LYNK&CO CIRC

Karl Marteliuss
Degree Project
MFA Transportation Design
Umeå Institute of Design
Umeå University
Sweden
2018
Would this stimulate greener development in terms of materials and have an effect on overall energy consumption?

How would the interior look like within this mindset?

Could it still generate profit?
ACKNOWLEDGEMENTS

Since I was a kid I have been aware of the transportation design program at Umeå Institute of design. I always compared it to NASA or something which is almost impossible to accomplish. It was the dream, and it was not for me. For a long time I struggled with confidence and therefore did not make an effort to even try. So I would therefore send a special thanks to my girlfriend Lisa Gustafsson. A person who made me believe in myself and from her support I got enough courage to finally fulfill this dream of mine. Without her, this would not have been possible. It has also been amazing to have her on my side during this final project, especially as we are expecting our first child together. That journey have kept my focus and helped me to realize what is important in life. I would also like to thank my parents Karin Marteliusson and Mats Holmqvist. Even though they have had a hard time understanding what it is I am doing, they have helped me financially in moments of scarcity. Also Andreas Friedrich from my sponsoring company Lynk & Co. Last but not least, all my classmates. We have been struggling together and we have been celebrating together. A special thanks to Andreas Vang Niehen, Raul Salas and Jon sommarström who always listen. I would also like to thank Jonas Söderström for valuable feedback and motorcycle inspiration and David Risberg for all the expertise in the workshop.

Thanks!

16.05.18 Sweden

ABSTRACT

This project is questioning our modern way of life. With the current capitalistic economy we are draining the world on resources and creating inequality among people. It is often said the the capitalistic system is lifting people out of poverty and there is no better way. However, it is proven to be negative for our ecology and it is important that we find new ways of develop mobility. So our future generations can enjoy the freedom that we today have become so accustomed to. What can we do to consume less and respect the world we are living by. Is it a matter of consuming green. Or do we need a fundamental change in how we create things. A bright light in these questions is maybe to head into a circular economy. This project therefore explores how a automotive interior would look like when designed with a circular mindset. Could a Universal Basic Income reduce extraction and what is the role of A.I and automation in the development for better mobility.

Inspiration & Methods

For this project an in depth literature research was carried out to gather information about our economic system and social factors. The research about digitalisation and automation have been gathered from highly regarded magazines and web news papers. Second part of the research is also web based, and about sustainable materials that could be used in this interior concept. The design phase started with creation of a user in a chinese context, based from the trend analyzer firm Stylus. China was chosen because it’s a rapid growing economy and it’s the main market for the Chinese-owned car brand Lynk & Co.

The collaboration partner for this thesis. The design phase followed with sketching to quickly visualize early ideas. These were then brought into a CAID program to fit the chosen package of a small city car. The design was created around a male mannequin to ensure usability. A full-size mockup was built to test functions and validate design around a large male and the smallest female percentile.

Result

The project resulted in a strategic concept of how a new business model would push for a greener development using a circular mindset. From that perspective a interior was created using sustainable materials. The overall structure is covered in a hard cover manufactured in recycled plastic. The seating and dashboard were design with the highly efficient material Abroform in mind. Abroform is based of Lignin which is a byproduct of the paper industry. Therefore no additional extraction is needed making it sustainable. Further it had all the positive design characteristics from conventional plastics. The soft seat cushions and the front dash was designed with compressed felt, manufactured from organic wool. These parts created a friendly and soft interior and are easy changeable for maintaining purposes. Overall the interior focused on providing smart storage solutions using few materials with an “bolt-on aesthetic”. The design language is using a friendly surface treatment and to include users make the journey pleasant.
**TABLE OF CONTENTS**

<table>
<thead>
<tr>
<th>ABSTRACT</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION</td>
<td>8-9</td>
</tr>
<tr>
<td>PROCESS</td>
<td>10</td>
</tr>
<tr>
<td>RESEARCH</td>
<td>10</td>
</tr>
</tbody>
</table>

**ECONOMY & SOCIETY**

- Circular Economy: 10-11
- Capitalism: 12-14
- A.I. & Automatisation: 15-16
- Basic Income: 17-18
- Greenwashing: 19

**SUSTAINABLE MATERIALS**

- Waste: 20
- Newspaperwood: 20-21
- Plastics: 21-22
- Textiles: 22
- 3D printing: 23

**BRAND**

- 24

**MY GOALS AND WISHES**

- 25

**THE CONCEPT**

- 26

**SHARED SUSTAINABLE MOBILITY**

- Justify Myself: 26
- Social Democratic Car: 26-28
- Mass Transit Context: 28
- Storage: 28-29
- Technology & Interaction: 29
- A.I. & Safety: 29-30
- Driver Licence: 30

**USER**

- 31

**WHO'S DRIVING**

- Young People: 31
- Xiao Qingxin: 32
- Scenario: 32-33

**CREATIVE DEVELOPMENT**

- 34

**REFERENCE MODEL, COLORS & SHAPES**

- Benchmark: 34-35
- Warm Simplicity: 35

**SKETCHING**

- Initial Sketches: 36-39
- Midreview: 40
- Dash Storage: 41
- New School vs. Old School: 42
- The Chris Bangle Greenhouse: 42-43
- Full Size Mockup: 44-45

**RESULT**

- 46

**FINAL DESIGN**

- 46

**CONCLUSION**

- 58

**REFERENCE**

- 62

**APPENDICES**

- 69
Before deciding upon a thesis theme it’s hard to motivate another new product. From today’s worldview it’s not unusual to discover reports of how the human species waste resources like never before. My generation, the millennials (I am born in the late 80s) have a different view on products than people born between 1940-1960 for example. They came from an era where people didn’t had much but they valued their belongings very high. If something broke it was more common to repair rather than throw and only the necessary was purchased. It’s important not to romanticize the past but the view on products and how they consumed was more sane back then. In the modern world with a growing middle class it’s rather the reversed since many of today’s products have become much cheaper due to globalization and efficient manufacturing methods. In the first world countries the economic growth have increased people’s living standards but with the pricetag of more waste (Backderf 2015).

“When I was a kid, it seemed like they made something new everyday. Some, gadget or idea, like every day was Christmas. But six billion people, just imagine that. And every last one of them trying to have it all.” (Donald; Interstellar 2014.)

The quote from the dystopian movie interstellar is saying something about the present. Maybe our real world will end in the same way, drained on resources due to mass consumption. It’s only possible to speculate but it’s needless to say that if the world need another product it has to be justified. A sustainable solution that can last and be recycled or made of recycled materials. However, with the risk of being naive it’s essential to keep in mind that a car can probably never be completely sustainable but that can’t be an obstruction from trying to make it as sustainable as possible. It could be a statement to raise the awareness about the environment. This thesis interior is therefore a small car, kei car or similar leaving a small footprint on the environment. By designing it as part of a car sharing business the societal relevance is high due to the increasingly populated urban areas where space and usage efficiency is key. Conventional owned cars are being parked 95% of their lifetime (Fortune 2016). A big design challenge is to make the interior simple. With few sustainable materials easy to maintain and therefore changeable giving the interior a longer lifespan.

Artificial intelligence, known as A.I technology have lately gained wide attention. As the google owned company “deepmind” developed an A.I called “alphago” and defeated the world’s leading players in the chinese abstract board game GO. A game far more complex than chess and even require creativity to be successful (David et al., 2016). A.I is technology capable of making complex decisions and even the possibility to learn itself. Technology concerning A.E.s and autonomous driving is often discussed among the professions in modern automotive industry. The discussion is simplified and about what we will do in the car when we don’t need to drive. It’s a long way to go before the technology can handle every situation (Roy 2017) and this project aims to be closer in reality since sustainability is an issue that needs to be addressed today. Yet, in a historical perspective It’s not an unexpected development for this discussion, as the author and professor Yuval Noah Harari (2017) points out. The mankind have tried to develop solutions and techniques with the aim of making our life easier and more convenient. However history has shown that whatever we invent or do, our life never seems to be any easier, there is only a new thing that comes with a new set of problems. AI technology will probably have a great impact on our society but for this thesis the joy of driving is key and the sense of freedom it gives the user. Nonetheless it’s possible to use this technology as guardrails and to monitor the driver to reduce major accidents as the former hero aviation pilot Chesley Sullenberger mention (The drive 2017). With this mindset the driver is always in control. Driving is something I enjoyed growing up with and a experience worth passing on to next generations.

The next step in this project is do a literature and internet research on how economy, innovation and climate is connected. The climate issue is not a new problem, and by researching the economical and ideological factors of society it will hopefully shed some light on the insufficient development regarding this problem, where is the change? This is of course a huge topic and to fully understand it would be a lifelong project. At least scratching the surface will help to fairly understand the global complexity and to see how a better solution for car mobility can be designed on a overall strategic level. How do our economic model look like today, is there better alternatives? Can A.I and the digitalization contribute to a better solution to car mobility and how can a implementation look like. Second is to go into sustainable materials to see how mobility can be improved in a more detailed level.

