate Palmer, James E. Tate, Zia Wadud, John Nellthorp, “Total cost of ownership and market share for hybrid and electric vehicles in the UK, US and Japan,” Applied Energy, Volume 209, 2018, Pages 108-119. CO² Emissions data from the Union of Concerned Scientists, 2018.

Figure 2: (2018) The Future Of Transportation Is Autonomous And Electric. seekingalpha

Waste

Cars can cause more harm to the environment during the making process "The impact of the manufacturing — if you look at it from an environmental damages perspective — almost half of the damages can often come from the manufacturing of the car itself,"(Kyle Jaeger 2016) this being due to waste and use of production methods to make metals to produce the vehicles this process is damaging to the environment.

The waste produced by manufacturing cars is a big issue for manufacturers globally "fully one-third of the total environmental damage caused by automobiles occurred before they were sold and driven" (Mark Foster 2016) the use of techniques to mine metals and produce material for cars is incredibly high reducing this would help to reverse the damaging effects that it has on the environment.

The design of the components used and design of cars can help reduce cost and waste "production-consumption cycle" (Asimow 1962) by carefully designing a component or product and how this product is going to be produced the disposal and recycling of the product by analysing these factors manufacturers in the auto industry and more could reduce waste through better design making the same component with less material.

Solution recycling cars

Many manufacturers are making an effort to reduce their carbon footprint by turning to renewable resources to build cars "At Ford, we aim to reduce our impact on the environment," (Debbie Mielewski 2016) manufacturers just like ford are looking into using natural materials that we find in nature to make cleaner cars for the future.

What types of materials might manufacturers use to make new cars "As a leader in the sustainability space, we are developing new technologies to efficiently employ discarded materials and fibres"(2016) companies are making use of the material that didn't make the cut and plants that grow naturally in the ground to make building material from reducing pollution from making materials.

Companies like ford are pushing for more use of recycled material using consumer products "There is no waste," (Debbie Mielewski 2019) to reduce our waste countries could use there plastic bottles and other consumer products to create new interior door panels and dashboards more companies in the car industry are using more renewable materials in their cars to help reduce waste and pollution.

Overpopulation

Pollution is clearly a global issue and also a future issue but there is an equally big issue The population of earth is increasing and space is limited "The environments are very different, and they're different from what we evolved to live in,"(Dan Kennedy, Ph.D 2016) human beings are not built for the amount of population on earth see (Fig 3) and it could cause many issues in the future.

The rate of growth and not having the luxury to move more freely without people engaging in your space is going to create problems in society "And it's going to have effects on our mental health."(2016) studies by researchers have found that stress in cities is higher than people who live in less populated areas there are many negative effects for people who grow up in cities like being more deceptible to stress and long term health problems.

With our mental health to consider and ever increasing population numbers ever rising "Our planet cannot withstand such numbers,[of]"(Peter Ward 2019) people this growing number will

undoubtedly cause food shortages and product consumption which consequently will produce waste in our cities this is already an issue for Africa and soon the world.

With the increase in our population and personal transport also set to rise "Over the past 20 years, the rise in the number of cars on the road in Britain has been relentless, going up from 21 million in 1995 to 31 million in 2015"(Philip Gomm 2016) this increase in vehicles on our roads has caused pollution health problems and traffic jams that stretch for miles in most cities.

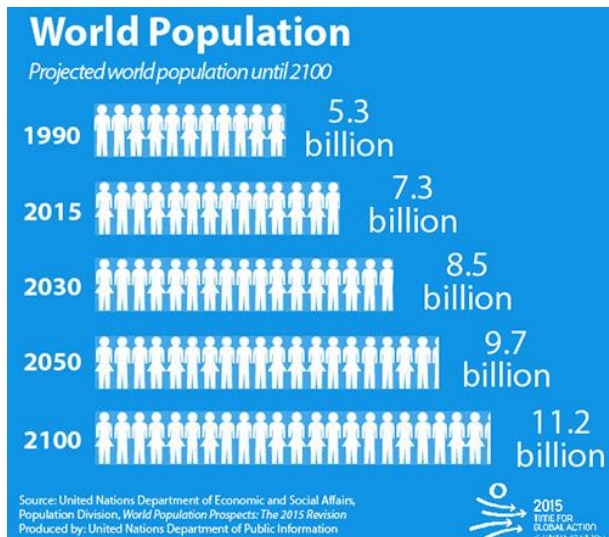


Figure 3: 2019 world population prospects. United Nations

Shared cars

More people in urban areas are now taking to public transport there are less personal car owners in cities than ever before "Millennials in particular live more in cities and buy fewer vehicles," (Strada 2019) this trend of using public services to move around and sharing space in cars is becoming a more popular choice of travel to access cities.

The sharing of each other's vehicles and less being owned is gaining popularity for people living in built up areas "[so]They are more likely to rent a vehicle, use a rideshare scheme or take public transport and that's threatening the business model of the automotive OEMs."(Strada 2019) so vehicle manufacturers are looking at ways to profit from this by means of smaller mobility to move more freely in urban areas.

In countries like Russia the implementation of shared vehicles has already started and are looking forward to the future to new advances in autonomous mobility systems "But it's clear that in several years, when self-driving technologies become wide-spread, these two services will eventually become one. You'll have a choice—either to sit in the backseat and the robot will drive, or sit behind the wheel yourself."(Ryazanov 2019) it's evident that these technologies will eventually become realised and cars will take on a new role of shared mobility and will help our cities become more efficient and less crowded.

