



CHALMERS



The First and the Last

Exploring how a Lynk & Co micromobility vehicle could be designed for 2030

Bachelor thesis in Industrial Design Engineering

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Cover: Visualization of LynkLyte, a micromobility concept for 2030

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Abstract

This thesis presents the development of a micromobility concept for the year 2030. The purpose of the project was to develop an inspiring and immersive concept. The project was given by Lynk & Co Design, who oversee the designing of cars for Lynk & Co.

The micromobility market is growing and is expected to continue to expand. Another trend is that European cities are suggesting different ways to limit the usage of cars in cities. One way of doing so is to limit the possibilities of parking cars in city centers and, or, implementing green zones where car traffic is limited.

The micromobility concept was aimed to have a strong link to Lynk & Co members and enable transport where a car might not be a fit solution in the year 2030. The outcome was an electric scooter which is foldable and can be charged in the trunk of a Lynk & Co car. It enables convenience to the members who, for example, need to park far away from their office or who want to explore a city in a convenient way. It is the perfect choice to travel the first and last mile.

The final concept has technical parts and functions which could be possible to manufacture if developed and specified further. The finished concept was developed to inspire further development.

Executive Summary

Society is facing a tough challenge to meet the sustainability goals set by the Paris Agreement. One of the factors needed to be met is to decrease the carbon emissions which then also challenges the car industry. While urban strategies plan for reducing the need for cars, the industry invests in electric vehicles. If the accessibility for cars is reduced the market space for micromobility is to be expected to increase further. These are some of the factors which has led Lynk & Co Design to investigate the opportunities of a micromobility concept which would be compatible with their already existing products, cars.

The purpose of this project was to develop a micromobility concept which would complement transportation in the near future where the car is not enough. The solution suggests a concept which allows the driver to travel distances which might not be accessible with a car in the future. Given that the solution is electric it will not contribute to emissions or noise pollution while used but still gives the driver a comfortable travel option.

The project itself was divided into three phases. Phase 1 started by investigating the field, defining the problem and any limits such as the context of which the solution would take place. This was done by writing different scenarios within different contexts where the lack of a solution is apparent.

Phase 2 of the project was an ideation phase where various methods, such as brain writing, brain drawing, mashup innovation, morphological matrix, etc. were used to generate ideas and solutions. Three main concepts were taken into consideration where the best qualities of each were combined into LynkLyte.

LynkLyte was during phase 3 finalized to match the brand of Lynk & Co while also making its own statement. This was done by applying the gestalt principles which can be seen in the already existing cars as well as including contrasting colors and shapes from their existing concept car, The Next Day. A model was made to be able to visualize LynkLyte using Blender and pictures were rendered into context. The scenarios were also applied at this stage to further visualize LynkLyte in usage.

LynkLyte is a compact concept that can be placed in the trunk of a Lynk & Co car and when needed, picked up and extended to a fully sized scooter. The battery can be charged in the trunk of the car while not in use, so the user does not have to remember to charge it elsewhere. LynkLyte is an extension to the car and brings the user closer to their destination where the car cannot travel.

Table of contents

- 1 Introduction 1
 - 1.1 Background 1
 - 1.2 Collaborating companies 2
 - 1.3 Purpose 3
 - 1.4 Scope 3
- 2 Final result LynkLyte 5
- 3 Theoretical background and methodology 7
 - 3.1 Micromobility 7
 - 3.2 Urban planning 8
 - 3.3 Methods 9
 - 3.4 Software 15
- 4 Process 17
 - 4.1 Phase 1 18
 - 4.2 Phase 2 27
 - 4.3 Phase 3 37
- 5 Result 41
 - 5.1 Traits 41
 - 5.2 Final product - LynkLyte 42
- 6 Discussion 53
 - 6.1 Process 53
 - 6.2 Concept discussion 55
 - 6.3 System discussion 56
 - 6.4 Ethical aspects 56

6.5 Further development	58
7 Conclusion.....	61
References	63
Appendix	1
A Brief.....	2
B Scenario writing.....	3
B.1 Parking roulette.....	3
B.2 Other scenarios	5
C Mash up innovation	8
D Morphologic chart	10

1

Introduction

Cities in Europe are constantly evolving, with a common interest in reducing environmental impact. At the same time, the desire to move in a comfortable manner remains. One sort of vehicle that has emerged increasingly in cities is electric micromobility. The project intends to explore how cities may look like in 2030 and to conceptualize a micromobility solution for that scenario.

When micromobility is mentioned in the text, it is to describe a small vehicle that does not require a license of the person operating it. The vehicle can preferably be carried and parked without needing a big, designated parking space. These vehicles do not aim to carry the user long distances, but rather to be nimble and easy to use. Micromobility vehicles can be especially useful where larger vehicles are harder to use, for example in the city. Two examples of types of micromobility are bicycles and electric scooters.

The definition of micromobility includes larger vehicles such as golf cars, the requirements being that the weight is less than 500 kg, have a top speed below 45 km/h and do not have a combustion engine (Institute for Transportation & Development Policy [ITDP], 2020.). In this project however, the focus will be on smaller vehicles that can fit in the luggage compartment of a car, and the use of the word micromobility will refer to such vehicles.

1.1 Background

A trend that has been noticeable in recent years is that the use of micromobility has increased. Many cities are also choosing to invest in expanding infrastructure for easier access by bicycle (Zh'ang, Ding, & Chen, 2022). These changes will likely have the side effect of reducing accessibility when driving a car in cities that choose to prioritize biking, leading to an assumed increase in micromobility demand. These developments may encourage car companies to expand their product range to include micromobility solutions. These solutions

would be particularly valuable in cities of the future where car usage is restricted, offering greater accessibility and addressing transportation needs effectively.

Another recent trend that is likely to persist is that the desire to own things is decreasing. Many people think that the most important thing is accessibility, and if it is close at hand, it is satisfactory (Harms. S, 2003). This may lead to more services centered around rental of products. Examples regarding micromobility are rental bicycle systems and electric scooter services (Business Region Göteborg, 2022). Based on the number of companies that have emerged in the last few years providing rental services of electrical scooters, it appears to be a profitable business model. If this trend continues, companies may need to update their business models to stay relevant with today's changing attitudes towards ownership.

Another aspect that needs to be taken into consideration is that technology is evolving rapidly, and it can be hard to see what the next technological advancement will be. However, a good assumption can be made on the basis that technology takes multiple years from working prototype before reaching the consumer market. Thus, assumptions of what technology will be available year 2030 can be made by looking at recent technological advancements. Furthermore, a correlation between supply and demand can be assumed, where more resources will be put into technology that is highly demanded.

1.2 Collaborating companies

The project is initiated by Lynk & Co Design, a division of Geely Design. Located in Gothenburg, their aim is to design and ideate future mobility according to project supervisor from the company (personal communication, January 17, 2024). They in turn work for the car brand Lynk & Co.

Lynk & Co is a Chinese and Swedish car brand founded in 2016 with one car model launched in Europe and nine car models launched in China. The company's philosophy in car sales is unique to other brands in the way they market for shared use in addition to owning/leasing a private car. They provide the usual options to either buy or lease a car. However, their two unique services are their car subscription, with the benefit of having only a 20 days' notice period to end the subscription. Furthermore, they provide the option for members to rent out

their private Lynk & Co cars to others while not in use. The intent is to not put focus on ownership of their products but rather on sharing (Lynk & Co, n.d.).

1.3 Purpose

The purpose of the project is to create a micromobility concept that fits the project's urban vision of Europe in 2030. The project will be presented in an interactive and immersive way with the aim to inspire Lynk & Co through the project's results. The desired impact of the concept is to facilitate the transportation of the target audience within an urban context.

1.4 Scope

The design brief provided by Lynk & Co design calls for innovative ideas and smart solutions regarding new micromobility options for Lynk & Co members. Lynk & Co, known in Europe for its subscription based, sharable mobility concept, seeks to integrate new micromobility ideas into their vehicles to offer their members freedom and style. The brief states that the concept should be set in 2030, envisioning a future where cars may not fly but should provide environmentally friendly transportation. Three contexts were provided as possible scenarios. Urban, implying the context of a busy city. Offroad, meaning how travel can be done to get out of the city. Lastly, Family, meaning how travel with micromobility can be done to fit more than one person. The brief indicates that a full story around a product and its service/usage is supposed to be created, emphasizing interaction and immersion to create compelling experiences in a close-future, potentially autonomous world (see Appendix A).

The chosen way to complete the task was to create a micromobility vehicle concept specifically made to be used in urban areas of Europe. The main goal of the project was to create something that inspires and presents how such a scenario could look like. Therefore, no consideration has been made to costs of the components or production of the vehicle. However, it was made sure that each technical principle is plausible, but that is how far the analyze regarding technical features was done. The focus has instead been on creating a

vehicle that looks like a Lynk & Co, which reflects Lynk & Co's identity, and that reflects Lynk & Co's vision of their future design.