**With few sustainable materials easy to maintain and therefore changeable giving the interior a longer lifespan.**
Today's economic system are mostly linear, a take, make and dispose model of production. “Environmental problems, such as biodiversity loss, water, air, and soil pollution, resource depletion, and excessive land use are increasingly jeopardising the earth’s life-support systems” (Bocken, Hultink & Savaget, 2017).

A need for new economic model is crucial since our existing is gloomy both for environment and equality (Klein 2014). In 1992, OECD countries and the former soviet was accounted for 70% of all the world carbon dioxide emissions due to fossil fuel extraction. The term fossil fuel includes Coal, Oil and Gas. The same year scientist agreed upon that the carbon dioxide content in the atmosphere was increasing, and that the increase was a result of fossil fuel extraction. This is leading to higher average temperature since carbon dioxide is a Greenhouse gas and will have a negative effect on the environment (Azar 2017). The scientists are not sure how negative it will be since it's hard to predict the outcome, all we know it's bad. Today the temperature have increased 1 degree Celsius compared to the pre-industrial era. Since 1992 to the carbon dioxide emissions have been reduced to 44% in 2016. USA have the same emissions as in 1992 but EU have dropped 16%. The increase has mostly happened in developing countries with China in the forefront and is now the biggest polluter in the world (Azar 2017). One example to help improve this issues is a circular economy. Also called cradle-to-cradle design. Such a model is regenerative where products and system are designed to be long-lasting, maintained, repaired, reused, refurbished, remanufactured and (in the last resort) recycled. Keeping emissions, energy and waste to a minimum (Circular economy 2017). The circular economy is by no means a complete solution on fixing the environmental problem, it's far more complex than that. However it does induce to a more sustainable approach and more democratic lifestyle when implemented. This is nothing new and has been around for quite a while, in 1976 the Hanna Rekman report was sented in to European Commision where Walter Stahel and Genevieve Reday sketched a proposal for a economy in loops. Looking into how this system would affect job creation, savings of resources and waste prevention (Circular economy 2017). By a virtual open space, the European Circular Economy Stakeholder platform (2017) is promoting the transition to a circular economy by having a dialog with stakeholders. A reasonable question to ask is why this model has not been implemented in a greater extent, when its proven to help climate. Especially as a unified research community is shouting for new economic model, showing how today’s capitalism is draining the earth on resources (Klein 2014). Well, economic systems are like tankers, powerful complex structures not easy to move. It would require a great effort by everybody involved to change their life and behavior to move this ship around.
According to award-winning journalist Naomi Klein, author of the critically acclaimed international bestseller The Shock doctrine and This Changes Everything, the fear of losing growth by adapting a new economic system has been a major aspect for not implementing such, including a circular model. Even though it has been proved to successfully achieve growth by a circular economy (TheEllenmacarthurfoundation 2017). Some even argue that we need to get rid of the growth model to help save the climate, a anti capitalist ideology. She also explains how most of us see and are aware of the climate problem, even willing to make sacrifices to change development, or at least not to make it any worse. The discussion has been going on since the 1970s with different intensities. Yet, the necessary steps are not taken mostly because of a small elite of people gaining on capitalism, who perform heavy lobbying to shift the previous decades of capitalism have so far lead to more dealing with the problem they send it overseas. Making countries to point finger on each other, arguing that they do everything they can to reduce emissions, and it’s the developing countries responsibility to reduce the amount of carbon dioxide released into the atmosphere. Which we all know is completely ridiculous and one of the major problems is that some people are making money on our extreme consumerism, people in rich countries. However, lately the market have highlighted this environmental problem and is trying to make us consume green. This is of course great, but the problem remains since its the amount we consume that have led us to this critical point. Companies are using greenwashing, a term which will be explained later in this report. Another direction seen is where the climate burden is put on the single individual (Klein 2014 p.13-129). Making ambitious average people to pay more for their green detergent, and to buy ecological food and clothes. Often more expensive products which is making sustainability a matter of income and educational level. Further, the capitalist system is also letting the ordinary people take the hit when politicians making cuts in health and public spheres, in order to bail out fossil fuel companies, who were responsible for the problem the first place. The tactic of putting the burden on the individual is uppermost a makeup to cover the corporate and government paralysis to do anything of substance for the environment. Simply, the consumer pays for the immature behaviour so that large corporations keep making huge profits. An example is the financial crisis in 2008 which the award winning american movie “the big short” illustrates. Where the masses get to clean up the mess caused by high level Wall Street bankers. People need to be more aware of this problem, privatisation caused by the previous decades of capitalism have so far lead to more green thinking illegal. An example is how the Trade Rules only consider price and therefore always giving privilege to foreign over domestic (Klein 2014 p.75-91). Another problem with the current World Trade Rules and climate deals, that are rich countries are not responsible for what developing countries emit. Meaning they can lower their emissions by moving the production to another country. Coal dependent developing areas with no or little regulations on emissions and work conditions. To put it short, instead of making ambitious average people to pay more for their green detergent, and to buy ecological food and clothes. Often more expensive products which is making sustainability a matter of income and educational level. Further, the capitalist system is also letting the ordinary people take the hit when politicians making cuts in health and public spheres, in order to bail out fossil fuel companies, who were responsible for the problem the first place. The tactic of putting the burden on the individual is uppermost a makeup to cover the corporate and government paralysis to do anything of substance for the environment. Simply, the consumer pays for the immature behaviour so that large corporations keep making huge profits. An example is the financial crisis in 2008 which the award winning american movie “the big short” illustrates. Where the masses get to clean up the mess caused by high level Wall Street bankers. People need to be more aware of this problem, privatisation caused by the previous decades of capitalism have so far lead to more...
inequality, larger economic gaps and ecological decay. For example, Klein shows that private energy companies are not willing to make the necessary investments in green energy. Since profit is all that matters in a free market ideology (Klein 2014 p.96-103), while government owned companies are more likely to do. A recent example is how the German voters went through for a government takeover to see a greener energy supply development. Clearly showing that there is a will among the average people to skip privatization in order to change the trend in a more sustainable direction. To be able to cope with the future environmental challenges we must find a way to go back to long term public planning and say no to powerful corporations (Klein 2014). Furthermore, shipping is not part of the trade deals making the transport a black spot within the World Trade Rules (W.T.O), where no country have to take responsibility. With the free market, highest profit ideology, leading manufacturers will always send productions to the country with the cheapest labor and often the worst working conditions. Resulting in that shipping has gone up 400% the last three decades and are predicted to triple to 2050 if we don’t change the rules to better suit our climate (Klein 2014). Changing trade rules would therefore benefit local and small scale production. Stepping away from mass production would increase equality as public jobs (elderly care etc) would get more funding and therefore help already vulnerable groups such as women and people of color.

In the climate discussion we often hear voices arguing that the extreme weather is a result of a natural weather cycle. But, 97% percent of the climate scientist claiming the changes is caused by humans (Klein 2014 p.33). In contrast to the early discussed deniers, Yale researchers found that people with a “egalitarian” worldview marked by a strong belief in social justice and equality overwhelmingly accept that climate change is real. A worldview which is suppressed by the Capitalistic - highest profit ideology. Harari (2017 p.133) points on how researchers have found out that people are naturally egalitarian, at least in smaller groups. While in large groups we tend to manage a higher level of suppression since humans are more dependent on religious stories to be able to go in the same direction. From this perspective it’s possible that globalization can have a negative impact and why ecological systems tend to focus on small scale solutions. Another unfortunate outcome is how geographically, wealthy nations don’t get as affected as the less prosperous countries, as climate change often result in severe drought in already food scarcity areas in Asia and Africa. Areas who has nothing or little to do with the environmental problems in the first place. Climate change is also increasing the gaps at a local socioeconomic level as the elite protecting their “freedom” by not letting go of the power. A glimpse of hope in this otherwise dark reading is through history our borders have been constantly decreasing trough small steps. Maybe globalization which has been possible through digitalization is now the final step towards a borderless nation (Harari 2017). It’s still a long way to go before becoming a single united world and maybe the climate changes will be to severe for us to experience that future, since we don’t seem to manage the 1,5 degrees Celsius increase limit that was set 2015 in Paris (Klein 2014).