The future of supercars autonomous

Along with sharing each other's space in cars there will be another helpful innovation that will bring society together this being Autonomous cars they will change the way we socialise in our cars the way we interact with the interior "Vehicle design is definitely going to change completely," (Rimac 2019) the interior space will become larger as the passengers will spend more time interacting in that space as people will not be in control of the driving experience design in this area will be key.

The overall look of autonomous cars and the ways manufacturers approach this is shown in many concepts "Nobody really knows what it will be like. Some people are working on things that look like little trains on rubber wheels, if that's the right direction I am not really sure. I have some ideas of my own which I won't share now." (2019) so many popular car makers are experimenting with the new architecture and space that autonomous mobility will offer, and it is an exciting future for this technology.

With advancement in new driving technology the issue of where supercars fit into that market has been on luxury brands minds autonomy can be used to teach inexperienced people to race "The car basically takes you around the track at the right speed, the right RPMs, the right gears, the right line, and you learn through the car showing you the best way. Then you can take over on the next few laps, and if you make a mistake, the car can intervene." (Frank Stephenson 2017) The world of supercars will have a place in this driverless market and will teach people to control their cars more safely on and off the track this will be useful in road situations.

Loneliness and socialising

There are positive and negative ways that technology can keep us safe but also keep us apart it can become a barrier in some cases socialising has become easier through technology but has made society closed off from each other "there has been a decline of the sense of community the nation feels as a whole" (Simon Roberts 2019) more and more people are becoming antisocial and feel there is no communication in our society.

A supermarket has recently conducted a survey that will give people a better understanding of peoples social life and how there are more lonely and unsocial people than many people think see (Fig 3) and that most of the participants added they felt that there is no "support network" (Olivia Petter 2019) the lack of communication between friends and family once the people that you could always count on are now only reachable through social media.

Social media is taking away face to face interaction and instead of going out and seeking a social life people are using technology to replace interacting and "feel totally absorbed online" (David Brooks 2017) more people are using the internet as a way to connect with each other and become lost in a digital world and are becoming further alienated in society.

The connection between technology and its effects on people's social wellbeing is apparent in today's world "feeling socially isolated can lead to one becoming objectively isolated." (Caroline Beaton 2017) the more you isolate yourself the less communication skills you have and can distance you from conversations with friends or family social media is creating a gap between people.

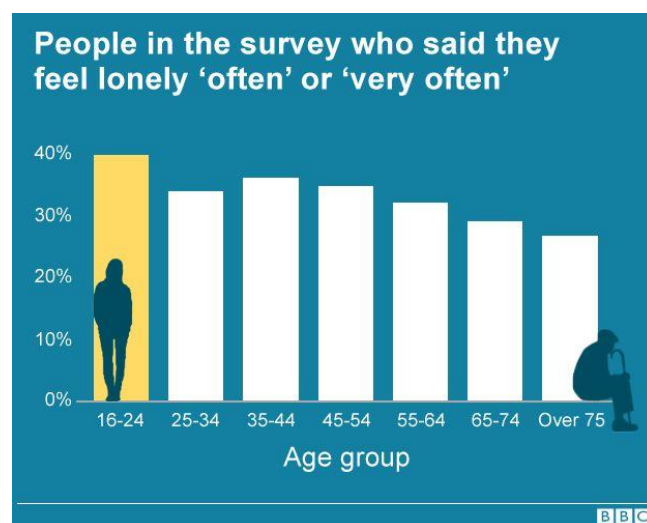


Figure 3: (2018) BBC

Technology in cars connecting people

Technology has definitely made an impact on our lives but has also brought deprived people from poor countries to make connections with people car manufacturers in the future will use technology to help bring people together "We're moving from being just a hardware provider to being a hardware, software, and experiences provider," (Don Butler 2016) cars will interact and connect to devices and new screen technology will allow us to video chat and interact in a more personal manner with loved ones and friends.

Companies like Ford understand this mission and are making an effort to use innovative technology in their cars and are looking to use it for better experiences for socialising "The future is going to be different, and we are embracing that difference, and we'll continue to be a part of people's lives." (Don Butler 2016) car companies are understanding that autonomous cars are going from dreams to becoming reality and we will use cars as social media spaces and an interactive space for friends and family.

It's been known that our phones are an extension of ourselves in the future so will our vehicles they will be known as "[the]ultimate mobile device." (Ford CEO Mark Fields 2016) we will use phones to connect to our cars using voice commands to control apps and in car A.I allowing people to connect even easier.

New innovations in tech in phones and watches will change the way we interact with cars "Connectivity is the new battleground for car manufacturers," (Chas Hallett, editor-in-chief of What Car 2013) the most interesting and most recent developments in smart watches are being developed further to use in our cars to even control vehicles.

This advancement in smart watch connectivity will also become a crucial part of our interaction with vehicles our key to the car and operator of our interior space "In-car internet is coming and now with consumer electronics focusing on watch-based connections, Nissan is getting ahead of the game and joining the two together very cleverly." (2013) the watch will be as important as the car itself it is a convenient way of interacting with the car using voice commands to simply open the door to the interior change the lighting and access apps and social media.

There will be other ways we can use watches in our cars if you're in the house or outside or at work you could use the watch to customise the climate of your automobile "Imagine if you could heat up your car on a cold day before you got into it or shut the roof of your convertible when it started raining and it was parked outside," (Mr Hallett 2013) this device could save people time allowing the user to talk to friends or organise a meeting and just relax without unnecessary interruptions.

AI assistant

Along with smartwatches we may also see a change in the way we interact with our cars using an "Intelligent Personal Assistant." Also known as A.I That will help organise your work life meeting with friends playing your favourite songs when you may have had a stressful day it will recognise your patterns and use it to provide you with a better experience the next time you enter.