2

Final result LynkLyte

The final result of the project is a digital three-dimensional model of a micromobility concept. The concept is inspired by the Lynk & Co cars and brand, but also by exploring how 2030 could look like. The main principle of the concept is that it is presented as part of a scenario. The scenario is about a couple with a Lynk & Co subscription. It presents a realistic story, where the day begins by driving to a parking garage located on the outskirts of a large city. From there, they take their micromobility vehicles from the trunk, which they use to travel to their respective jobs. As they finish work at different times of the day, one person heads back to the car and drives home, while the other stays behind to buy groceries on the way to catching the train.

The main goal of the final concept was therefore to find a way to create a vehicle having all traits necessary to complete the tasks of the story. The most important part, and what makes the concept special from the many micromobility products or concepts already existing, is the combination of being compact while storing, and having a luggage area while in use. This, as well as staying true to the identity of Lynk & Co design are the main traits of the final concept. Furthermore, an attempt was made to also design the vehicle in the way Lynk & Co visualizes their future design.

The final design of the concept consists of a body which is mainly inspired by Lynk & Co cars but adjusted to fit the smaller. In the front, by the wheelhouse, the battery and mechanics that allows the concept to function is located. The rest of the body is used as a luggage area. An important principle used when transporting luggage, is to keep the center of gravity close to the ground. Because the wheels must be small enough to fit in the car, the balance will be compromised. Therefore, the overall weight distribution is an important consideration. Other than the body, the handle is also inspired by Lynk & Co cars in the way that the shape mimics the design of their steering wheels. The wheels also resemble the wheels of Lynk & Co cars as they have a design of polygons, present in Lynk & Co car's rim design.



Figure 1. Rendered image of final concept

The micromobility vehicle is foldable, allowing it to appear sufficiently large when being ridden, while also being compact enough to fit in the trunk of a Lynk & Co car. It is folded using a telescope function in the steering stem, bringing the handle and seating area closer to the main body. Additionally, the rear wheel is folded by having an axis between the forks and the body, which they are rotated around. By doing this, the floor of the storage compartment in the main body is folded to be along the walls on the inside, making space for the wheel. The rear support for the seat is folded via an axis between the body, which it rotates around, and a rail below the seat which it follows from the back and forward. The folded shape is meant to look like a polygon, which is commonly used Lynk & Co design.

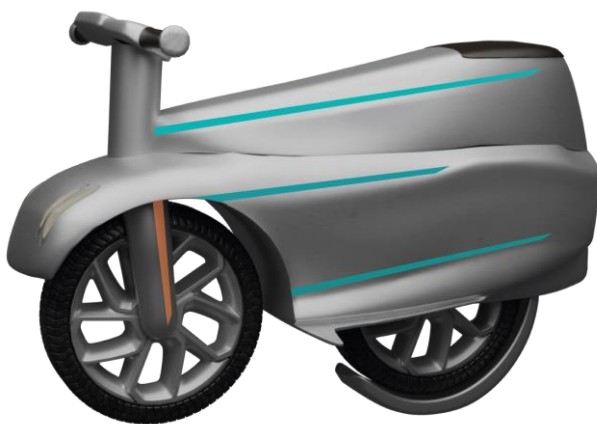


Figure 2. Rendered image of the final concept while collapsed

3

Theoretical background and methodology

This chapter presents a collection of theories and methods used throughout the project. Initially, background information and previous research on micromobility and urban planning are provided to contextualize the work. This is followed by descriptions of the methods and software used. The majority of these methods were utilized for ideation and concept development.

3.1 Micromobility

The market for micromobility is projected to grow over the next decade according to estimates by McKinsey & Company (2023). In 2022, the micromobility market was valued at around \$180 billion, and the analysis suggests that this figure could double by 2030. The significant shift in the market could lead to a reduction in personal car usage, which will pave the way for new innovative transportation solutions. McKinsey & Company conducts an annual transportation survey, and the 2022 survey indicates that many people are open to changing their transportation habits. Nearly 30% of respondents stated that they plan to increase their use of micromobility, 46% are willing to replace their privately-owned vehicles with other alternatives, and 70% are willing to use transportation services where they share vehicles with others.

The Stockholm Chamber of Commerce views micromobility as essential for the city to continue growing while avoiding the need for significant investments in road networks or public transport (Stockholms Handelskammare, 2021). Micromobility is seen as a win-win situation for the economy, the environment, and the city's residents. To increase micromobility, there is a need for infrastructure development such as bike lanes and parking facilities (Stockholms Handelskammare, 2021).

The micromobility market today predominantly consists of bicycles, electric scooters, and electric bicycles (Stockholms Handelskammare, 2021). Additionally, there are alternative solutions such as hoverboards, one-wheel vehicles, and skateboards, although these are primarily utilized by enthusiasts. Furthermore, it is common to utilize sharing services for renting electric scooters and bikes (Stockholms Handelskammare, 2021).

A study conducted at the University of Brescia reviewed existing literature on electric-powered micromobility to review user behaviors and associated issues. The findings revealed a strong correlation between usage rates and weather conditions. Electric scooters emerged as a popular choice among users due to the sense of freedom they provide, their enjoyable nature, and their ability to reduce travel time (Boglietti S. et al., 2021). Furthermore, the study indicated that the use of electric-powered micromobility predominantly replaces walking or cycling rather than car usage. On average, trips using electric-powered micromobility range from 1.2 km to 2.7 km in length, with an average usage duration of 10 to 16 minutes per trip (Boglietti S. et al, 2021).

3.2 Urban planning

How society will work and look in the future is a question which cannot be answered for certain. However, plans, projects, and strategies to achieve specific goals are put together ahead of time and taking these into account makes it possible for assumptions to be made. Due to the current climate crisis, 196 parties signed the Paris agreement back in 2015 and this essentially means that all 196 parties need to work towards the Sustainable Development Goals (United Nations Framework Convention on Climate Change, n.d...). However, how this is implemented in urban planning differs widely.

When it comes to traffic, most cities aim to reduce their environmental impact, but the approach to achieving this goal varies depending on various factors, such as the city's cultural heritage. Additionally, cities prioritize different actions in their plans to create a more sustainable urban environment. For example, Berlin already has a significant number of vegetation zones throughout the city (Metropolis, 2015), which they intend to preserve. Instead, they are focusing on transitioning to the use of more renewable energy sources.

A priority for many cities is to minimize the space occupied by cars throughout the cities. In the city Lyon, they aim to build and use big parking lots around the city where the inhabitants can park their car during the workday (Lyon Confluence, n.d.). Other cities such as Gothenburg focuses on public transportation (Göteborgs Stad, 2014), where the end goal is to create a safe and lively city center.

In conclusion, various urban plans across Europe share the common goal of minimizing carbon emissions. This is often achieved by reducing the space allocated to cars within cities and promoting alternative modes of transportation.

3.3 Methods

This section covers the different methods that were used to carry the project forward and aims to describe each method theoretically. Many methods were applied in iterating steps. This, as well as how these methods were used in the project will be explained more in chapter 4, Process.

3.3.1 Design process

The engineering design process has been followed throughout the project. The method is commonly used as a set of steps used to solve design engineering problems, (Svenska institutet för standarder [SVID], n.d...). The process is known to be iterative, which means that the steps may need to be repeated and backtracked throughout the process. This is visualized in figure 3.

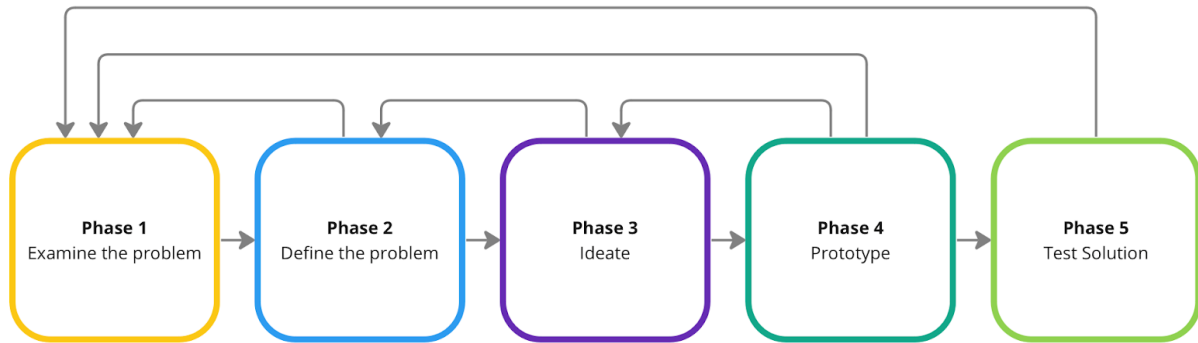


Figure 3. Illustration of the phases in the engineering design process and how they are linked

The process can be divided into five phases. The *first phase* is to examine the problem. When initiating the project, it is necessary to collect information about the subject. When working with product development this can for example be; the product, similar products on the market, the user, the environments where it is used, and technologies incorporated.

It is standard procedure to define the problem before developing solution concepts. Defining the problem is usually done in multiple steps (McGill University, n.d...), where the first is to create an understanding of the problem followed by defining the problem. Creating an understanding of the problem itself is a major part of *phase one* in the engineering design process but also stands ground to how a problem is defined. One of the problem definition's purposes is to clarify the objectives of the outcome, to set the goals, as well as constraints and functions needed.

Where the first phase is to create an understanding of a problem area, the *second phase* is to define the problem. The first two phases often overlap each other, and they can be hard to differentiate when reiterated (Svenska institutet för standarder [SVID], n.d.).