events and is comically illustrated in the satiric animated television series South Park. Where all the unemployed blue collar worker replace Amazonos personal A.I “alexa” in order to have a job. A positive use of digitalization where seen from the events in the North Africa and Middle East during 2010 and 2011, also known as the “arab spring”. Where people could mobilize and overthrow the dictator- ship much thanks to the effective communication powered by social media (Arab Spring 2017). The current #metoo movement is also a positive example, a global movement raising the issue of women around the world being sexually harassed and suppressed by dominant Alpha-male corporate structures. Often hidden structures and therefore hard to address, and this is happening in basically every level of society, in the whole world. If this movement will have a large scale global impact it would probably be better for the climate in the long run, since they questioning the same hierarchical structures that not only abuses women but also counteract climate change. This is even more evident as women often play the prominent role in organisations fighting climate (Klein 2014 p.303). More lately though, the globalization has experienced troll factories, pouring through constant surveillance, “big brother see you”. The only difference is that the power today is in the hand of about ten companies, with google and facebook at the top (Jönsson, 2017). Which proves the overwhelming power modern corporates possess. This stream of information, also called “big data” can of course be used in a constructive manner if in the right hands. According to a article published in the swedish newspaper Dagens Nyheter (Lön达尔, 2014). Big data is being used to collect data from peoples traveling behavior and habits and therefore help city planners to design an efficient mass transit system. The city Nancy in France is an example where this is implemented. Moreover advancements in A.I technology predicts that even more demanding jobs, like economist and engineers will have a decrease. However it’s reasonable to think that this dark political landscape is caused by the huge uncertainty digitalisation creates in this initial state. That’s it only in this transition between industrialisation and globalisation we will have these issues, before we learn the tools of how to use constant connectivity. It’s after all as big of a challenge as the industrial revolution in the late 17th century. This fear
er families the agricultural revolution occurred. From that Homo sapiens developed the theistic ideology, we basically created Gods to justify our cruel treatment of other life and plants. During the descendant scientific revolution we got rid of the Gods putting the Human as the most powerful as we shifted to humanistic religions and made the world to a “one-man-show” (Harari 2013). These humanistic ideologies counteracts the green movement as they let us think that Homo sapiens have tamed earth resources and technology. A famous quote from the Steam engine founder James Watt frames this issue. “Nature can be conquered” (Klein 2014 p.173). This is making us think that some gadget, innovation or such are just waiting around the corner to be discovered and ultimately save the climate and mankind. Harari (2017 p.181-191), even claims that economic growth is Homo sapiens new large scale religion were new inventions and products are the solution to a problem that require less of these. Which is why we seriously consider geo- and climate engineering to change the climate so that we can go on “as usual”. This could not be any more misleading, our believes in technology is actively working against our necessities mental change. What Homo sapiens need is to realize is that we can not conquer resources and that some stunning innovation will not fix the problem, the world is not limitless. People and earth is one unit and must work together and what we need is a new ideology, and head into unchartered political territory (Klein 2014 p.60).

With this knowledge there is nothing saying that an artificial “superintelligence” will treat the Homo sapiens any different than how we have treated less intelligent life. From a personal point of view we, don’t know when yet, an artificial intelligence will be better than us to design artificial intelligence. And that is when the intelligence boom will occur and the difference between man and machine can be as big as a person and an ant is today. To some people this is absurd and has been questioned. One of the critics is robot guru Rodney Brooks, an MIT researcher in A.I. According to a DN article he argues that we misunderstand what computers do when we say that technology is “thinking” or being “smart” (Lerner 2017).

Basic Income
This fear of automation taking over have once fueled the discussion of a basic income. Basic income is a sum of money, a form of social security unconditionally given to every adult citizen within a country (Basic income 2017). The idea first came in the beginning of the 19th century and was initially a way to fight poverty. At this moment Canada is carrying out a small experiment where they offer economic support to 4.000 workers in different communities to evaluate the effects. Mostly interested if it would increase the health and wellbeing among the participants. Even Finland and the city of Oakland, California is testing this in smaller scale (CNBC 2017). The Finnish universal basic income (UBI) experiment was shown to; “report lower stress levels and greater incentive to work”. (Chapman 2017)

The amount of money handed out by the Finnish government was kept low ($600) to motivate people to work and therefore help stimulating the economy. Some claim that with this low amount the finnish government was not trying to free people from work, rather than accepting low paid jobs and would therefore counteract poverty (Juhanainen & Mäkinen 2017). However, most of the studies have shown positive result. A small scale experiment in the U.S during the seventies showed that young children were more likely to stay in school if they had a basic income (Surowiecki 2016).

Technology leaders, like Tesla founder Elon Musk and social media giant Mark Zuckerberg, CEO of Facebook are both promoting this kind of idea since they also expect automation and Artificial Intelligence to replace a great number of jobs. The movement are furthermore being backed by eight Nobel Prize winners, Joseph Stiglitz former Financial Chief at World Bank Group (WBG) is among one of them. Even Social scientist David Graeber, Guy Stand- ing och Yanis Varoufakis is promoting this (Paulsen 2017). Ideas like Basic income (unconditionally basic income, citizen’s income) has long been seen as a dream from the radical left but have moreover found its way into the political mainstream. Basic income supporter Philippe Van Parijs (2017) has argued that this is the highest level of freedom for any citizen. The right to do whatever you might want to do. Using earth resources and “external assets” as you may like. This would also be beneficial for those who have a strong interest in art and creativity. Pursuits not usually associated with raising heavy money for the community but with a powerful cultural value for people. This is according to Philippe currently not possible since money is the ticket to use earth’s “assets” and to pursue creative dreams. It should therefore lay in governments interest to provide this access to empower equality and to reduce the economic gaps among residents. Supporters of this ideology also advocate the necessity to give the citizen the power to say no. Swedish sociologist Roland Paulsen claims, by giving people “fuck-off money” they would hopefully work less and most of the shitty jobs would disappear pushing the overall production to a more sustainable level. This would be a solution to go toward a more “egalitarian” worldview. Since it would give more spare time and also the chance to care for your kids and elderly. Enhancing warm values, putting the human and their needs in the centre and work against competitive structures making the world less hierarchic. A help to push people to take smarter decisions for the environment without forcing them. However, to put it simple, some say it’s just a mean to privatize even more and to get rid of the welfare state. And is why tech giants and neoliberals are promoting this (O’hagan 2017).
“But the trouble comes when UBI is used as a way of merely making techno-capitalism more tolerable for people, when it is administered like a painkiller that numbs the pain and masks the symptoms of economic injustice without addressing the root causes of exploitation and inequality. We cannot treat UBI like an endpoint; it should be a stepping stone to fixing core issues.” (Sadowski 2016).

Going back to sociologist Paulsen who is furthermore discussing the science-fiction author Ursula Le Guin novel “shevek”. Which put a finger on the inherent fragility of utopias. In her novel there is no private capital, no hierarchies and sexual equality. The people who chose not to work have the right to the same living standards as the workers. However, this creates informal and hidden power structures where the ones not working are very unpopular. These power structures are hard to adress and challenge just because they are hidden. This raise the question if the idea of UBI, initially a way to fight poverty and to erase the socioeconomic gaps, will be replaced with a new set of destructive power structures. Equally negative to the ones we have today. The general discussion about UBI is that it’s the only alternative and we will eventually have to go there due to automatisation. And therefore should the debate start with with UBI and not see it as the final solution.

by giving people “fuck-off money” they would hopefully work less

Greenwashing

Greenwashing is a term founded by Jay Westervelt’s article from 1986 about hotel’s towel management and how their reuse could save the environment (Greenwashing 2017). It’s when company’s using word such as “sustainable, green, ecological or climate” in their marketing to benefit from the consumers growing interest in the field but is insignificant in comparison of the climate destruction the company as a whole causes. Initially the global warming issue wanted to align with economic interest and where therefore not defined as a problem of mass consumption, car culture or large scale agricultural industrialization, pouring out high emissions. A solution to this would have meant big changes in how we live, eat, shop and work. Instead it was presented as something technical and something that can be bought within the market system. Resulting in companies like Walmart making business on the climate issue where they provide “so called green” products saying to fix the climate (Klein 2014 p.209-210). Another example example is IKEA, they have a rich history and a strong promoter for flat packaging and the designers have to consider not only the aesthetic aspect but also how it’s assembled and shipped, disassembled and recycled. A good example of how to adapt the mindset of a circular economy. However, the official standpoint for big companies like IKEA and H&M regarding sustainability is often to promote their tremendous work to help the environment. But it’s important to remember that these companies have fundamentally changed our view on products as they are the biggest result of capitalism. The products are becoming so cheap it’s easier to buy new ones and they make extensive benefits from our changed behavior. They depend on sending their production to countries with “slave like” working conditions where quantity is premiered over quality.
SUSTAINABLE MATERIALS

Waste

While the previous chapter is about the society. How different ideologies, economic models and technology are connected. This chapter is diving into something more concrete, sustainable materials. While the previous research will help me to design a car platform for the people on a strategic level this chapter is hopefully going to give some guidance in how to design the car interior more “hands-on”. While the best way to go is to use renewable biodegradable materials that can be composted after use. A research was also conducted into waste materials. An idea is to use waste as a source of material in the interior to minimize the environmental impact. What we should do, is to eliminate the concept of waste, as William McDonough (2017) stated in the Hannover principle. This can be interpreted in two ways. One is to use organically produced raw material with little energy consumption during extraction and production. Pure materials which can be recycled after use. Meaning there is no waste as it goes back to the soil. The other is to use waste as a raw material into the new products. This is also considered to be environmental friendly but the end of life is limited since the materials often needs to be thrown away after use. As of today, the world only recycles only about 5% of its materials (Conca 2017). A result of our “take, make and dispose” economic model. A single average middle-class American family uses up to 4,000 tons of raw materials every year. This shows how much of recycled materials that can be used into new products. In the following a compiled list of materials are presented, some are raw material while some is made from waste. Which, if possible will be implemented in the concept later on.