The future of the car and the many innovations that will make our lives easier AI will offer many new features to the users experience "in the process, it completely adapts to your needs, personally welcoming you as it automatically adjusts seating, temperature, as well as screen preferences." (JONATHAN M. GITLIN 2019) the future holds artificial intelligent assistants that will allow the driver or non-driver to control the car using their voice and be waited on hand and foot by a virtual secretary.

It will open many new doors for the end user with just a simple phrase you can change your mood lighting music and more "We expect much higher engagement with voice interaction," (Dieter May, BMW's SVP 2019) the future suggests that we will have a deeper connection to our cars they will understand our personality likes and dislikes and use that information to tailor a more enjoyable and relaxing experience for the user.

If you are outside enjoying a coffee with a friend you may be able to interact with your watch or smartphone and contact your car by phrasing "Alexa, ask Automatic where my car is," you will get a location off your vehicle as it collects you autonomously just a few ways that we may interact with our future mobility.

Health problems in Britain

New devices will definitely make our lives easier but misuse of these products could affect our health With so much technology in today's society there are less people exercising than they did in the past "A number of factors work to drive home exercise, including self-consciousness, cost and convenience," (Michael Oliver) with the rise in the cost of food and products and balancing work life the UK is becoming unhealthy.

There are large amounts of British citizens that are unfit "The research finds that a significant chunk of the population rarely or never exercises," (Oliver) the trend of being isolated at home spending more time online getting products delivered easily makes people lazy and less motivated to engage in healthy activities outside the comfort of home.

The fact that people can access so many products and unhealthy food online has made human beings impatient see (Fig 2) society is a cycle of instant gratification without the need for going out "It's gotten me in the mode of expecting things at my door pretty quickly." (Fatemi 2016) human beings don't have the capacity to wait for their products and expect it instantly which has a negative effect on mental wellbeing.

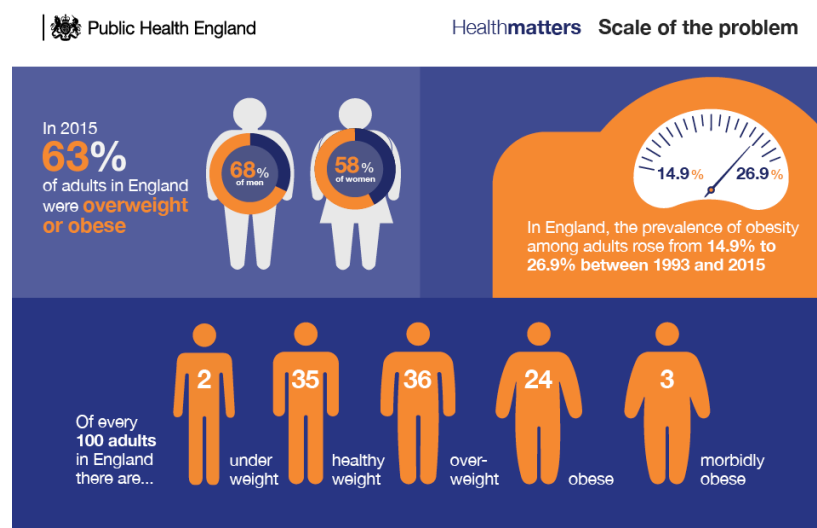


Figure 4: (2017) Health Matters. Gov

Solution health technology

Some manufacturers have recognised these growing issues and have conducted research into our lives and created a car that can monitor a person's health using the interior this concept was shown at Geneva "the car that cares." (Neil Versel 2012) the idea of this experimental vehicle was to

demonstrate that monitoring technology could save lives and allow people to confront their health issues and become more active.

Ford have developed this health monitoring system in the seats and steering wheel of the car it will inform the driver of their fitness "Sync will be Ford's key technology supporting activities in the health and wellness sphere," (Gary Strumolo 2012) this technology could help emergency services get to a patient before they cause a crash due to ill health and the convenience of keeping up to date with your health in a car offers the user a better insight into themselves and manage their stress and understand when to relax.

it not only supports the driver with their health but also alerts the driver of other people in the car and their health "We shouldn't have to worry that we're disconnected from our own health maintenance when we're in our cars," (Ford 2012) this means that if there is a developing illness the driver will be able to take action and potentially save a life this type of innovation has its place in the car industry and is soon to be realised.

Stress at work

With advances in new health monitoring technology we face other problems but this time of the mind life has become faster paced people are finding it difficult to cope with their workload and this is having an effect on the national health service and the individual's mental wellbeing "one in 20 cases of depression or anxiety annually is attributable to high stress at work" (NHS 2007) this number is sure to rise year by year and it is using a lot of resources to care for those effected by work stress related issues the country is being overworked and expectations of results is higher by bosses.

The factor of short deadlines for people is forcing workers to take their work home due to the "time pressure is the single most important cause of stress and of the illness to which it leads," (Institute of Psychiatry, Kings College London 2007) with no time to finish their workload family life becomes less important and leads to strain in relationships and the individual's social life and overall happiness.

There are more expectations from bosses in responsible roles who oversee many people and feel that failure is not an option "Initially the message was clear: people doing important or difficult work under pressure were particularly susceptible," (Jill Kirby 2018) stress in the UK and globally is at an all-time high and people are looking for ways to cope with work and that fine balance of family life.

Smell technology

The stress of work life and the pace of life becoming that much faster car manufacturers are looking into new technology that could relax their occupants in future vehicles by using the simple sense of smell "electric smell" (Wynne Parry 2018) this device could be used to send smells to your friend or receive them the sense of smell is the most powerful memory provoker and could be used to calm occupants after a hard day's work.