The *third phase* of the engineering design process is called the ideation phase. This phase consists of generating ideas and concepts which can solve the problem defined in phase two. To facilitate creativity in this phase, different ideation methods are often used. There are several methods, targeting creativity in different manners. The purpose is to help developers to be open minded for new ideas. Different methods used in this project are listed and explained throughout this chapter.

Phase four, is to prototype one or more concepts. Depending on the objectives of the project, prototypes can differ in form, from sketches, models, or detailed product prototypes with set functional attributes.

The *fourth phase* of the process is to test the solution but is not relevant for this project since this project concludes with a concept.

3.3.2 Scenarios

A scenario can be created to better understand the environment and situation where a product is supposed to be used (Johannesson H. et al, 2013). The scenario will describe how the user interacts with the world in specific contexts. Scenarios are built upon collected data and assumptions. The scenarios can be used to describe best case scenarios, worst case scenarios or a normal day. Oftentimes multiple scenarios are created through different viewpoints to broaden the picture. A scenario where the product is used can also be staged or observed to easier catch problems that could occur.

To create a scenario the first step is to decide the purpose of the scenario. After that it is important to determine which actors the scenario will include, different users can have different goals and intentions (Wikberg Nilsson Å. et al, 2017). When the purpose and actors are set, a theme for the scenario must be decided, here it is possible to use brainstorming to come up with different themes. Then it is time to write the story, here it is possible to create multiple stories with different main users, intentions, and themes to then discuss and develop the stories further (Wikberg Nilsson Å. et al, 2017).

Since this report aims to develop a product intended for use in 2030, creating a scenario has been a crucial part of envisioning everyday life for the users in the future.

3.3.3 Persona

A persona or personas can be created to easier analyze and understand the user. The persona is a fictive character that fits in the targeted user group. Analyzing the persona can help to understand the users' needs, abilities, and limitations. The first step in creating a persona is to identify the target group and then to describe the typical user, his/her behavior, emotions, priorities, and personal goals (Johannesson H. et al, 2013).

To create a persona the first step is to visualize the context where the users are and fully try to understand situations and context in which they operate. Here it is possible to start looking for patterns in the users' behaviors, needs and issues to create a general picture of the target audience. From the more general envisioning, one or more detailed characters are developed. The persona can be envisioned through a detailed story, citations, and pictures of the fictional character (Wikberg Nilsson Å. et al., 2017).

3.3.4 Information gathering

Information gathering can be used to gain new knowledge and understanding of a field or target audience. This can be done by surveys, interviews or polls and can be done to further understand how things might be in the future and not only how it is now (Wikberg Nilsson Å. et al, 2017).

3.3.5 List of functions

List of functions refers to creating a list defining the functions needed for the intended concept to operate properly as *main functions*, the functions enabling the main functions as *subfunctions* and the functions that are not essential but adds value as *desired functions*. Defining, describing, and sorting the different functions creates a base to problem solve and ideate on. (Svenska institutet för standarder, 2019.)

3.3.6 Morphological chart

A method to create part of solutions is a Morphological chart. By listing desired criteria's and then writing down every possible way found of fulfilling these criteria, the solutions of the functions can then be combined in multiple different ways. The best ones are kept and further developed (Wikberg Nilsson Å. et al, 2017).

3.3.7 Brain drawing and Brainwriting

Both brain drawing and brainwriting originate from a procedure called Brainstorming where a design team develops different framings of questions where different solutions can be given as answers (Wikberg Nilsson Å. et al, 2017). The motive of the methods is that the team should not criticize the validation of different solutions beforehand as well as challenge the creativity to come up with imaginative solutions. The goal is to create a quantity of different ideas rather than qualitative ones at a beginning and then cull the non-realistic ideas at a later stage (Wikberg Nilsson Å. et al, 2017). When referring to Brain Drawing, the way to present part solutions or ideas is through sketches and drawings. While using Brain Writing the ideas are presented through written words and sentences. Many times, the design teams are given a set time to come up with the solutions (Wikberg Nilsson Å. et al, 2017).

3.3.8 Mashup Innovation

Mash up innovation is a method from Hyper Islands Toolbox (Hyper Island, n.d.) to generate innovative ideas. The first step is to brainstorm around pre-decided areas such as in this project, location, transportation, and weather. Then follows a session where the participants take one idea from each area and combine them to possible solutions. The ideas can then be developed further. By first generating ideas in each area and then combining them it is possible to generate many different solutions in a short period of time (Hyper Island, n.d.).

3.3.9 Form analysis

Form analysis is a method which is used to create a framework to design a product. The shapes, colors, materials, and contrast found in already existing products or products of the same brand are studied and through these, patterns can be observed. Further analysis based on gestalt principles formulated by Max Wertheimer (Interaction Design Foundation, 2016) may also be of use. Some of which being:

- Law of similarity
- Law of proximity
- Law of closure
- Law of experience
- Law of common fate
- Law of symmetry
- Law of continuity

The gestalt principles are described to have their base in humans' ways to group things and to see patterns. This is used to create similarities which may induce recognition of function as well as branding. In total there are twelve principles, however only the seven deemed most relevant for the project are mentioned. Especially Law of similarity, which is when objects are perceived as a group due to them sharing superficial characteristics. This is a common principle observed in branding.

3.3.10 Technical possibilities

When creating a concept some ideas may be seen as more realistic than others. Concluding the feasibility of a concept requires defining the possibility of a function to work as intended. This can be done either through defining a new technique from scratch and proving its function or applying functions and techniques which exist in products today. A way to save time during the ideation process could therefore be to do market analysis of functions which can be implemented in different ways for the concept in the making.

3.4 Software

The following subsections present an overview of the software that was used in the project. They were used with the aim to design, visualize, and develop the concept and scenario.

3.4.1 Chat GPT

Artificial Intelligence is a tool which has undergone grand development recently. Artificial Intelligence refers to the ability of a computer program or robot to imitate the intelligence of a human. There are many different implementations of Artificial Intelligence today, one implementation is GPT, Generative Pre-trained Transformer, where ChatGPT from OpenAI is a popular option. ChatGPT uses supervised learning with reinforcement (OpenAI, 2022.), meaning that humans have responded to a generated answer as either good or bad regarding form and content. ChatGPT sources its information through text data from the internet, such as public books, websites, articles and more (OpenAI, n.d...).

Usage of a Chat GPT enables quick response where the user sends in a question or request to it through a web-based chat function and receives an answer seemingly instantly in the chat. Current versions available are ChatGPT 3.5, which is free and ChatGPT 4.0 which users can access through paid subscriptions.

3.4.2 Blender

Blender is a free 3D creation program (Blender Foundation, n.d...). It can be used for a big variety of different purposes, most importantly for this project, three-dimensional modeling, animation and rendering. Blender was used for making quick models to explore shapes, as well as creating a detailed model with various materials and rendering it.

3.4.3 Adobe Dimension

Adobe dimension is a software that enables creation and rendering of three-dimensional models to visualize ideas (Adobe, n.d.). The software is used in the project to create three-dimensional models of various concepts and ideas in a fast way.

4

Process

The process was divided into three phases. Phase 1 marked the beginning of the project, during which information was gathered and an understanding of the subject was developed. This phase included background studies, creating an urban vision and scenario for 2030, and developing a persona to align with the scenario. Phase 2 aimed to generate numerous ideas, which were then narrowed down to the best few. This iterative process continued until a satisfactory result was achieved, providing a solid foundation for Phase 3. Phase 3 focused on finalizing the concept, increasing the level of detail, and determining how technologies could be implemented. The implemented process is illustrated below in figure 4.