What we should do, is to eliminate the concept of waste

Newspaperwood

A material discovered is called NewspaperWood (Citymetric Staff 2015) and is exactly what it says. Recycled newspaper is putted together, by using a solvent free glue to something that looks like a log. Then it’s cutted into usable planks. This material was first developed in Norway since they have a sophisticated system of recycling newspaper. One positive aspect is that since newspaper already exist no additional extraction is needed. The material can basically be used in the same way we use wood, it can be cut, milled and glued into larger pieces. This has to be considered at a early design level since the ability to bend or create large positive surfacing is limited. Including various thickness and ultra thin shapes. If the newspaper wood is designed incorrect it would create enormous amount of waste and would counteract the mind-set of a circular system. This would therefore function best as trim details or where the surfacing can be as straight as possible. One can also argue for using trim details or parts only for aesthetically purposes should be kept to a minimum since it contradicts the economic model. The material also need surface treatment like conventional wood. However, if the material is kept away from ending up in a landfill it’s can work as incentive, it’s better to have it inside cars than in the ground. Since it’s produced in the same way as wood the material can be sanded to show the lines and can therefore age beautifully. Something to consider as it can strengthen the relationship between user and artefact according to Chapman’s 5 elements in emotional design (2017).

Plastics

Modern car interiors are filled with plastic in different shapes and textures. Some are shiny others are matt, and it’s reasonable to claim it’s way too much of them. Before the plastic era car interiors often had parts of painted metal, and textile or leather on parts that had to be soft for comfortable reasons. From a production line perspective, painted metal dashboards and door panels is probably more sustainable since it reducing the the amount of parts and overall material volym. It also reduces the assembly steps and production uptime, which has an effect on the overall production energy footprint. Something to consider when designing cars today. One reason to cover all the interior parts is that there is a belief that painted or raw surfaces is considered to be less premium (Author’s opinion from the automotive industry). It is also used for sound absorption capabilities and to cover technical and safety systems like airbags. Plastic is a excellent material for its freedom in design but it has to be used carefully since the raw material originates from fossil fuel and have a negative impact on the environment. However, experiments trying to reduce the negative impact are being carried out. Between 2014-2017 Swedish design agency Form Us With Love designed a chair for international swedish furniture giant IKEA called Odgir. The chair is made in the material woodpolypropylene in a 30/70 mixture. Meaning recycled plastic and renewable wood. This is better than using virgin plastic but mixing different materials will have a negative effect since recycling of this product will become impossible. Therefore should this kind of mixing be avoided. Another company using recycled plastic is the Antwerp-based brand EcoHird. They produce toys for kids using recycled plastic to raise the environmental question and to invite kids to the circular economy. These products are fully recyclable after use. And they don’t have to use chemicals or resin into their products which make them safe for production, the user and the environment (Morris 2018). There is a perception that materials like polyester (PET) and other types of plastic are fully recyclable. That is however a slight misunderstanding, recycled plastic is not a closed loop. Plastic is always degenerated when recycled, meaning a plastic bottle can never be a new bottle. It’s will degenerate because it will not meet food quality standards but instead becoming toys, carpets or cd folders etc. But the energy it takes to produce virgin plastic products is much higher, and by recycling the material are being kept of ending up in landfills (P, I, Anne 2009). Things like Newspaper and plastic bottles are now routinely recycled, while furniture and other...
Textiles

The conventional textile industry is one of the largest polluters in the world, mainly due to a major fashion industry, who according to The World Bank is responsible for almost 20% of the world's industrial pollution. The negative impact is mainly caused by huge amounts of water during the manufacturing process, combined with toxic dyes and chemicals harmful to the local ecology (Lee 2014). While talking about sustainable textiles, 4 main factors are often mentioned, raw material extraction, textile production, added chemistry and end-of-life. Another aspect discussed is the longevity and durability of the textile. And if there is an infrastructure of to turn it back to raw material (Hoguet 2014). A textile filled with chemicals to make it long-lasting will be hard to turn back into raw material. So there is a lot to consider but there is a few materials that stands out according to a article in The Guardian, written by Deidre Hoguet, director of sustainability and material exploration at Designtex. First out is Solution dyed-nylon, common in carpets and upholstery and is both sustainable and have high performance. The coloring process require very little water while the color itself making the fabric very resistant. Meaning it will manage heavy maintenance and cleaning without fading. Furthermore there is already a widespread reclaiming infrastructure. The second one is one of the oldest player in the game: Wool. Wool is renewable, recyclable, biodegradable and can be produced organically. When it comes to performance, it's water repellent and have inherent flame-resistant properties without adding any chemistry (Hoguet 2014). Which makes it a perfect candidate for a cradle-to-cradle design philosophy. A important factor is to design the textile element in such a manner it's easy disassembled and is using as little material as possible. Let's imagine the seating will require some soft textile for comfortable reasons, it would then be preferable to attach it to the seat (a injection moulded hardcover,) in a way it's easily removed. It would then be easy to clean (beneficial for carsharing with many different users) and easily changeable when worn out and also easy to recycle. Implementing the cradle-to-cradle principle.

3D printing

The 3d printing technique has been here since the 80s but lately becoming more discussed as mean of replacing some of the production. It's still quite expensive and ineffective when producing large volumes. However, it could be used as mean to easily repair on site, without having to send replacement parts across the world. If we imagine that the total production is reduced in a circular economy and evenly spread out globally it might work as tool for production and repairment of spare parts. Keeping the transports at a minimum making it even more effective to repair would stimulate longer lifespan for the products. These manufacture and repair workshops could also create new jobs.
This project is a collaboration with the newly started car brand Lynk & Co, owned by the Chinese company Geely. The research and development is located in Gothenburg, Sweden. Their cars are going to be manufactured and sold at the Chinese market. They presented their production-ready Lynk & Co 01 at the 2017 Shanghai Auto Show, where they also presented their luxury sedan concept 03 (Lynk & Co). Lynk & Co is branded as an outgoing progressive car company targeting a young, modern and urban user. One of the key drivers is to change how we look at owning cars and how we use them. For example they have digital platform “open to anyone with a good idea” (Lynk & Co) and call themselves born digital. According to Lynk & Co the digitalisation enables people to access their car more flexible and the user does not necessarily need to own it. These progressive company core values go hand in hand with this thesis to rethink interior design in order to become more environmentally friendly and long lasting. It also helps that the brand is new on the market and therefore less restricted to their history and probably have more positive attitude towards changing the way we look at mobility.

This project will target the Chinese market for two reasons. First and most obvious, it’s Lynk & Co main market. Second and more important is that China has had a massive economic growth in the last three decades and is considered to be the second strongest economy in the world at the moment. According to New Yorker reporter Evan Osnos, it’s just a matter of time when it surpasses America’s economy in size and then it will be the first time we have the largest economy in a non-democratic country (Osnos 2018). As a result of this rapid development China is anticipated by 2025 to produce one quarter of the world’s solid waste (Mathews, Tan 2015). It’s therefore important to provide smart thoughtful solutions in such regions. Making responsible products from a holistic perspective, making sure that people’s working conditions, the environment and the end user is fulfilled. It’s crucial to minimize the damages and experts assert it’s possible to “leapfrog the development” (Gerig, Doberstein 2010) to skip the downside of the industrialization in China.

The goals of this project are:

To develop an interior design of a sustainable small shared citycar, aiming for the Chinese market. Where the Lynk & Co history and brand values can be implemented in a respectful manner.

To find information and understanding about production methods and materials to make it as sustainable as possible. Where components and materials are used to a minimum and in a way that enables a cradle-to-cradle principle. With regard to raw material extraction and energy consumption during production, maintaining while the product is in use and dismantle and recyclability in the end-of-life cycle. Furthermore show understanding in vehicle design principles such as ergonomics and package.