The idea of using the sense of smell in cars is to allow the occupant to share a moment with their friend or a family member without having to be there with them in order to experience it this is where VR could be useful "It is part of a whole, integrated virtual reality or augmented reality. So, for example, you could have a virtual dinner with your friend through the internet. You can see them in 3D and share a glass of wine together" (Adrian Cheok 2018) the integration of smell and virtual reality will allow people to experience the other person's environment and socialise with them if for example they were on a business trip it could make the person more relaxed and reassured.

What the inventors of this device need to do is produce a smaller easily used product "The next stage is to produce it in a more controlled manner, and this will allow for people to develop software and products to generate electric smell." (Cheok 2018) these being phones and car manufacturers

this device could change the way we interact with our interiors and the way we experience virtual reality and the use of social media.

Projected windows

There are other advances in interior technology manufacturers are looking at using the windows inside the car as interactive touchpads "Windows of Opportunity"(Rick Marshall 2012) the interior could become more interactive stopping boredom of occupants by allowing them to play games and connect their phones to the windows and use there apps.

In the future we can expect our phones and watches will be connected with our cars so we will be able to use them access our apps using the windows and interact with the moving environment "Advanced windows that are capable of responding to vehicle speed and location could augment real world views with interactive enhancements to provide entertainment and educational value." (Tom Seder 2012) this new development could have many educational purposes for adults and children move and learn click on buildings and listen to the history of the architecture even watch films or YouTube videos via the interior.

Mind control

In addition to being able to interact with the windows inside as a form of entertainment you will also be able to potentially control the vehicle using just your thoughts "There are two starting points of this project. The first one is to provide a driving method without using hands or feet for the disabled who are unable to move freely; and secondly, to provide healthy people with a new and more intellectualized driving mode,"(Zhang Zhao 2015) the potential of this new way of driving would be to enable those who can't drive giving someone back there independence and freedom from their debilitations.

Soler cell windows

New innovations are making the impossible possible for disabled people but also brings new energy solutions like window energy gathering panels that are clear and could produce half of the cars power "the large window areas could be turned to solar cells during parking, thus recharging the batteries and simultaneously keeping the car's interior cool."(Lin 2018) This revolutionary material is aesthetically pleasing and does not disrupt the users view from inside the cabin it will collect energy while static helping to charge the batteries.

It's an incredible leap in solar energy and could power a building with no cost to the environment so this Solar energy window could revolutionise the way we think about collecting power for our cars in the future "wonder mineral"(JESUS DIAZ 2018) this material holds many applications for houses cars phones and also lends a hand in saving the planet just a number of innovations that will help change the future for the next generation.

Spherical wheels

Automotive makers are also looking into the future of wheel design but why are car manufactures looking at new ways to move by using a treaded ball "because spherical wheels could allow the car better lateral movement,"(Chris Davies 2017) this ball made by goodyear if fitted to cars would give us more opportunities to make more use of space as the vehicle could move In any direction without delay parking cars closer together decreasing the congestion in the city.

How will these wheels be different from conventional ones well goodyear's ball wheel is smart and can read the road and compensate for changing weather conditions and communicate that with other nearby drivers "That means a lot higher sensor content from the vehicle for reading the

environment and the road.”(Keith Price 2016) the wheel is making decisions on the best course of action in certain conditions this will be a safer way to travel as the wheel will never lose grip helping to increase safety and will also inform the driver of the wear percentage so they can change the ball to a fresh ones.

This spherical tyre could change the way we engage in our cities and interact with other vehicles this ball design shows that the world is changing and soon will be vehicles and tyres “These are mere possibilities, and what we do with our concept tyres is much like what car companies do with concept cars,”(Price 2016) innovative thinking that went into these spherical balls will inspire and get manufacturers to consider radical designs that could improve our lives this idea of a smart tyre could get the ball rolling in the right direction.

How will my vehicle use this research and what is its intended purpose?

My vehicle is set In the year 2060 environmental concerns increasing population a need for sharing with space becoming an issue and a social media boom and ever decreasing resources will force car manufacturers to adopt a fully electric drivetrain cars will be built from renewable materials and Aston martin will have to adapt to this changing world.

with a car that can offer its young and aging customers the same driving experience elegant interior with autonomous driving features combining its classic heritage with a modern twist with M as you're A.I assistant taking the wheel or showing you how to take the car to its limits on a track outside of the stresses and restrictions of a modern city.

Why Aston martin and how does my research link to the brand

Aston martin is a global recognised brand and has a long history and is and always will be a forward looking automaker that innovates and uses its limited resources to create stunning futuristic designs “Everyone who drove it in the war years was convinced they had driven the car of the future.” (Guy Bird) even in the very early years of the brand it was like nothing people had seen before the company was breaking the mould of traditional styling and simple technology of the day and creating a distinguished futuristic machine that would bring automakers into the future.

Its unique ability to take what it has and changing it to make it better through small design changes Aston martin created the most aerodynamic efficient machines for the road and the race track it was far ahead of its time with its beautiful exterior it truly was an “aesthetic revolution” (Guy Bird) and since its first designs it continues to shock people with new technology and luxury sleek lines changing what it has to make something incredible that grabs the soul and stirs the senses.

Aston martin has made the leap into electric vehicle's as the brand are environmentally concerned and could see the benefits of using an electric powertrain “What does electric give you?” (Palmer 2019) electric power can lower emission's give the user a more enjoyable experience with no lag from a traditional engine and lowers noise pollution and helps people to breath cleaner air.