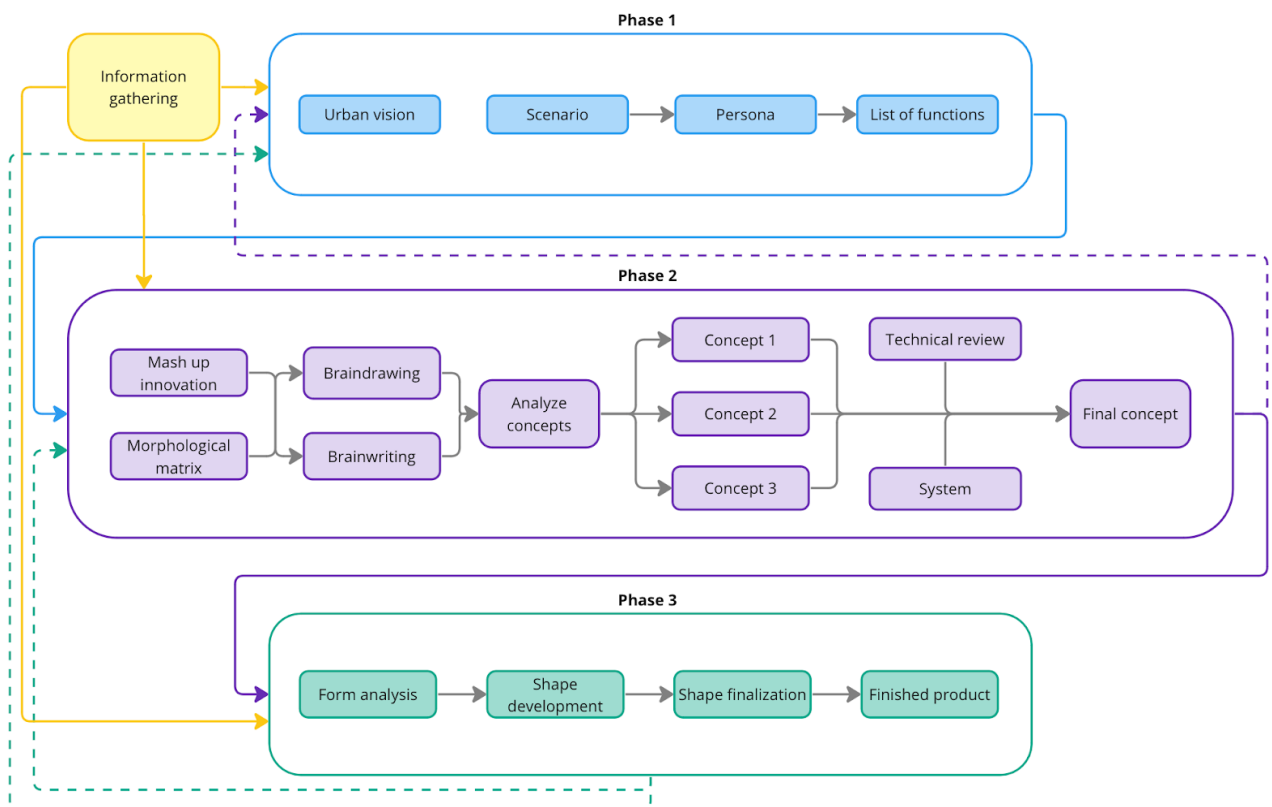


Figure 4. An illustration of the three phases of the project and how they are linked together

4.1 Phase 1

During the first phase of the project, a problem definition was established. To gain a better understanding of the problem, information was collected and structured. This involved creating scenarios, personas, and establishing a shared vision for 2030 within the project group. The following subsections explain further how these strategies were used.

4.1.1 Urban visions of 2030

The vision describes where cities in Europe are expected to be headed in the upcoming years based on the theory about micromobility and urban planning. The different aspects of the vision were narrowed down to only a few points that were thought to be the most relevant ones.

One common trend is the desire to create a more sustainable future, and this is no different when it comes to cities. Two clear signs of this are the more prevalent usage of solar cells and renewable energy sources wherever the possibility arises (Naturvårdsverket, (n.d.)). Another clear trend is the rising popularity of electrical vehicles. This will be visible by cities having an increased amount of charging stations, as the demand rises. The potential change that will likely have the most impact on micromobility is the introduction of environmental zones in many cities. While this has already been implemented in some cities, others have plans to do so in the near future. With the expectation of increased urban traffic in the future, micromobility will enable more people to travel within the city simultaneously. For this to happen, cities will need to simultaneously expand the road network to accommodate micromobility, such as by adding more bike lanes.

The main takeaway from these changes was that there will be an increased possibility and necessity to use micromobility in the future. With the desire to bring more greenery to the cities as well as the increased urbanization, there will be less space for traffic. This means smaller vehicles could be a solution to replace cars. Considering the big amount of people living outside the city traveling to work in the city every day, the conclusion reached was that cars will still be needed and used but will be more difficult to use in the city.

The vision builds on the premise that cars will be used to travel to big parking houses in the outskirts of the city, from where a micromobility vehicle would be used to travel the last distance to reach the destination.

In addition to these bigger visions of how cities would look and work in the future, there were also a list of smaller changes made. These would not have a big impact on 2030 micromobility but could still be helpful to have in mind. One development in recent years is the changing view on work hours and workplace. Flexible working hours and remote work options are becoming increasingly common (Dennison, K. 2024). This will affect micromobility in that traffic is not as regular as it used to be and will most likely become less regular in the future. Another change that could be greatly associated with this change is the increase in part ownership of cars and carpooling. For this reason, it was important to think about hygiene and feeling of ownership when developing a micromobility concept. There is also the risk of urgently needing a vehicle, which could be more difficult if it is shared.

There will also be developments in public transport, self-driving cars, charging stations and drones (Kuo, Y. et al. 2023). Improved public transport will have an impact as it is a competitor to micromobility. Therefore, micromobility must either offer something unique to public transport, or offer the same thing, but do it better. Self-driving technology, although mainly being developed for cars, could in part be implemented in micromobility in a few years. It could therefore be useful to see if some parts of self-driving are suitable to be implemented in micromobility. Improved charging stations, depending on the level of sophistication, will mean that it will not be as important to have a long-lasting battery. If the trade-off is that it becomes more lightweight, faster charging could mean that many may deem it to be worth it to have less battery. It will therefore be important to find the optimal balance between high battery and low weight. Lastly, drones could be the new way of delivery, making truck traffic in the center of the city unnecessary, further strengthening the claim that car free zones will become increasingly common (Eskandaripour & Boldsai Khan, 2023).

4.1.2 Information gathering

To get another view on the matter of creating a Lynk & Co branded micromobility concept for 2030, information gathering was done by asking informal questions to Lynk & Co members through social media. Questions were asked with the intent to find out why they liked Lynk & Co, and what their thoughts were on micromobility and the future.

There were two main reasons why people chose to use Lynk & Co cars, either they were drawn to the unique car subscription offered by Lynk & Co (see chapter 1.2), or they considered the car to be of high quality and worth the price.

There was also a split between regularly using a micromobility vehicle and not, but there was no correlation between owning the car and not using micromobility. There was however a correlation between not using micromobility and living far away from the city. The reasoning being that it was much more practical to use a car, and a feeling of not being accessible enough. However, as this survey was sent out in Sweden where a car can reach everywhere in cities, there was also no one mentioning the fact that they might need it to go from the parking space to their destination.

What Lynk & Co members thought was most important for a micromobility vehicle was comfort and safety, but there were also some noteworthy thoughts shared on the matter. Many thought that current micromobility solutions lacked the option to carry luggage or passengers, which they would like to have the option to do. There was also the issue that for some people there was not enough space to keep multiple vehicles, so the micromobility concept had to either be comfortable to use in all weather, or not take any extra space where the car is stored. There was also a concern about the battery capacity, where it was hinted that the car could be entirely replaced if the reach and comfortability of the micromobility solution was good enough.

The purpose users found where they would want to use micromobility instead of walking was shorter distances, but further than when it is more convenient to walk, approximately 1-5 km distance. Another potential use for micromobility was to carry bigger items, for example furniture or grocery bags. This suggests that allowing storage on the micromobility solution is both a gap in the market and a reason many could think of that would make them interested in the vehicle.

All information gathered throughout the project was handed according to GDPR.

4.1.3 Scenario

Based on the vision, more detailed scenarios were created. The scenarios described a specific situation that might happen in a context of 2030. The scenarios were used as a tool to describe the vision in a more immersive way. It started with mapping out which problems could be in the daily life of Lynk & Co members, or in general. It included brainstorming scenarios where micromobility would be relevant, as well as setting up a list of parameters which described 2030 compared to now. One of the main stories during the project was *Parking Roulette*:

“Picture this: You're in the driver's seat, butterflies in your stomach as you are about to start your first day at your new job. The excitement is real, but so is the anxiety as you navigate the unfamiliar roads to the office. Just when you spot a parking space only five minutes away from your destination, the idea of a closer one pulls you in, fueled by a hint of laziness and the hope for a more convenient space.

You decide to play parking roulette, steering away from the seemingly perfect spot. As minutes tick by, you find yourself driving further and further from the office, all the while scanning for a parking space that remains elusive. Panic sets in, and the clock becomes your enemy. You start to realize that the parking spot you initially dismissed was the optimal choice.

Now, not only are you farther away, but you're also late for your first day. The stress and frustration build up as you think of the missed opportunity for a smooth, punctual entrance. But what if I told you there's a smarter solution to this daily dilemma?”

This story was written at the beginning of the project and helped lay the groundwork for the problem definition. Other scenarios were also written at the same time but weren't optimal for this project. The scenarios originally formulated were further refined by being integrated into ChatGPT. Through this process, the scenarios were transformed into a more selling and interesting story (see appendix B).

As the project follows an iterative process, the writing of scenarios was returned to later in the process. This was done to further develop and modify the original scenario to better fit with the refined concept and visions. This enabled a better visualization of how the concept was to take shape and demonstrate more of its features and benefits. The result were two different scenarios to demonstrate the versatility that the concept offers.

Work commute:

“A couple living in a suburb, commute into the city together in their Lynk & Co car. Although they don't work at the same office, one works at the bank and the other is a teacher, there is a large commuter parking lot conveniently located between their workplaces. Upon arriving at the parking lot, they each retrieve a LynkLyte scooter from the trunk, share a goodbye hug, and head to their respective workplaces.

The office worker rolls the LynkLyte under their desk for the day, while the teacher removes the battery and securely locks the scooter at the bike parking or designated staff area.

On their way home from work the teacher whose workday ends earlier stops by a grocery store and can easily fit the bag under the seat of the LynkLyte to then continue to their car to meet up with his wife.”