To analyze and better understand trends, politics and social factors and how this affect people, communities and the automotive business. And to propose different ways of providing cars on a strategic level so it can be used by many people without increasing the amount of personally owned cars, making mobility more democratic.

To better learn to visualize, not only in sketching but also finalizing using computer software such as Keyshot and Vred. Another useful tool to learn is MAYA. To be better at polygon modeling and also use Clay to define shapes.
THE CONCEPT

Justify myself

As of today, we live in a capitalistic world, driven by our strong belief in economic growth. So powerful some even call it our new worldwide religion, it’s the solution to everything, it counteracts poverty, gives us new innovations and it even reducing violent conflicts. The back side to this shiny coin is that it slowly tearing down our world as we know it, draining the earth on resources and increasing economic gaps, and destroying the ecology. So quite ironically, I’m going to present automotive interior, hopefully a solution to a problem with yet another new product. Which only highlight the fact that I am a result of my surroundings, embracing the same culture I want to oppose.

The social democratic car

However, let’s put the hypocrisy aside and focus on sustainability. This concept is obviously a shared solution with the aim to reduce the number of cars. While shifting the profit from high sales numbers to amount of subscribers it would gain profit for the company and be better for the environment. This will also motivate manufactures to keep the cars running as long as possible, embracing the circular mindset on a fundamental level. This is however nothing new and is some extent happening around the globe. In order to make a considerable climate change by rearranging the automotive business it’s clear that the company’s exclusive power also need to be reduced, to push for a long-lasting greener development. As mentioned, shared car business models are being presented today, such as rental and subscription services, with the stated aim to reduce the number of cars in overpopulated areas. However the car is still a symbol of status in some communities and can therefore be hold back by a shared business model. And the fact still remains, that brands dictate the terms of these business models. Automotive manufactures follow the free market fundamentalism which obviously don’t provide the significant social and ecological change, profit is the only King in the growth Empire. Earmarking the profit going back to the company for green innovation would push for a change and more long lasting sustainable development. This would have to be legislated from governments, putting pressure on the manufacture. The same system can be found in government owned energy sector. This, combined with the profits from subscribers would motivate manufacturers to invest in greener (often more expensive) materials and production methods and eventually reduce cost to “normal” levels. The shared car could even be subsidized from the government, making this system cheaper than owning a personal car, almost as an extension of the public transport, to reduce the amount of personally owned cars. This raises the question if there is even a possibility to make future automotive development a peoples matter. Inviting the car into politic contexts. Making the part of the car company that provides shared urban cars a cooperative, where social benefits and public interest are important foundations.

Through democratic elections, the people can vote and express their views, which would counter the car as a status symbol and maybe push it on a more egalitarian route, and hopefully make it greener in the long run. This would also move mobility towards something everybody could use and be shared by everyone with a driver license. The opinions from the people can today easily be heard as modern technologies provide quick and easy communication, something that has been criticised in democratic structures, that the slow going process inhibits rapid development.

The democratic view could work as an incitement to use different materials than today. Let’s imagine that trade deals being changed and policymakers push to prevent long-distance transports at sea. By modular design and new production methods like 3D printing becoming widely accessible and affordable it’s possible to move the production close to the cars final destination. Since China is already a manufacture hub and would not be very affected this could push Europe and north America into producing more and

SHARED SUSTAINABLE MOBILITY

I am a result of my surroundings, embracing the same culture I want to oppose.

An illustration made by the Author of how a Circular production model in the automotive industry could look like.
reducing the transportation at sea. This would gain local production and create more jobs evenly instead of sending the production to the country with the lowest bid. These local production facilities could also work as workshops where the car could be maintained repaired and upgrad ed when needed and to give them second life trough take back strategies. By making the cars small and powered by a fossil free green energy (Battery or Hydrogen) it maximizes the circular mindset on a micro and meso level. Furthermore focusing on organic local production of renewable materials like wood and wool. Where these materials cannot be applied the use of recycled material should be of utmost importance, to leave a small carbon footprint. Such as recycled metal or plastic. Most important and where a designer could do most use, is the actual design of these components. Make sure that they are designed in a way that limit the waste during production, utilizes the properties of the material where they fit best. And easily changeable so they can be separated when recycled and use as much pure material as possible. Most important, with a decentralization of the corporate power shifted to the people, the car can be designed to be more long-lasting instead of being replaced every year due to profit-interest.

Mass transit context
This idea presupposes that through use of big data, a smart city planning can be accomplished to make public transport more efficient and the main source of transit. And cars working as a complement rather than letting it be the prime source of mobility like today. By making public transport free it will additionally motivate people to use it’s system to a greater extent than today. Green transportation are made more accessible making people choose it because it is easier. This is further enhanced by making these shared cars accessible on strategic places around the city and along the main mass transit system. At the same time this includes more people to use cars but without increasing the number of personally owned one’s. This however puts a large responsibility on the government making sure to provide affordable housing through reforms and legislation close to the main mass transit areas. To help preventing gentrification making sustainable living a matter of classism (Look at San Francisco). The shared cars should also be provided in the areas far away from the mass transit connection, to help people in the periphery to transport them self to a mass transit hub. Places often characterized with low income. One can argue for if these cars are needed at all, if the mass transit is so widely used. But it safe to assume that for some chores the car is more efficient and for some even necessary. Travel to the nature outside the city with a friend for example, and also for families with kids it can be comfortable to get groceries in a relaxed manner. Or simply get from A to B alone.

Storage
The hubs where the cars are parked should be designed so that they use as little space as possible. A vertical fully automated parking house would be the most space efficient. To go even further the parking house should also work as a stationary charger using a green energy source most efficient for its location (Solar, Wind or Water) to charge the car while parked. To enable people without a smartphone to use the cars, they can be accessible through manual release from the hubs, using your driver license or be booked by an app.

Technology & Interaction
While in the car it’s important and up to everyone to do whatever they like, and not overwhelm them with apps, offers or suggestions to steer the user in a certain direction. This has been the course the last decade when digitalization have find its way into the automotive business. During a internship at BMW Advanced Design in Munich the author walked by a big advertisement board everyday saying: So connected you feel free. Digitalization have helped us in many ways but to be connected at all time, erasing the boundaries between work and spare time have only proven to be a cause for stress and negative on our mental health. Gunnar Aronsson, a stress and work environment Professor at University of Stockholm interviewed by DN believes we were not as stressed back in the days when people had religion to turn to in difficult times. Today’s soulless growth offers very low comfort (Kasurinen 2017). This use of digitalization to gain more money, make us consume more and constantly scream for our attention is a destructive path to choose. Therefore should this concept only include the absolutely necessary, Steering wheel, pedals, speedometer and Gps. And by making it as a public service will help to keep advertisers and other “seller of the next thing” far away.

A.I and safety
Why do we need to be careful with A.I. Well, Nick Bostrom’s point about A.I as a deadly tool is something to consider seriously. It is therefore reaoned to limit a advanced technology such this to safety. It’s most logical step in development, according to Interaction expert Sullnberger (Roy 2017). Enhancing the technologies already existing in modern cars and improving automatic braking and cruise control to the next level. The car could be connected to GPS and each other, making it impossible to set onto collision course. Head into a wall of rocks, or go into pedestrian streets at high speed. The cars system should simply not allow it, as a driver it would be impossible to override the system unless in special cases. This would make the car a high technology product but as a driver you would never need to choose, monitor, select or engage in any technical interaction, it’s simply just there to keep you safer. It’s better to go in this direction since the difficulties with different driving modes is the biggest challenge today among car manufacturers. The switch from “not in control” to “in control” contains several hardships. Reaction time, focus and legal responsibility in case of accidents are the most common ones.

The human is proven to be a poor an inefficient technology supervisor, and therefore a system that monitor the driver would be a better way to go. It would however be possible to adjust the level of assistance, while the lowest offers basic safety and the highest help the driver so take corner more efficiently, to park in a safe way and improve his/her driving. This would happen without the driver even take any notice. A reason to why brands and companies want to skip this step, jumping right into fully autonomous is that
it would mean a huge opportunity to make new revenues as more business models opens up. Completely logical evolution in a Capitalistic - growth fanatic ideology. Where technology is promoted to make bigger profits instead of saving more lives. Which might explain why the autonomous discussion within the automotive sector has been so loud lately, especially from the tech manufacturers providing the software. It would make more sense to initially provide this technology to trains, ships, and buses since they often follows a pre decided route and would easier to apply in the real world. The trains even goes on rail. There are of course developments in this field but they are not as loud as the automotive counterpart. Why? A personal reflection may be that tech companies are lobbying heavily to push the automotive business in this direction, since it would mean big money to provide every car on the planet, every new model, every year with this technology. Which make train and ship business less interesting to invest in.