Aston martin has always tried to push the boundaries of what is possible and are open to new ideas in technology and design they are still using old to make new products but they are looking into the future of their company and giving it a different spin “We are still using the same principles of modularity of design, using knowledge and techniques we've evolved over the past two decades, but now we are taking it to a whole different level,” (Ian Minards 2017) Aston realise that autonomous vehicles will be reality sooner than we think and are adapting to this in there Lagonda concept which shows the direction Aston are going.

With the launch of Lagonda Aston martins forward thinking branch of their company they aim to show the world what the future of the automobile will look like and what innovative technology we

could expect "When we relaunched Lagonda, we set ourselves an ambitious target to be the world's first luxury electric brand. We see the Lagonda brand sitting within a unique niche in the market," (Marek Reichman 2019) not only does Lagonda inspire future generations to reach for what they thought was not possible and bring it into reality Aston martin will follow suit and these two brands will come together as one and create jaw dropping designs and out of this world solutions to our current pollution overpopulation and limited resources and aim to solve them from day one using innovative ideas and technology.

Aston martin aims to provide people with an experience like no other a place to take in the worlds beauty in an even more futuristic and tranquil interior that will express the users unique personality while the car does all the hard work "It is for the high-end luxury customer who wants to explore and be autonomous while remaining mindful of the impact they are having on the environment." (Marek Reichman 2019) Aston martin cares about our planet and is one of just many brands in the automotive industry stepping up and showing the world a better way to power us forward with a fully electric drivetrain and renewable recycled and natural fibres to create its stunning interiors while giving back to the planet that has given us so much.

For those lucky enough to afford such a vehicle the interior will be like nothing that the current generation have seen it will offer the user a place to relax socialise connect with technology and escape their daily routine "Lagonda will achieve this but it will also provide joy and delight to the people who get to enjoy its unique internal environment." (Marek Reichman 2019) the goal of Aston martin is to create an escape and a unique experience for people to enjoy and feel special each vehicle giving the user a tailored and individual service.

As Aston martin are looking into how they could utilize autonomous features in their car it is clear that they are looking at new ways to use this technology as an entertainment and learning tool "Why couldn't the autonomous driver show you the best racing line around a race track? Autonomy predominantly provides, you know, safety, stress-release in urban congestion and so forth. But autonomy has another play in our space, which is how it can actually enhance the driving experience"(Linda Xu 2019) the idea is Aston will make a car that allows customers to experience a professional racing drive using autonomous driver then the user will be shown how to approach lines on a track and take over the wheel.

The company are looking into how they can maintain relevance in the future by using new ways of building and creating a new design DNA "When you develop a car today, it still needs to be relevant and useful to the consumer in ten years. So, technology will play an increasing role in ensuring our cars can be updated and remain technologically relevant," (Sproule 2019) Aston will ensure that their vehicles remain advanced leaders in the luxury market and offer its customers a radical new look and feel to their vehicles.

The car will also be used as an A to B service to work and home the idea is that the driver has the choice between driving and relaxing keeping the human elements with a twist of autonomy "With autonomy, you don't have to have a carbon-based chauffeur, you have a bits-and-bytes-based chauffeur." (Sproule 2019) a vehicle you can really relax and enjoy a silent journey in with no awkward conversations between driver and passenger a sports car made for you.

With technology to match with the sophistication of a brand that Aston martin expects there future models like Lagonda will be a connected car using social media to enhance the users experience so "5G networks will play a crucial role in handling the massive amounts of data generated by AVs and their users for all kinds of purposes, including safety, connectivity and entertainment." (Simon Sproule 2019) Ensuring the security of the user's data and the car itself from being hacked this danger poses a threat and luxury brands like Aston will have to create a high-level security net that can stop foreign parties from infiltrating its systems.

The Aston of the future will be a stylish innovative and inspiration to other brands as Aston firmly places its name in the future of mobility luxury sports travel "A highly-desirable electric vehicle with the levels of performance expected of an Aston Martin". (Sproule's 2019) A car that a passionate individual can appreciate and relax in as they taste the future of Aston martin sports cars.

In conclusion we face many issues in the future and at present the misuse of resources that are wasted in production of vehicles that cause more pollution before the car is even on the road the emissions created by traditional engines and overpopulation and the health factor of what pollution can do to human beings the most effected in major cities my design will use all of the research conducted and create a eco-friendly vehicle that uses natural materials to build its beautiful interior and exterior.

and use innovative technology to help bring the current and next generation more connected and socially closer together Aston martin is one of the most iconic brands who are changing the way we think about the automobile and are making efforts to help lower emissions push technological boundaries and break the mould with incredible designs "We don't make cars, we make dreams," (Sproule's 2019) it will accomplish this and much more as it drives us into a eco-friendly future.

References

Bibliography

Bhandarkar, S., 2013 . Vehicular Pollution, Their Effect on Human. *Vehicle Engineering*, 1(2), p. 33.

" Emission from vehicles especially automobiles is responsible for about two third of air pollution in the urban area"

Bibliography

NEWS, B., 2019. *Health*. [Online]
Available at: <https://www.bbc.co.uk/news/health-50119981>
[Accessed 23 october 2019].

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"However, health studies show clear links with a much wider range of health effects,"

"We are already working hard to reduce transport emissions and are investing £3.5 billion to clean up our air."

Bibliography

Jaeger, K., 2016. *archive.attn*. [Online]
Available at: <https://archive.attn.com/stories/13637/hidden-environmental-cost-manufacturing-vehicles>
[Accessed 25 October 2019].