Exploring cities:

“A couple decided to go on a road trip to a nearby town over the weekend. They only had one day to see the city and wanted to see as much as possible. They found a parking spot and left the car for the day to avoid looking for parking all day. Luckily, their LynkLyte had been charged in the trunk the whole trip there, and they were fully charged and ready to be used all day. With the built-in GPS screen, they could easily navigate through the city and visit cozy cafes and tourist attractions without any hassle.”

These two stories, as well as the information gathering, and persona played a crucial part in developing the list of functions which is presented in chapter 4.1.5 *List of functions*.

4.1.4 Persona

Alongside the scenarios two personas were created to better understand the users, Lynn and Cole, visualized in figure 5 and 6 respectively. The personas gave an example of how the user prioritizes and would potentially use the product.

“Lynn is a modern and trend-conscious individual who prioritizes convenience and style in the products she uses. She values having access to reliable transportation that allows her to get around the city comfortably and efficiently without delays, but it is equally important that the vehicle reflects her personality and lifestyle.

Lynn is ambitious and dedicated to her work. She is a very creative person and works in marketing, where her passion for innovation and creativity shines. She constantly takes on exciting projects and challenges at work and is known for her hard work and dedication to her career.

In addition to work, family is important to Lynn. She has two children and loves being a mother but has never let it get in the way of her career or her own interests. She enjoys keeping up with new smart technological solutions that can facilitate her daily life. Everything from a modern stroller to having the best noise-canceling headphones. For Lynn, convenience and efficiency are important in all aspects of her life. This includes her daily commute to work in her Lynk & Co car. The worst thing Lynn knows is when there is unexpected roadwork on the way to work or when it's difficult to find parking. “



Figure 5. Visual representation of Lynn, generated using Bing Image Creator (OpenAI, 2024)

“Cole is 33 years old and lives in a suburb of Gothenburg. He works at a tech startup and is looking forward to meeting someone to start a family with. He is an adventurous and environmentally conscious individual who is always looking for innovative and sustainable solutions for his life. He is a nature lover and enjoys exploring the world around him, both inside and outside the city. For Cole, it's important to live a life in balance with his surroundings while still being able to enjoy modern conveniences.

When Cole discovered Lynk & Co, he was drawn to their vision of offering driving in a completely new way. He was fascinated by their focus on the sharing economy and sustainability, which aligned perfectly with his own values. Being able to share a car instead of owning one appealed to him because it reduces the resources used.

In his free time, Cole enjoys working out at his gym or going climbing with a friend. The climbing center is just a few kilometers from where he lives, but he usually takes the car because he does not like public transport.

Cole sees Lynk & Co as more than just a car company. To him, it represents a lifestyle and a community of like-minded people who share his values and interests. Being part of the Lynk & Co family gives him a sense of belonging and an opportunity to contribute to a more sustainable future.”



Figure 6. Visual representation of Cole, generated using Bing image creator (OpenAI, 2024)

From the personas it was further exemplified why it was important that the final product was to be flexible and that it could be used for many different purposes. It is important that the product is easy to use and serves as a good combination with the users existing products such as their car, bags, and other personal belongings. Style and technical features are also important factors for the users.

4.1.5 List of functions

From the scenario, persona and the information gathering a list with functions was created. Here, requirements and preferences that needed or could be a part of the solution were listed, see table 1. The functions were labeled as either main or subfunctions, based on how important they were. Throughout the idea generation process the list got developed further and got to be more specific towards the development of the final project.

Table 1. List of functions at phase 1, the type of function as well as their prioritization was defined. Descriptions and limits were defined in phase 2

Function	Type of function	Description	Limitations	Prioritization
Enable transportation	Main function	Carry driver a shorter distance	total distance > 15 km	Essential
Enable steering	Supportive function	Steering wheel/Handlebars		Essential
Enable regulation of speed	Supportive function	Brake & gas	Maximum speed of 20 km/h	Essential
Powered by electricity	Supportive function	Battery driven		Essential
Meet cycle path requirements	Supportive function	Limited speed developed through battery	Maximum speed of 20 km/h, tire width > 0,08 m	Essential
Ensure safety	Supportive function	Stable and limited speed	Maximum speed of 20 km/h	Essential
Allow storage	Supportive function	Contain a storage compartment	40 litres	Desirable

Function	Type of function	Description	Prioritization	Prioritization
Enable charging	Supportive function	Charging docket which charges the battery.		Essential
Warn pedestrians	Supportive function	Sound indicators & light indicators		Essential
Inform the driver	Supporting function	Speed indicator, battery life indicator		Essential
Unload driver's legs	Supportive function	Seat		Desirable
Aligned with the Lynk & Co brand	Supportive function	By having similar design attributes		Essential
Fit in car trunk	Supportive function	Foldable	0.95 x 0.50 x 0.50 [m]	Desirable
Connect to phone	Supportive function	Bluetooth		Desirable
Enable charging in the car	Supportive function	charging docket which is compatible with storing compartment of a car		Desirable

4.2 Phase 2

The second phase consisted of multiple methods to ideate as many different solutions as needed for saturation. The methods used were explained in chapter 3.3, and implementations of each method will be described in the following text. Also described are different concept outcomes which aligns with the scenario and vision, as well as selection of the final concept.

4.2.1 Ideation

In the beginning of the ideation process, ideas were produced using the brain drawing method and allowed to be imaginative and not restricted. The ideas that showed most promise was later developed into more realistic versions. When a satisfying number of ideas had been produced, mash up innovation was used to explore possible solutions. To ideate solutions and possibilities the following main areas were defined:

- Location
- Weather
- Packing
- Technical features
- Practical features for urban use
- Charging structure
- Safety
- Integration with the car

Each area got assigned a color and ideas were listed on sticky notes within each area (see Appendix C). Focusing on one area at a time helped to increase a variety of ideas. The ideas were then combined to create concepts that fulfilled the criteria set in the list of functions in several different ways.

The next step in phase two was to complete the function list started in phase one that served as a base for the morphologic matrix (see Appendix D). The matrix was also based on the solutions explored in the mash up innovation. The purpose of the matrix was to find even more solutions to each function, but also to discard any unsuitable solutions and keep the reasonable ones. When the matrix was complete, one solution from each function was picked and combined to form a concept. In this way the outcome was multiple concepts which all achieved the criteria listed in the list of functions, see table 1 in 4.1.5.

The concepts created from the morphological matrix and the mash up innovation were then visualized and developed further using brainwriting and brain drawing. In short sprints, concepts were drawn and explained further to explore the possibilities within each concept.

Some of the visualized ideas from this method were already listed through the morphological matrix and mashup innovation but also new solutions came to surface.

The imaginative concepts were analyzed and tested against the requirements, scenarios, and personas to see which ideas best matched the needs. The concepts got combined with each other and developed further to be finalized to three possible concepts.

The three chosen concepts were developed further and visualized with the 3D software Adobe Dimension. They were all visualized in the same way and with the same attention to detail. This was to keep them neutral compared to each other when choosing the best and most suited concept.

4.2.2 Concept 1

The goal with the concept was to make a vehicle that is as compact and portable as possible. It is a scooter with an adjustable handlebar, small screen, and small, maybe adjustable wheels. When the bottom part is folded it would be possible to pull it like a suitcase. By folding the handlebar, it could be carried in an easy way, see figure 7.

The concept makes it possible to easily store the vehicle in the car trunk as well as bringing it along, into the office or home for storage or charging. The scooter has a battery which can be taken out for charging or replacement. The concept focuses on minimalistic solutions and how it is possible to meet the users' needs without adding on extra gadgets. Further development of this concept would focus on technical aspects of the folding and how the design can enhance the experience.



Figure 7. Illustration of the three concepts in reference to humans

4.2.3 Concept 2

The concept is a small vehicle that has space for luggage. It has a compartment in the front with space for a bag or grocery bag. With two wheels in the front the vehicle is stable even with luggage. To make it easy to take into the office or into a grocery store it can be folded and pulled like a suitcase, see figure 8.

The main focus of the concept was to make a fairly small electric scooter more convenient and comfortable. With this solution, no bag must hang on the handlebar and slippery roads will be easier to navigate with the three wheels. The design can be developed further to explore the limits and possibilities of the storage compartment as well as the technical aspect of how it can be folded in a convenient way.



Figure 8. A three-dimensional visualization of Concept 2, the concept capable of carrying luggage

4.2.4 Concept 3

Concept 3 focuses on modularity; the user can choose to use it standing or sitting. This, by having an adjustable handlebar, wheels that can be extended and a removable seat, see figure 9. This is a flexible solution that can meet various needs from the user. The vehicle also has a removable small basket in the front with space for a bag.

The concept explores how it is possible to use a minimalist vehicle that can be used as it is, or with added functions to make the ride more comfortable. Further development could explore if it would be possible to add even more functions to the product to meet needs from various users.



Figure 9. A three-dimensional visualization of Concept 3, the flexible concept allowing either sitting or standing

4.2.5 Concept combination

The three concepts were analyzed to see which aspects of the concept best met the criteria and scenarios. The micromobility market today was also analyzed to see what was missing in the market so that the concept would add as much value as possible.