Driver Licence
Since the intelligent system make it safer to use the car it’s possible to even simplify the way people manage to get their driver licence. Let’s imagine a person getting a licence by using VR. By ordering goggles and driving simulators to your front door it will reduce the pressure on driving schools and more people might even afford a licence. Making the car more democratic. 

Let’s imagine a person getting a licence by using VR

Young People
This project aims to target the Young people of China. Historically, China as a country have been quite hard for young one’s to grow up in. Ranging from high expectations from the close family to oppression from the authoritarian communist state. A ideology also called Maoism initially founded by Communist Party of China’s (CPC) leader Mao Zedong. This doctrine was the state supporting ideology between 1949-1978 and is still today enrolled in the Constitution of the People’s Republic of China (Politics of China 2017). This period was characterized of equal poverty among the people. Lately china has adopted a more liberal
model of economy and has been one of the reasons to the fast growth. Despite the new communism, the state still have strict control of the means of production and companies. Today, the youth of China are becoming more individual, creating niches tribes. Where their consume, communicate on their own terms. However, some of the government pressure and social norms are still impacting their ability to live as freely as they want (Ried 2017). Further on, according to innovation research and trend firm Stylus. The young Chinese are becoming more aware of the extreme consumerism and promotes a healthier lifestyle. There is even a decrease among Generation Z thinking money is the key to happiness compared to earlier generations.

Xiao Qingxin
These movements have fuelled the modern Chinese hipsters, also called Xiao Qingxin. Which can be translated to “Little clean & fresh”. The Xiao Qingxin want to live a more simple and eco-friendly life than their ancestors. These people are typically well-educated and striving for self-realisation while opposing materialism. They are not seeking happiness in consumption and instead they value nature and diversity. Their values and mindset fit this project aim to propose a sustainable transport solution and therefore will the Xiao Qingxin stand as a benchmark in the coming development. It’s also possible to think that by targeting a young group of modern Chinese people, it has the possibility to influence the rest of the population in the same direction thinking long-term. However, in China there is also a huge movement in automation and screen obsession. A company have recently introduced an autonomous supermarket where it’s up to the consumer to pay for the groceries. The autonomous driving is rampaging across the culture. But this project will actively go against these structures to be in line with the low-tech, anti-algorithm, care about each other mentality. Something that hopefully would be appreciated by the modern Xiao Qingxin.

Scenario
Since it probably is going to be illegal to use the car within city centres. The scenario for this project will be for two people (Friends or Couple) to book a car, collect it at the designated parking spot, and to leave the city/suburban area to a place located outside the city close to nature. They will go light carrying only each a personal backpack. They will collect the car by using their driving licence and not their cellphones. During this journey they will stop at a store to pick up something they could eat later during the day. While parking the car it will suggest a position so it could be charging while the users are away. They will be in the nature for a couple of hours and then leave home as it goes dark. They will then park the car at parking facility and walk the last mile home.

They are not seeking happiness in consumption and value nature and diversity

A illustration of how the scenario work. The top image illustrate how the fully charged cars giving back energy to the grid powering the houses. The compass explains roughly how a system could inform the driver about efficient charging positions.
CREATIVE DEVELOPMENT

Benchmark
To get a good start and an idea of proportions and size, a similar car type is taken as a reference. This will help the workflow to see and better understand the volume that needs to be kept within. Images and measurements are being downloaded from internet and will stand as a base for the design. From these references a so called “bounding box” will be created in a Computer Aided Industrial Design software (CAID). For this project Autodesk Alias will be used as it is the standard for modeling in the Automotive Business. It is the Creator’s intention to also use Autodesk MAYA as it is part of the Goals & Wishes. MAYA is a polygon based computer software and is easy to work with when it comes to highly complex shapes and would therefore suit modeling of soft textile surfaces. This “bounding box” will also work as an underlay for future sketching since it will help the Creator to see the limitations. Second, a computer made male manikin will furthermore help as a reference. The manikin was modeled by the Author during the first CAID course during this programme. The manikin is 1.80 meters tall. This manikin will be placed within the “bounding box” to help design a ergonomic seating position. It will also help to evaluate that the interior components will be ergonomically placed and most important within reach. Making the interior design user-centered.

REFERENCE MODEL, COLORS & SHAPES

Warm Simplicity
Inspirational images were collected from internet. These were collected from Stylus CES 2018: Colour, Material & Finish webpage. The images will create a mood and help the creator to find a direction in the sketch phase. Warm simplicity embracing soft and friendly surfacing. Stepping away of traditional aggressive car attributes and highlights pure materials. Technology are being made soft and discrete and elevates the subtleness. Darker colors are being used to enhance the bright natural materials and colors.

Benchmarking the small city car: Smart for two.

Dimensions
Package Height: 1542mm
Package Length: 2695mm
H-point to Ground: 557mm
Chair Height: 287mm
Effective Headroom: 1000mm

Warm Simplicity

Back Angle: 21 Degree
Upward Vision Angle: 14 Degree
Downward Vision Angle: 11 Degree
Steering Wheel Angle: 24 Degree
Shoulder Room: 1177mm
**SKETCHING**

**Initial Sketches**

The first sketches were mainly on the dash. This is going to be the interior centerpiece and is therefore important. One might argue that an overall sketch would be most appropriate for this stage, but the design process is seldom a straight line. A few overall sketches were still made and can be viewed on the next page. The first draft for this project before entering 3d-modeling. It is easy to lose traction while in a CAD program and it’s therefore important to have a proper sketch as a vision. Since this project is mainly material driven the creator had a few materials in mind as the sketch process was ongoing. The materials is based from the research in the earlier chapter. The dash is the centerpiece it make sense to manufacture it in a warm living material like wood. Surrounded by a felt wrap to frame the centerpiece. For the main structure a recycled plastic was chosen for its bright beautiful texture. And it’s also a strong visual statement, a material to show that the car aims to be sustainable. For the seating a felt material is chosen. Easy changeable due to the high numbers of people that would use this car since it is shared.

Different setups were sketched, focusing on interface placement and change of steering wheel placement to reduce number of parts. An idea of just bolting metal rails as support and to mount interface onto was also sketched. With inspiration from the Swedish “String-hylla”.

A “normal” steering wheel was sketched since the concept is not autonomous. However an idea of letting the steering wheel be easy changeable from side to side was sketched. Because this would simplify left and right steered changes when the cars are produced in different countries. The steering wheel was design to be “chubby” to really let the user feel welcomed by its friendly appearance.

A sketch of a cut view of the recycled plastic structure. This is meant to be supporting the interior and maybe minimize the metal in the rest of the car’s outer shell.
The first key sketch.
Midreview

The first sketches were getting the author started with generating ideas and to get a direction on where to go. However it is difficult to understand the true proportions in real life even though using the rules of perspective while sketching. So after the first drafts where made the work was continued in Alias CAD program. Where a model based from the sketches where build. This modeling process highlighted some issues. For example where the intended volume, or the package space much smaller than expected. So the floor, which was intended to also be the step-up for the seat was really hard to fit. But that’s why a 3d-model is very helpful for a designer. It helps to fix this early problems. The work continued and a sketch on top of that cad model was made to ensure right proportions. Here a idea of letting the seats be a simple wooden piece was born. The idea originates from the chairs that can be found in the school where the author is attending. This is also creating a space underneath the seats that can be used for storage. This further is in line with the circular mindset since the seats can be bolt on to the plastic structure and be easy disassembled. And the leg would use pure metal and be separated from the rest of the material. An idea of letting the metal strings form a shelf on the dash for storage and placement for the speedometer was also sketched. Also one reason to make a wooden chair as the car seat is it would enable full adjustment of the seat. Compared to when the material is bolt or strap directly onto the plastic structure.