"The impact of the manufacturing — if you look at it from an environmental damages perspective — almost half of the damages can often come from the manufacturing of the car itself,"

(Ellsmoor, 2019)

Bibliography

Ellsmoor, J., 2019. *Are Electric Vehicles Really Better For The Environment?*. [Online]
Available at: <https://www.forbes.com/sites/jamesellsmoor/2019/05/20/are-electric-vehicles-really-better-for-the-environment/#3b6bb40076d2>
[Accessed 25 October 2019].

“unscientific conspiracy theory” (Dr. Markus 2019)

Bibliography

Ellsmoor, J., 2019. *Are Electric Vehicles Really Better For The Environment?*. [Online]
Available at: <https://www.forbes.com/sites/jamesellsmoor/2019/05/20/are-electric-vehicles-really-better-for-the-environment/#3b6bb40076d2>
[Accessed 25 October 2019].

(HAUSFATHER, 2019)

Bibliography

Ellsmoor, J., 2019. *Are Electric Vehicles Really Better For The Environment?*. [Online]
Available at: <https://www.forbes.com/sites/jamesellsmoor/2019/05/20/are-electric-vehicles-really-better-for-the-environment/#3b6bb40076d2>
[Accessed 25 October 2019].

Bibliography

HAUSFATHER, Z., 2019. *Factcheck: How electric vehicles help to tackle climate change*. [Online]
Available at: <https://www.carbonbrief.org/factcheck-how-electric-vehicles-help-to-tackle-climate-change>
[Accessed 25 October 2019].

“in all cases examined, electric cars have lower lifetime climate impacts than those with internal combustion engines”

Bibliography

DW, 2017. *How eco-friendly are electric cars?*. [Online]
Available at: <https://www.dw.com/en/how-eco-friendly-are-electric-cars/a-19441437>
[Accessed 25 October 2019].

"A battery can be used for other purposes very effectively - but we need to establish what 'whole life' is for a battery,"(Jim Holder, 2017)

(blogs, 2016)

Bibliography

blogs, 2016. *Automotive Industry and Impacts on Environmental History*. [Online]
Available at: <https://blogs.lt.vt.edu/jaherget/>
[Accessed 25 October 2019].

“fully one-third of the total environmental damage caused by automobiles occurred before they were sold and driven” (Mark Foster 2016)

Bibliography

Menerey, G. A. K. & D., 1994. Air & Waste. *Sustainable Development by Design: Review of Life*, Volume 44, p. 650.

"production-consumption cycle" (Asimow 1962)

(Haj-Assaad, 2016)

Bibliography

Haj-Assaad, S., 2016. *autoguide*. [Online]
Available at: <https://www.autoguide.com/auto-news/2016/07/automakers-are-building-your-cars-with-interesting-recycled-materials.html>
[Accessed 25 October 2019].

cars “At Ford, we aim to reduce our impact on the environment,” (Debbie Mielewski 2016)

“As a leader in the sustainability space, we are developing new technologies to efficiently employ discarded materials and fibres” (2016)

(LEKACH, 2019)

Bibliography

LEKACH, S., 2019. *mashable*. [Online]
Available at: <https://mashable.com/article/car-makers-recycle/?europe=true>
[Accessed 25 October 2019].

"There is no waste," (Debbie Mielewski 2019)

(Tayag, 2016)

Bibliography

Tayag, Y., 2016. *inverse*. [Online]
Available at: <https://www.inverse.com/article/10947-as-urban-populations-explode-personal-space-will-become-a-rare-luxury>
[Accessed 25 October 2019].

“The environments are very different, and they’re different from what we evolved to live in,”(Dan Kennedy, Ph.D 2016)

“And it’s going to have effects on our mental health.”(2016)

Bibliography

McKie, R., 2019. *The Observer*. [Online]

Available at: <https://www.theguardian.com/world/2019/jul/07/africa-birth-control-global-population-crisis>

[Accessed 25 October 2019].

“Our planet cannot withstand such numbers,[of]”(Peter Ward 2019)

(News, 2016)

Bibliography

News, B., 2016. *Cars on England's roads increase by almost 600,000 in a year*. [Online]

Available at: <https://www.bbc.co.uk/news/uk-england-35312562>

[Accessed 26 October 2019].

"Over the past 20 years, the rise in the number of cars on the road in Britain has been relentless, going up from 21 million in 1995 to 31 million in 2015"(Philip Gomm 2016)

Bibliography

silverpeak, 2019. *Autonomous vehicles, shared mobility, and Mobility as a Service – the future of the urban transport market is already here..* [Online]

Available at: <https://www.silverpeakib.com/the-future-of-urban-transport-2/>

[Accessed 26 October 2019].

before “Millennials in particular live more in cities and buy fewer vehicles,” (Strada 2019)

“[so]They are more likely to rent a vehicle, use a rideshare scheme or take public transport and that’s threatening the business model of the automotive OEMs.”(Strada 2019)

Bibliography

Khrennikov, I., 2019. *bloomberg*. [Online]

Available at: <https://www.bloomberg.com/news/articles/2019-02-08/here-is-the-future-of-car-sharing-and-carmakers-should-be-terrified>

[Accessed 26 October 2019].

"But it's clear that in several years, when self-driving technologies become wide-spread, these two services will eventually become one. You'll have a choice—either to sit in the backseat and the robot will drive, or sit behind the wheel yourself."(Ryazanov 2019)

Bibliography

MURDOCK, J., 2019. *newsweek*. [Online]

Available at: <https://www.newsweek.com/mate-rimac-future-car-design-change-autonomous-vehicles-electric-supercars-1464565>

[Accessed 26 October 2019].