Aspects that were found important were compatibility with the car, ability to travel with a smaller bag, and the comfort for the rider. The goal was to take the best part from each concept and combine to one final concept. The functions that were chosen from the three concepts were:

- A storing compartment for example a smaller bag.
- A foldable or compact design so that the product could fit in the trunk of a Lynk & Co car.
- A seat for a comfortable ride.
- A handle with a screen or space to place a phone to assist the rider with navigation.

Based on these criteria, several concepts that met the requirements were developed. Technical solutions were explored that would allow the vehicle to feel comfortable to drive but could become small enough to fit in a trunk.

4.2.6 Technical review

Throughout the ideation process, many solutions were based upon already existing and implemented ideas. For instance, when folding the steering stem on Concept 1, hinges are a well-established way of doing such, as well as telescopic pipes being a common way of adjusting the length. These functions were taken into consideration when deciding and combining the different solutions. The question “Does this function exist elsewhere?” was asked multiple times as well as “Is there a functionality which could improve this part?”.

Considerations of size could also be set as more decisions upon functionality were made. For instance, the trunk size, see table 2, of a car set limits and the car in question was the Lynk & Co 01, which was, at the time of the project, the only released car in Europe.

Table 2. Showing the limits set of a Lynk & Co 01 trunk dimensions

Lynk & Co car	
Direction	Measurements [m]
Width	0,95
Height	0,50
Depth	0,80

Similar products of the market were also considered. These measurements did not set limits but were considered as rational sizes for further developing the concepts. Depending on the attributes of the concept either an electric scooter from Voi, which the user stands upon riding, or Vässla, where the user is seated, were considered. For concepts where the user was standing the Voi measurements were considered, see table 3. Where the concept included a seating, dimensions of an electric scooter from Vässla was considered instead, see table 4.

Table 3. Showing the approximate size Voi scooter's dimensions; approximate due to the inconvenience of measuring dynamic or slanted forms

Voi electric scooter	
Part	Approximate Measurements [m]
Length standing plate	0,47
Width standing plate	0,18
Height steering stem	1,20
Width handlebars	0,60
wheel diameter	0,28

Table 4. Showing some of the dimensions of a Vässla electric scooter

Vässla electric scooter	
Direction	Measurements [m]
Height	1,15
Sitting height	0,86
Wheel diameter	0,36
Width handlebars	0,55
Total length	1,33
Between seating and steering stem	0,48

The measurements gave inspiration for dimensions for the concept in developing. Also taken into regard were measurements of anthropometry, see table 5. The average anthropometric measurements were used to set dimensions perfect for the average person, which in turn included most of the population.

Table 5. Showing mean measurements as well as standard deviation of some measurements for women and men, measurements taken from Antropometri.se

	Average man [mm]	Average woman [mm]
Shoulder height	607.62	574.57
Shoulder-elbow length	370.49	340.59
Thigh clearance	156.95	146.95
Elbow-wrist length	283.89	251.73
Crotch height	802.84	773.08
Hip breadth, standing	362.55	371.40
Elbow height	1103.78	1048.36
Iliac spine height, standing	1001.94	933.39

4.2.7 System

Parallel with the development of the concepts, potential systems surrounding the concept were explored. Combinations of listed systems were also considered before deciding. The process began with brainwriting, where ideas for different systems were rapidly generated. The main systems explored can be summarized as follows:

- Business to business. The possibility for Lynk & Co to sell a package of products to companies so that they can offer it to their employees. It could be in the form of a micromobility station at the office, a car-pool service or charging stations.
- Add on to Lynk & Co's existing service. A micromobility vehicle that fits in the trunk of the car will be sold with the car as an added feature. This will add value to the car and meet the need for transportation challenges within the city in the future.

- Micromobility stations in the city. These stations could be situated in garages or as stand-alone hubs in the city so that Lynk & Co members could collect a vehicle and use it for as long as needed, to then be returned and charged at a station.

4.2.8 Concept selection

During the concept combination phase, various forms and technical solutions were explored. In the selection process, the priority was to find a solution that met the criteria while also being easy and enjoyable to use. Solutions with too many folding parts were discarded due to the risk of breakage, and overly advanced ideas were considered too complicated to operate. As mentioned in 4.2.5, some of the most important points were seating, some sort of screen attachment, storing compartment and compact design to enable storage.

The compactness of the concept was set by the limits of which a car trunk was provided, see table 2. When taken into consideration, the foldability of the concept was where most technical solutions had to be implemented since the user's comfort was considered as an important factor.

The chosen concept, seen in figure 10, was an electric scooter where the seat and the steering handle can slide down towards the main body to become compact and portable. The vehicle fits perfectly in the trunk of a car and can fit a bag in the bottom part.

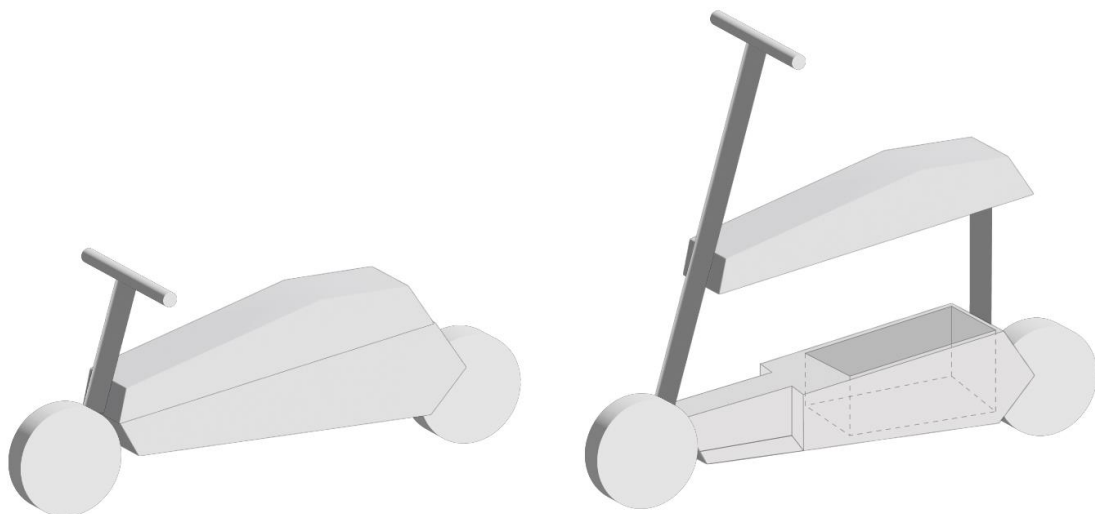


Figure 10. A sketch showing the functionality of the final concept

To ensure stabilization of the vehicle while fully extended, a pole that slides and locks into place in the rear end was added. The axis will rotate at the bottom and slide along a rail at the bottom of the seat and be locked in place when fully extended, as seen in figure 11 below. To add extra comfort for the driver the axis would double as suspension to absorb shocks during driving.

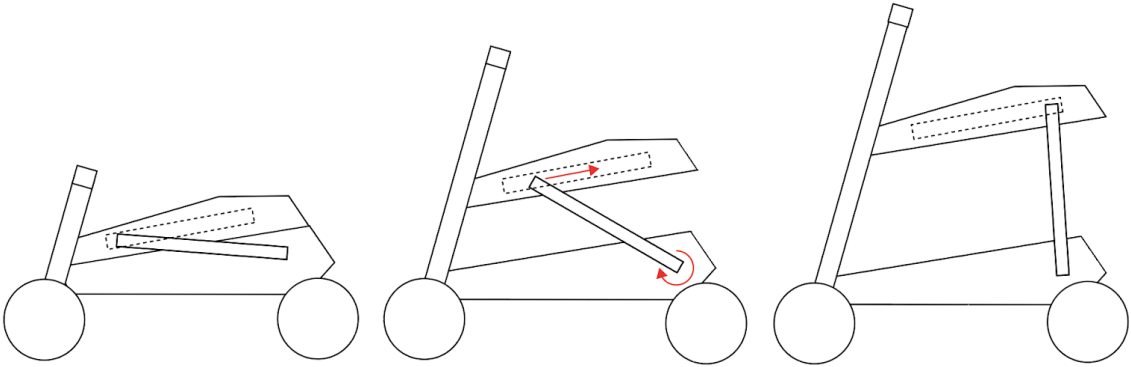


Figure 11 A sketch showing how the seat is able to support the weight of the rider

4.3 Phase 3

The final phase of the project, with the concept selection as a base, began with defining the proportions of the concept. The goal of the concept was that it could fit in a Lynk & Co car, see figure 12, have wheels at least the size of rental electric scooters (0.28 m) and fit as much luggage as possible, with a minimum of a paper grocery bag. With these basic parameters, experimentation was done with the shape to find a shape that could have big room for luggage, big wheels, and capture Lynk & Co’s design identity. When a final design had been decided on, a detailed three-dimensional model was made to show in the context where it would be used. Materials and details were also created for the three-dimensional model to finalize the appearance of the micromobility concept.