Dash Storage

Some feedback on the mid-review regarding the seat adjustment was discussed. Something that need to be addressed since the concept aims to be democratic. Is there a need for dash was also discussed? The underpart of todays dashes are used for safety. In order to prevent the passengers from “submarining”. Meaning they will slip under the belt in case of collision if the wall was not placed in front of them. But if this concept can be safer due to technology it is reason to believe that this might be skipped. However it could be naive to think that there are never ever any more accidents and therefore some protection might be for use. And there is also the perception of safety. If the user does not have anything in front of you, would you feel safe? A concept of letting the dash be a pure place for storage was anyway sketched, to explore the possibilities of maximizing the interior space. The more efficient Electric/hydrogen package enables to put some of the components normally package in the dash in the front of the car above where the conventional engine usually are placed. This would help the users of easy storage while using the cars. And even if some storage are placed in the back of the car the front space can be used for personal backpacks and such.
New School vs. Old School

While the most of the work have been focusing in the front of the interior, meaning the dash, steering wheel and the felt wrap it was time to start develop the seat of this interior. While the previous ideas had been focusing on bolting the seat onto the plastic structure a new approach was carried out to let the seat be a separate part mounted to the metal frame behind the plastic. Because this enables full adjustment of the seat and would cover every driver, something important as it is shared. And by letting the neckrest be part of the seat it is also following the adjustment. Something that was discussed during the mid review. The sketch seen on this page mimics the same shape as the inspirational chair by Arne Jacobsen on the previous page. At that time the new manufacturing method of bending plywood to regain strength was state of the art. This led the creator to realize and to think what is the state of the art today. Instead of using an old technic. By using the mentioned method of Abroform would be more modern without being forced. With that the creator mean it’s just not only used because it’s trendy, it’s actually a smart method since the form freedom is high and it’s at the same time green and positive for the environment. This was decided to develop both for the chairs and the dashboard.

The Chris Bangle greenhouse

Automotive design language often follows the same principle, with sleek masculine lines and streamlined dynamic shapes. For this project I wanted to step away from just that. Therefore the greenhouse was designed in an angled manner to maximize the interior space. Similar to the Redspace concept design by former BMW head of design Chris Bangle. To simply give the user the perception of large space inside the car. Since this car is meant to move within city’s the speed is seldom high and therefore the aerodynamics does not have to be considered.

The design of the seat and dash was also changed. The dash is a compromise between the first idea and the last, where it is only for storage. The dash is lowered in the front and creating a area for storage, which is meant for simple stuff like jackets and such, easy accessible as the user enters the car. And by letting the surfaces closest to the driver create a edge the stuff being stored will not move around while driving. The highest edge was also decided to be the attachment point of the steering wheel. This remove the steering components underneath the dash and is therefore not in the way as the user entry or exit the car. An idea was also born to let this rail be the component to attached other things as well. If extra cup holder is needed. Or if a larger display is required, just mentioned a few examples. This idea makes the interior in that sense modular and the different needs in different countries or regions can easily be fulfilled without making any larges changes in the main components. It is for example possible to have a docking station for a mobile phone in this rail. And to manage different yearly mobile updates this docking station can be replaced instead of changing the whole dash. Thus keeping the car up to date in a circular mindset.

These are screenshots from CAD-program and show how the greenhouse is angled outwards to maximize the interior space. The seats are separated from the plastic cover to allow for adjustments.
Full Size Mockup

In order to evaluate the size and proportions of the interior a full scale mockup was built using simple materials such as wood panels and Styrofoam. The model was made based from the measurements from the CAD data to test in real life how the different components would be perceived. Emphasis was put on the overall “tub” dimensions and the dashboard. It was key to test the height and how the dash storage was functioning in real life. The model was built at school and several test persons from different programs where asked to sit down and test the interior layout. They then got to talk with the creator to address their point of view and thoughts. And to propose suggestions and improvements. One point discovered was the lower part of the dash. It was quite close to the knees and could preferably be much thinner to create more space for the user’s leg. This would also significantly improve ingress and egress. However, the height and the view from the seating position was ok according to test persons at school and by the creator himself.

One point that was proven not to work properly was the greenhouse. The front edge was at a level that only allowed for a 4 degree upward vision angle, compared from the recommended [h-point] 14 degree. While testing the mockup it also felt that the edge was to low. Therefore was the decision to change the greenhouse made, to a more conventional and which fulfill the recommended 14 degree target. The interior tub was also very small and could preferably be larger. So a decision to enlarge the overall layout was also taken.

Above is an illustration of the field of vision with the different designs. The lowest shows the poor vision angle caused by the “Chris Bangle” greenhouse. The middle is recommended for this segment and the upper is the current design with a greenhouse all the way to the back.

Tyler McDonald, a classmate of the Creator is testing the layout. Tyler is considered to be quite tall, around 1.80 and he did complain about the short package since he would have problems with the pedals being too close. Therefore was the interior dimensions increased both in the front and back to enable taller drivers to have a comfortable seating position.

Furthermore a section of the door panel was milled in full scale. In order to test an idea with elastic strings placed in a cavity of the door panel. A simple storage solution to secure magazines and maybe bottles. This idea was kept simple and left without deep pockets where a lot of dust and garbage can be forgotten. It is also the creator’s thought that this solution would keep the panel simple even in production purposes because of the small depth. The repetitive lines is also a reference to Lynk & co visual identity.
The overall design aimed to use sustainable materials in a “only what’s necessary” manner to enhance the circular mindset. Since the concept is an extension of the public transport, a lot of consideration was made to the robustness and changeability of the interior. To withstand long-term use of wear and tear and digital updates. The public transport aspect was also a big part of why storage solutions were prioritized. Since it reasonable to consider that users of this concept are on the go.
The GO bar located within the steeringwheel is an intuitive way of putting the car into gear and GO. By pressing it forward the car will move forward and to reverse the driver pull it back. Minimizing the need for gear shifters and such.

A metal guardrail and a high friction organic rubber carpet are protecting things from sliding.

The GO bar

Coasthanger.

Scratch protection. A simple way to minimize wear and tear. Also easy to change or to clean. The simplicity if the recycled plastic cover was kept to make manufacturing easier. And the newspaper storage was left unchanged.

The cushioning is made from felt and is designed with changeability in mind. And to make the seating more comfortable the seating is adjustable in height and in length to fit all users.

The mount is located behind the seat to free up space for storage underneath. The point is located behind the plastic cover making it invisible.
The display is backlit from underneath a thin layer of wood to get rid of the cold feeling from conventional black mirror displays. An idea that originates from the early research. To further enhance a analog feeling the buttons have the same haptics as an old tape recorder.

The music player will connect to the user’s phone. If the user doesn’t have one a default player will play some music or the user can always choose radio.

The GPS is very simple and is voice controlled to minimize deep menus and unnecessary selections and complexity. For the HVAC everything is automatically adjusted to give the user a comfortable atmosphere and also to reduce the need for controls.
Early in this project I wrote about the society and our economic system. How it affects us and the industry. Further, how it will influence the development for future green innovations. My main question was “What if the automotive industry embraced a circular mindset?”. With the subline of “would this stimulate greener development in terms of materials and have an effect on overall energy consumption. This will be my first question to answer in this conclusion. The answer is; I don’t know or at least I don’t know for sure. But I can speculate and it is my belief that it could. Based from the knowledge of the Ellen MacArthur foundation, a topic covered in the research, to mention one example. By shifting the focus from pure profit to a closed loop it will give incitement to invest in greener materials and more expensive production methods. Especially if the model is a subscription and therefore would benefit by being longlasting. But once again I cannot know for sure since my design is a vision and have not been tested with the materials or the business model in reality. So I have to speculate at this moment. The main issue as I see it is not if it works or not, because there is a lot of reports by intelligent professional within economy and sociology claiming this. But how to implement it in a greater extent. It is my belief the the best and most efficient way of introducing this is by political reforms. Because the economy of the market are to strong and big companies will not do better just because they think it’s the right thing to do. They will do it either because they will gain money of it or they are forced to do so. But going into a circular economy would not have to be a negative thing since growth is still part of its business model. It is the reason to why it can work. But it’s also important to keep in mind that even if our economy would change to a circular it is not the universal fix to every sustainable problem in the world. A lot of the responsibility still lays within the people. We can not consume like we do or fly around the world four times a year, like the average middle class citizen. How this fundamental change is going to happen is very complex, and is according to me a matter of awareness and education. To realise that we don’t get happier by consumerism, not in the long run anyway. This is something companies know about and are exploiting consumers exposure to buy more and to by often. This is crucial in the change to a greener society. It should be harder to exploit markets and consumers than it is today. When companies have a get out of jail card in every aspect they act. One use to say that with great power comes great responsibility and that’s clearly not the case for the tech giants. The way Facebook handles personal information for example, is something to take very seriously especially in the aftermath of the global scandal concerning Cambridge Analytica.

That’s why I think it’s important that people with the power is making sure that the green alternatives is the most easiest to access. Sure, we are getting more conscious about the way we consume and more expensive ecological products are selling in higher numbers each year. Something that is going opposite of the current capitalistic ideology (at least in Sweden). That proves that people are willing to make it happen. But I think that the ordinary people should not bare the whole burden to fix this issue. It should be in the interest of the companies, and politics. In short, the people sitting on the power need to make sure to provide the change.