"Vehicle design is definitely going to change completely," (Rimac 2019)

"Nobody really knows what it will be like. Some people are working on things that look like little trains on rubber wheels, if that's the right direction I am not really sure. I have some ideas of my own which I won't share now."(2019)

Bibliography

Condliffe, J., 2017. *MIT Technology Review*. [Online]

Available at: <https://www.technologyreview.com/f/609073/what-does-autonomy-mean-for-supercars/>

[Accessed 26 October 2019].

"The car basically takes you around the track at the right speed, the right RPMs, the right gears, the right line, and you learn through the car showing you the best way. Then you can take over on the next few laps, and if you make a mistake, the car can intervene." (Frank Stephenson 2017)

Bibliography

Petter, O., 2019. *INDEPENDENT*. [Online]

Available at: <https://www.independent.co.uk/life-style/loneliness-week-friends-socialising-once-month-sainsbury-s-living-well-index-a8961686.html>

[Accessed 26 October 2019].

“there has been a decline of the sense of community the nation feels as a whole” (Simon Roberts 2019)

“support network” (Olivia Petter 2019)

Bibliography

Beaton, C., 2017. *Forbes*. [Online]

Available at: <https://www.forbes.com/sites/carolinebeaton/2017/02/09/why-millennials-are-lonely/#124604ed7c35>

[Accessed 27 October 2019].

“feel totally absorbed online” (David Brooks 2017)

“feeling socially isolated can lead to one becoming objectively isolated.” (Caroline Beaton 2017)

(Ford, 2016)

Bibliography

Ford, 2016. *Wired*. [Online]

Available at: <https://www.wired.com/brandlab/2016/02/how-connectivity-is-driving-the-future-of-the-car/>

[Accessed 27 October 2019].

“We’re moving from being just a hardware provider to being a hardware, software, and experiences provider,” (Don Butler 2016)

“The future is going to be different, and we are embracing that difference, and we’ll continue to be a part of people’s lives.” (Don Butler 2016)

“[the]ultimate mobile device.” (Ford CEO Mark Fields 2016)

(Wakefield, 2013)

Bibliography

Wakefield, J., 2013. *Nissan launches Nismo smartwatch for drivers*. [Online]
Available at: <https://www.bbc.co.uk/news/technology-23964797>
[Accessed 27 October 2019].

"In-car internet is coming and now with consumer electronics focusing on watch-based connections, Nissan is getting ahead of the game and joining the two together very cleverly."(2013)

"Imagine if you could heat up your car on a cold day before you got into it or shut the roof of your convertible when it started raining and it was parked outside," (Mr Hallett 2013)

Bibliography

Cain, L., n.d. *hfe*. [Online]
Available at: <https://www.hfe.co.uk/blog/britains-fitness-habits-revealed/>
[Accessed 27 October 2019].

"A number of factors work to drive home exercise, including self-consciousness, cost and convenience," (Michael Oliver)

"The research finds that a significant chunk of the population rarely or never exercises," (Oliver)
(Muther, 2016)

Bibliography

Muther, C., 2016. *bostonglobe*. [Online]
Available at: <https://www.bostonglobe.com/lifestyle/style/2013/02/01/the-growing-culture-impatience-where-instant-gratification-makes-crave-more-instant-gratification/q8tWDNGeJB2mm45fQxtTQP/story.html>
[Accessed 27 October 2019].

"It's gotten me in the mode of expecting things at my door pretty quickly."(Fatemi 2016)
(Versel, 2012)

Bibliography

Versel, N., 2012. *mobihealthnews*. [Online]
Available at: <https://www.mobihealthnews.com/tag/ford-motor-health-monitoring>
[Accessed 27 October 2019].

"the car that cares." (Neil Versel)

"Sync will be Ford's key technology supporting activities in the health and wellness sphere,"(Gary Strumolo 2012)

"We shouldn't have to worry that we're disconnected from our own health maintenance when we're in our cars,"(Ford 2012)

Bibliography

Maria Melchior and the Institute of Psychiatry, K. C. L., 2007. *NHS*. [Online]
Available at: <https://www.nhs.uk/news/mental-health/stress-at-work-is-a-risk-factor-for-depression/>
[Accessed 30 October 2019].

“one in 20 cases of depression or anxiety annually is attributable to high stress at work” (NHS 2007)
” (Institute of Psychiatry, Kings College London 2007)

Bibliography

Kirby, J., 2018. *globalnews*. [Online]

Available at: <https://globalnews.ca/news/4138006/stress-causes-today/>
[Accessed 30 October 2019].

“Initially the message was clear: people doing important or difficult work under pressure were particularly susceptible,” (Jill Kirby 2018)

(Parry, 2018)

Bibliography

Parry, W., 2018. *nbcnews*. [Online]

Available at: <https://www.nbcnews.com/mach/science/digital-smell-technology-could-let-us-transmit-odors-online-chats-ncna940121>
[Accessed 30 October 2019].

“electric smell” (Wynne Parry 2018)

“It is part of a whole, integrated virtual reality or augmented reality. So, for example, you could have a virtual dinner with your friend through the internet. You can see them in 3D and share a glass of wine together” (Adrian Cheek 2018)

“The next stage is to produce it in a more controlled manner, and this will allow for people to develop software and products to generate electric smell.” (Cheek 2018)

(Marshall, 2012)

Bibliography

Marshall, R., 2012. *digitaltrends*. [Online]

Available at: <https://www.digitaltrends.com/cars/new-tech-puts-interactive-apps-on-car-windows/>
[Accessed 30 October 2019].