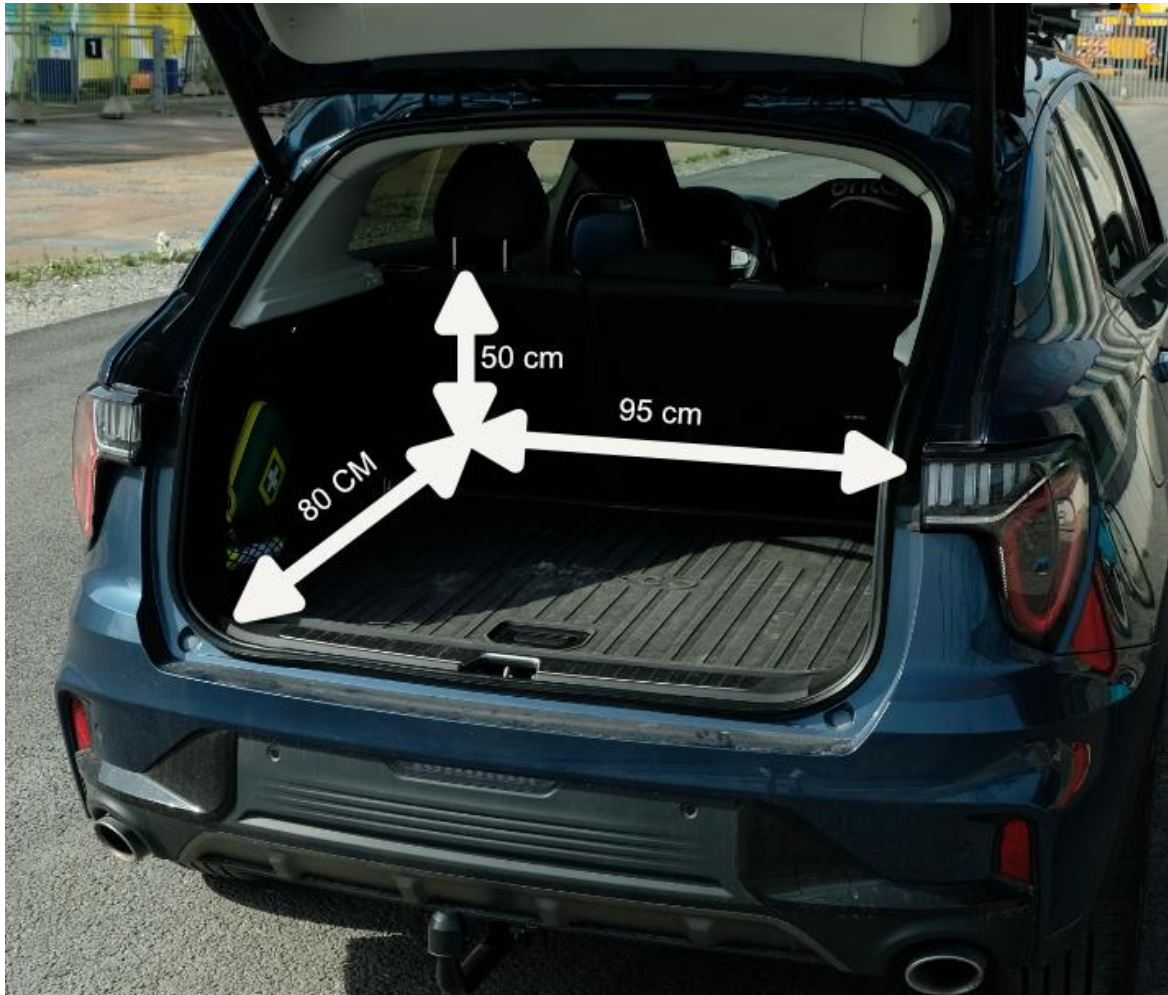


Figure 12. A picture taken to visualize of the dimension of the Lynk & Co 01 car trunk

4.3.1 Shape development

Development of the shape was done using Blender in parallel with Adobe Illustrator. Illustrator was mainly used to find shape and proportions from a side perspective and Blender was used to put it in a three-dimensional perspective. In the end, it was found that having one wheel on a foldable axle allowed the luggage area of the vehicle to fit a standard 40-liter duffel bag. Given that it is not uncommon to have an interest where physical activity is involved and that a trait of one of the personas created was an interest in practicing sport (see chapter 4.1.4), being able to bring a duffel back was a good parameter.

With these shape decisions, a preliminary shape of the concept was created with the intent of making a canvas on which to add details. The shape was not final but instead meant to change when more details were added. To make a shape that suits Lynk & Co's signature design, a

form analysis was made to find common elements between different parts of the car. First, various detailed pictures of the Lynk & Co 01 car were gathered. Then multiple attributes were written down that were based on observations of the Lynk & Co brand. The pictures were then analyzed and checked for every attribute it contained, see figure 13.


component	rounded edges	penta-/hexagon	logo	chrome/silver	matte leather	contrasting textures	accent colour	chamfer
	✓		✓	✓		✓	✓	✓
	✓	✓		✓	✓	✓		✓
	✓	✓	✓	✓		✓	✓	✓
	✓	✓		✓	✓	✓	✓	✓
	✓	✓	✓	✓	✓	✓	✓	✓
	✓			✓	✓	✓	✓	✓
	✓	✓	✓	✓	✓	✓	✓	✓

Figure 13. Image of a table showing design attributes different parts of the Lynk & Co 01 share

4.3.2 Shape finalization

Before adding the details of the vehicle, a visit was made to Lynk & Co design where they showed their vision for the future of car materials. They imagined the future cars to have smooth minimalistic shapes, with a base color of polished aluminum. The appearance would be made interesting by adding details made with a bright accent color in two layers. In addition to this main color, Lynk & Co envisioned there being a contrast color to the first color, but used more sparingly, and using lights for detail. They also saw the opportunity to use recycled plastics, and the color pop that brings, as detailing on a part which doesn't require any mechanical properties.

When working with the detailing, these ideas were used as inspiration for the detail of the micromobility concept of this project. However, the final details were equally inspired by the

vision of the project, this being to create a concept which would represent both Lynk & Co's vision, as well as the vision gained from doing the project.

5

Result

To better understand the concept and how it is connected to the conclusions drawn in chapter 4, this chapter shows and describes each part of the concept. As well as connecting the result to chapter 4, the final shape and detailing is described and a justification on why it builds both on the vision of the project and the vision of Lynk & Co.

5.1 Traits

The main traits of the concept are strongly tied to the vision and scenario set in 2030. What these traits are, and why they are important for the concept is divided into characteristics necessary to fit in the vision of cities 2030, and characteristics necessary for the scenarios.

5.1.1 Urban visions of 2030

The vision of the daily commute in 2030 for people working in the city, but living outside of the city center, is to park the car in a parking garage, and move to work from there. This gives the conclusion that it is important that the micromobility vehicle in some way is accessible from the parking garage. The final concept of the micromobility solution fits perfectly sideways in the trunk of the Lynk & Co 01. A side benefit of this is that it will also be able to fit in Lynk & Co cars with a shallower trunk if such a car is to be released in Europe. The solution of bringing the micromobility vehicle in the car gives a more flexible usage compared to a vehicle stored in the parking garage. Furthermore, Lynk & Co's primary business model is selling cars, meaning a concept where the vehicle is stored in a car and made specifically to fit in a Lynk & Co car trunk does not require a change in business model.

LynkLyte has a size viable for usage on normal bike paths, as it is smaller than a moped allowed to go on the bike path. This is important with the reasoning that many cities choose to focus on expanding infrastructure for bike paths. Therefore, LynkLyte will work for a future

with less car traffic in the city center, where it would be convenient to park the car 1-2 km from the workplace, and travel using the micromobility concept to get the final distance.

5.1.2 Scenario

The main scenario describes a potential everyday situation, necessitating an adaptable micromobility concept capable of serving multiple purposes. This is why LynkLyte is compact enough for two vehicles to fit in the trunk of a Lynk & Co car. Furthermore, it is convenient to bring on a train and be used from there to get home if the two people co-traveling to work finish or start work at a different time. Another trait, although common for all micromobility vehicles, is that there must be a way to either lock the vehicle outside and bring the battery to the workspace, or a way to bring the entire vehicle to the workspace. For this reason, it is possible to take the battery out of the vehicle if there is no place to store something with the size of the concept in that workspace. The most important trait that makes this concept special apart from the appearance, is the ability to carry luggage. In the main scenario, it is desired to carry grocery bags. It is however possible for the vehicle to carry larger luggage such as a duffel bag in many other scenarios, for example exploring cities.

5.2 Final product - LynkLyte

To describe the final product, the chapter is divided in different parts to easier understand the different aspects of the concept. The main idea of the concept was to create something that felt like a mix between a sporty and comfortable vehicle. Additionally, the design was made to match the vision Lynk & Co has or their futuristic cars. At the same time, as for any product, it was important to make it easy to handle, and to make the functionality intuitive.

5.2.1 Form

As Lynk & Co primarily is a car company, but also describe themselves as being a fashion brand in China, where appearance is important, the shape and details of the micromobility concept was an important part of the project. This was an important aspect, despite Lynk & Co in Europe not being as evolved in this aspect. One important part of Lynk & Co Europe,

however, is them taking inspiration from China, and China taking inspiration from Europe. To reflect that Lynk & Co is primarily a car company, the form is greatly inspired, both by Lynk & Co's current car designs, but also their vision for future cars.