The current Capitalistic ideology is pushing people out of poverty. That’s the positive aspect often highlighted when talking about it. We are further producing more and more products and services. Things we don’t need but we buy it to impress people we don’t like. Yet, the amount of jobs needed is decreasing due to automatisation. That’s why a UBI (Universal Basic Income) is maybe the only way to a more sustainable society. Because today we are creating things we don’t need because of our current model and is a result of the structures in society. As long as we keep these structures nothing will change. I, myself am a advocate for a UBI. One could say the reason to why I am studying this is a result of those structures just mentioned. I sincerely enjoy the creative process, the exploration, the feeling of creating or building something. Using your mind and hands to build is something I found truly fulfilling. Create images and artefacts to trigger emotions. If someone would ask if I do this to make a change in society I would lie if I did say yes. The fact is I don’t care that much. I do this because I love the creation in itself, it does not need a purpose. And today’s society don’t offer much for people that share my passion. The circumstances of contemporary creative professions are very hard since our society primarily puts money first. And that is making creative work very hard to engage in. Except for people with a rich cultural or economical capital as a back-up, and is the reason to why people working in the creative field maintains from middle or upper class. In other words, to be able to work creatively is a matter of class in the modern world. For me, the car design industry looked like the only way to work creatively and also to make a living out of it. It’s also a huge interest since where I grew up the car was the ticket to get “out of there”. Which puts the car as the ultimate symbol of freedom. The car design industry is however good in many ways, especially compared to fashion or graphical designers, who have a much tougher climate. However, the capitalistic ideology is constantly present in the industry. My experience is that it’s seldom about creating smart or thoughtful design. It’s about doing the next big thing so that the industry can sell more than its competitors, it’s purely superficial. This combined with the competitive atmosphere, only focus on status, power and image. Which is characteristics of the car design industry in particular and design in general. Is fueling negativity and is one reason to why changes is so hard to make. Of course there is practical issues like safety regulations and manufacture limitations but the overall ideology of design is not about to work together, but to work against each other. This is of course affecting the people working with it and finally the consumers and in the last resort environment. This become very obvious when reading Naomi Klein’s book about capitalism. Is even evident at a modern corporate level. As the New Yorker reporter Sheelah Kolhatkar writes about the bad working conditions at UBER, when the previous
company CEO introduced competing among the employees “which led to secrecy, lack of cooperation, and animosity among employees. “There was no sense of trust, no sense of ‘We’re building this together, ‘” (Kolhatkar, 2018) It’s my belief that by changing transportation to become more sustainable it’s crucial that changes are made within the industry first. That change probably starts at school. I can see the competitive atmosphere is still a big part in this kind of creative work. My own role in this can be frustrating, since I am driven by a strong ideology when it comes to creativity and the society is pushing for more extravaganza and higher sales, only rewarding the people who has the energy to produce as 130% all the time. I can be disgusted by myself and my situation I’m in. Creating soulless stuff with the aim of being new, for no real purpose. It’s self hated in its purest form. But I guess that’s the side-effect of making something that is mainly artistic commercial.

The design of the interior was aiming on being small first hand. I found myself struggling with the small package. Since the business is mainly focusing on the visuals, most of the graduation students at transportation design schools is doing something large or luxurious as a thesis. I believe it’s because these large packages enables for stretched and elongated shapes and surfaces. Which often looks very beautiful and majestic, they have an eye-catching effect. Often preferable in the modern world when everybody wants to stand out. The approach of doing something for the people and compact, was a challenge physically but also from the perspective of going against the “luxurious car” norm. I do however like the people’s approach and I think it’s too often neglected in transport design. Maybe it’s because this industry puts a face on capitalism and this is even visible on a university level. Doing something more democratic and far away from the ultra luxury is closer to my heart because of my heritage. Since the car was shared it challenged me to make it friendly and easy to use. This was quite the struggle since the brand is very progressive and edgy. At first it felt these values was contradicting each other but I later realized that they could work together. Mostly because doing friendly design is progressive, since the industry is overwhelmed by aggressive stance and masculinity. Another struggle, constant present during this thesis has been the corporate contempt, generated by the initial research. The insight of the structures of our society made it feel hard to motivate myself to keep on working. The realization that “this” we do is not going to change anything, maybe even be the opposite of what the world need made it almost unbearable. This was also affecting my relationship with the brand that was sponsoring all this. The research made me feel like I did not care about them, and I did not always tried to design so that my form language would fit the brand image perfectly. Also I believe it had something to do with the complexity this kind of project offers. It’s so difficult, and as a creator you are not sure if you are going to make it. So you create a bubble to handle it, and sometimes that can be very destructive. My relationship with the brand had also to do with the fact that I am creatively drained after these two years at transportation design at UID, and by the year of traveling around to do low paid internships. I also had personal and economical issues that made it almost impossible to do the thesis at the company in Goteborg. I am positive that my attitude would have been different if I made it there. Being close to professionals to get guidance and help. But my attitude to this thesis can both be seen as something positive and negative. The positive aspect is that I did something I believe in, and maybe be created something progressive and new. However, I do regret that I was not in contact with the people working with this more and therefore probably missed a lot of good insights and tips from the people experienced in this field. The materials used for this concept have been a key factor. During my research I found a couple of different materials that was claiming to be sustainable. Which was then implemented in the interior. I have been trying to consider how the material being used is manufactured. Because this is affecting the design. If a material is best extruded that is important to consider while creating the shapes. According to my own philosophy, this is crucial in order to be a competent designer. This type of thinking is making the step from concept to reality as small as possible. One point of the plastic cover is that it might be better to use an organic material such as corn plastic. My reason to choose a recycled material in that case was it’s simply more visual, and would benefit to prove this concept. Another point was the
**Capitalism**
https://static.veaselfinder.net/images/media/396e8a952de1a618021f3f0e9bd7f9d3.jpg

**A.I & Automatisation**
http://a.alnews.com/images/Politics/trump-congress-ap-er-170724_16x9_592.jpg
https://www.maxim.com/.image/t_share/MTUxNzIyMTA0NgweMjMIOTYwolation-robot.jpg

**Basic Income**
https://www.commanderugs.org/sites/default/files/view_article/thumbs/abi.jpg

**Greenwashing**
https://i.pinimg.com/564x/35/d0/cf/35d0cf86df9bdc01d25af5d6901256e8.jpg

**SUSTAINABLE MATERIALS**
http://www.ncl.ac.uk/media/wwwnclacuk/instituteforsustainability/images/Landfill%20jpg.jpght

**Newspaperwood**
https://static1.squarespace.com/static/59de0b04e45a7c4966b1814f/59de3c2b6bb054120959a2/f/59e387b0699y-be1b0162606d1/15089923456EL/TIL.jpg?format=2500w

**Plastics**
https://api.pinterest.com/originals/8be/7b2a/8be/7b2afcafaa1815c3e992ed03233c.png

**Textiles**

**3D Printing**
http://dljy4w60ymlo.loadfront.net/wp-content/uploads/2014/04/Volkswagen-Car-Parts-615x445.jpg

**BRAND**

**GOALS & WISHES**

**THE CONCEPT**

**Mass Transit Context**
https://api.pinning.com/56x6/68/38/6638136e6463f12a7e1d4683d0484.jpg

**Technology & Interaction**

**Driver Licence**
https://www.vrroom.buzz/sites/default/files/styles/article_top_banner/public/a_11.jpg?rok=LVWnrd&c=1007a17f-76de98efcb67c6d3e688

**USER**
https://api.pinning.com/56x6/33/72/29/6732296445500d3e50736b0084044d0.jpg
https://leibal.googleusercontent.com/wSe_9DEaFUhz7TOQgJLaeDF8AUO9P2PGwEry8EymKkKYhaTG9_jNBrX-JVUnKxU5wec+s85

**Young People**
https://commons.wikimedia.org/w/index.php?curid=172440

**CREATIVE DEVELOPMENT**

**REFERENCES MODEL, COLORS & SHAPES**

**Benchmark**

**Warm Simplicity**
https://www.pinterest.com/pin/23221754312404262/

The moodboard images was retrieved from Stylus CES 2018: Colour, Material & Finish webpage. https://www.stylus.com/jlkndq
**SKETCHING**

**Initial Sketching**

**Mid-review**
https://www.google.se/search?biw=1747&bih=916&tbm=isch&sa=l&q=chair+myra&oq=chair+myra&gs_l=psy-ab.3...2466.6694.0.6974.5.0.0.0.0.0.0.0.0.0.1.64.psy-ab..0...0j0i1j0i30k1j0i30k1.0.Fc7u6v4phKI#imgdii=w-vEf75Q7Y1VSM:&imgrc=XosGqqA6npZnjM:

**The Chris Bangle Greenhouse**

---

**RESULT**

**FINAL DESIGN**

**Summary**
https://www.pinterest.com/pin/94505292154936811/

https://www.pinterest.com/pin/233221754312494262/

---

**APPENDIX**

**Timeplan for the thesis project.**