“Windows of Opportunity”(Rick Marshall 2012)

“Advanced windows that are capable of responding to vehicle speed and location could augment real world views with interactive enhancements to provide entertainment and educational value.”
(Tom Seder 2012)

(Murgia, 2015)

Bibliography

Murgia, M., 2015. *telegraph*. [Online]

Available at: <https://www.telegraph.co.uk/technology/news/12040216/Mind-controlled-cars-unveiled-in-China.html>

[Accessed 30 October 2019].

"There are two starting points of this project. The first one is to provide a driving method without using hands or feet for the disabled who are unable to move freely; and secondly, to provide healthy people with a new and more intellectualized driving mode,"(Zhang Zhao 2015)

(DIAZ, 2018)

Bibliography

DIAZ, B. J., 2018. *fastcompany*. [Online]

Available at: <https://www.fastcompany.com/90165034/this-glass-could-turn-our-homes-cars-and-screens-into-power-plants>

[Accessed 30 October 2019].

"the large window areas could be turned to solar cells during parking, thus recharging the batteries and simultaneously keeping the car's interior cool."(Lin 2018)

"wonder mineral"(JESUS DIAZ 2018)

(Davies, 2017)

Bibliography

Davies, C., 2017. *slashgear*. [Online]

Available at: <https://www.slashgear.com/apple-wanted-spherical-wheels-for-its-autonomous-car-23496382/>

[Accessed 01 November 2019].

"because spherical wheels could allow the car better lateral movement,"(Chris Davies 2017)

Bibliography

Gibson, D. K., 2016. *bbc*. [Online]

Available at: <http://www.bbc.com/autos/story/20160308-from-brain-coral-a-smarter-tyre>

[Accessed 01 November 2019].

"That means a lot higher sensor content from the vehicle for reading the environment and the road."(Keith Price 2016)

"These are mere possibilities, and what we do with our concept tyres is much like what car companies do with concept cars,"(Price 2016)

Bibliography

Bird, G., n.d. *magazine.astonmartin*. [Online]

Available at: <https://magazine.astonmartin.com/heritage/past-present-and-future-aston-martins-dynamic-story>

[Accessed 01 November 2019].

“Everyone who drove it in the war years was convinced they had driven the car of the future.” (Guy Bird)

“aesthetic revolution” (Guy Bird)

(Hirsh, 2019)

Bibliography

Hirsh, S., 2019. *weforum*. [Online]

Available at: <https://www.weforum.org/agenda/2019/03/james-bond-goes-green-in-new-movie-with-electric-aston-martin-ca>

[Accessed 01 November 2019].

“What does electric give you?” (Palmer 2019)

(Burt, 2016)

Bibliography

Burt, M., 2016. *autocar*. [Online]

Available at: <https://www.autocar.co.uk/car-news/new-cars/aston-martin-db11-technology-influence-future-models>

[Accessed 01 November 2019].

“We are still using the same principles of modularity of design, using knowledge and techniques we’ve evolved over the past two decades, but now we are taking it to a whole different level,” (Ian Minards 2017)

Bibliography

Wilde, D., 2019. *motor1*. [Online]

Available at: <https://uk.motor1.com/news/356858/aston-martin-evs-london/>

[Accessed 01 November 2019].

"When we relaunched Lagonda, we set ourselves an ambitious target to be the world's first luxury electric brand. We see the Lagonda brand sitting within a unique niche in the market," (Marek Reichman 2019)

"It is for the high-end luxury customer who wants to explore and be autonomous while remaining mindful of the impact they are having on the environment." (Marek Reichman 2019)

"Lagonda will achieve this but it will also provide joy and delight to the people who get to enjoy its unique internal environment." (Marek Reichman 2019)

(Xu, 2019)

Bibliography

Xu, L., 2019. *huawei*. [Online]

Available at: <https://www.huawei.com/en/about-huawei/publications/winwin-magazine/33/aston-martin-a-fresh-perspective-on-driverless-cars>

[Accessed 02 November 2019].

"Why couldn't the autonomous driver show you the best racing line around a race track? Autonomy predominantly provides, you know, safety, stress-release in urban congestion and so forth. But autonomy has another play in our space, which is how it can actually enhance the driving experience"(Linda Xu 2019)

"5G networks will play a crucial role in handling the massive amounts of data generated by AVs and their users for all kinds of purposes, including safety, connectivity and entertainment." (Simon Sproule 2019)

"A highly-desirable electric vehicle with the levels of performance expected of an Aston Martin". (Sproule's 2019)

Bibliography

Daniel, A., 2019. *cityam*. [Online]

Available at: <https://www.cityam.com/aston-martin-the-float-that-left-the-city-shaken-not-stirred/>

[Accessed 02 November 2019].

"We don't make cars, we make dreams,"(Sproule's 2019)

Image References

Figure 1: Evolution of CO2 emissions in the EU by sector (1990-2016) [online] Available at: <https://www.europarl.europa.eu/news/en/headlines/society/20190313STO31218/co2-emissions-from-cars-facts-and-figures-infographics> [accessed on 13/11/2019]

Figure 2: (2018) The Future Of Transportation Is Autonomous And Electric. Seekingalpha [online] Available at: <https://seekingalpha.com/article/4163546-future-transportation-autonomous-electric> [accessed on 13/11/2019]

Figure 3: (2019) world population prospects. United Nations [online] Available at: <https://www.un.org/en/sections/issues-depth/population/index.html> [accessed on 13/11/2019]

Figure 4: (2018) BBC [online] Available at: <https://www.bbc.co.uk/news/stories-45561334> [accessed on 13/11/2019]

Figure 5: (2017) Health Matters. Gov [online] Available at: <https://www.gov.uk/government/publications/health-matters-obesity-and-the-food-environment/health-matters-obesity-and-the-food-environment--2> [accessed on 13/11/2019]