The gestalt principles, particularly the Law of Similarity, were considered when identifying attributes present in both past and future Lynk & Co car designs. The main attributes anticipated to be present in future cars, is their two headlights parallel to each other, their typical two lines going down each side, as well as their use of contrast colors for detail. For reference of which attributes detected in present Lynk & Co 01, see figure 14.



Figure 14. Images highlighting shapes and attributes which were used for inspiration when shaping final concept

The most important part of the concept was to create a shape which gives the vehicle a feeling of being a smaller version of a Lynk & Co car. To achieve this, the shape of the side of the main body was inspired by the side view of Lynk & Co cars, see figure 15. It is slightly altered to be compatible with the smaller and different shape. Additionally, the wheelhouse for the front wheel was inspired by how they usually look on cars. To match Lynk & Co's vision of their future cars being soft in shape, but simultaneously keeping the resemblance to a Lynk & Co car, the distinct shape of the sides could not be toned down completely. However, both the saddle and front of the base could have a simple shape, while not taking away from the goal of the overall appearance. Since it was also found out through questioning members on social media that the most appealing shapes according to current Lynk & Co

members were smoother, more comfortable looking shapes, these simple shapes came to serve this double purpose.

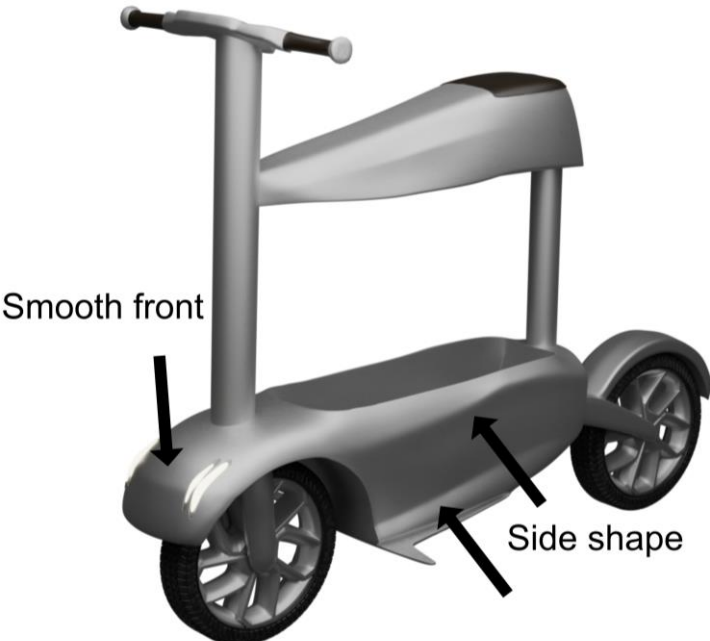


Figure 15. A rendered image showing the final shape of the main body of LynkLyte

As well as this, there had to be a good transition between the shape of the seating and the shape of the body when the concept is folded. The aim was to create a side view which looked like an irregular polygon to further match the Lynk & Co car design.

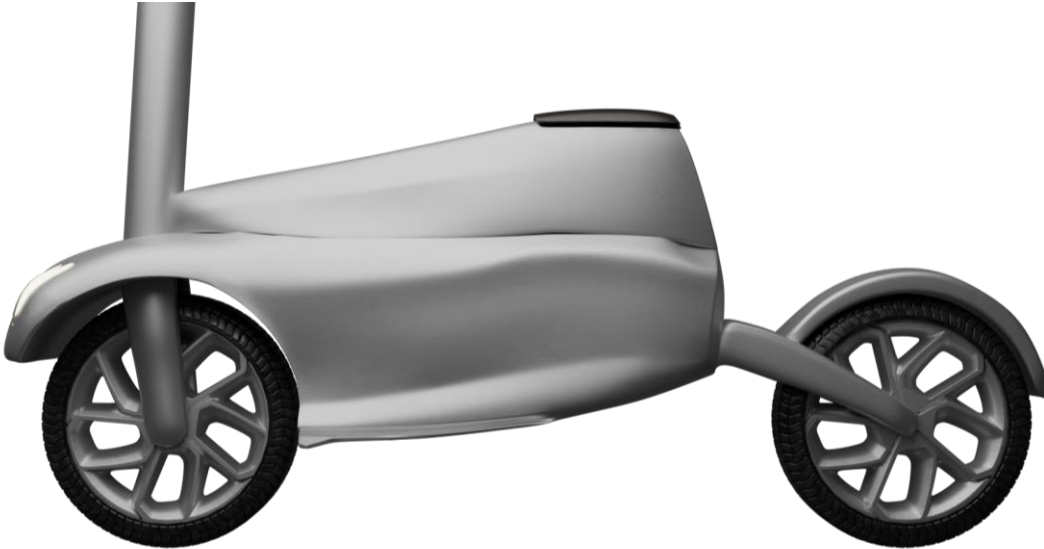


Figure 16. A rendered image showing what the collapsed LynkLyte looks like

Another detail taking inspiration for Lynk & Co cars are the wheels. Trying to combine the appearance of Lynk & Co rims, as well as typical wheels for bikes or scooters, the wheels use cavities to create the shape of polygons, for reference see figure 17. Another important visual of the wheels is that the rear wheel is situated on a fork, both to be able to carry more luggage, but also to give the appearance of a motorcycle.



Figure 17. A rendered image of the wheel model for LynkLyte which takes inspiration from Lynk & Co rims

The handle of the concept is designed to give the impression of a steering wheel. To do that, the middle of the steering wheel of a Lynk & Co car was used as a reference shape for the middle of the handle, shown in figure 18. This was however made flatter than a steering wheel for the purpose of including a screen. This will have a connection to the car, giving a smooth transition from driving the car to riding the micromobility vehicle. Whether this is by keeping the same destination on the map and transferring it to the screen of the micromobility concept, or automatically staying in the same call as you were in the car. This is of course solved by any mobile phone, but because the goal of the project is to create a concept and a story of using it, creating something where the car and the micromobility concept is connected is an interesting premise.

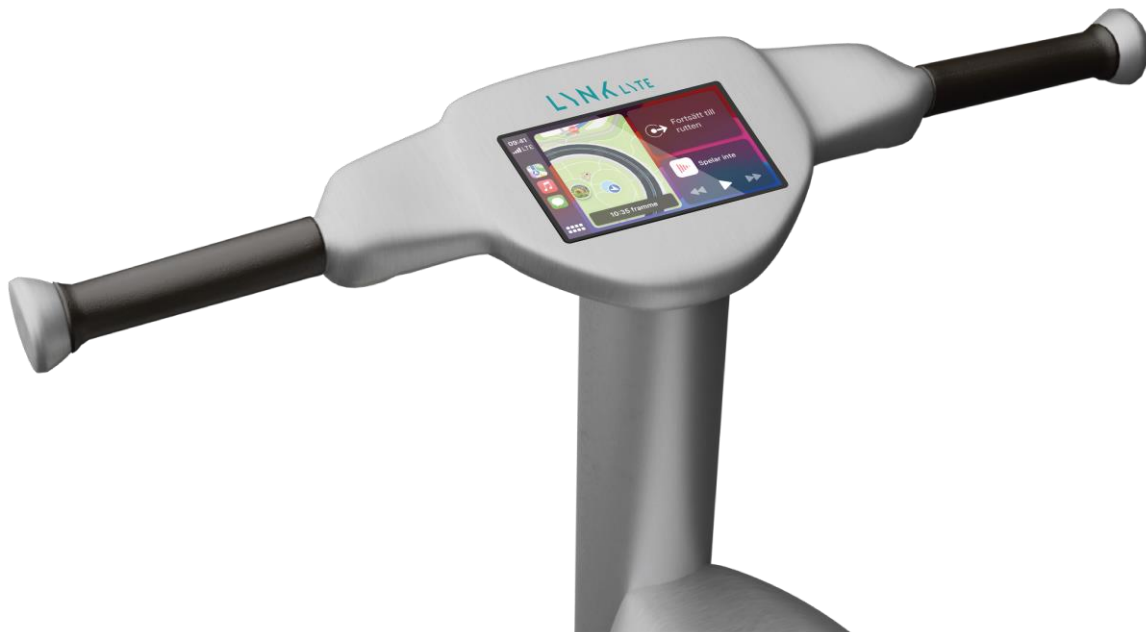


Figure 18. A rendered image showing the handle of LynkLyte

There is no common appearance of the headlights between different Lynk & Co car models, apart from the fact that there are usually two parallel headlights. They can vary in size, be connected or separate, and be positioned below the same transparent plastic cover or different ones. For this reason, the headlights were made in such a way to match the theme and shape of the vehicle. In this concept, they enhance the comfortable, futuristic, and sporty expression of the vehicle. This was done by following the shape smoothly but adding a sharper bend from the front to the top of the body. It gives the vehicle a kind appearance, often associated with being comfortable, while the sharper edge together with the shape of the side, gives the vehicle a flowing and fast appearance.

Creating a shape that looks futuristic is hard to define and depends on how the rest of the vehicle looks, as well as being subjective. Therefore, the main trait of the headlights regarding this aspect is to keep them simple and make it possible to create this appearance using details in combinations with the headlights. Another important aspect for the shape of the headlights is that they are further down in the front than they normally are on a car. But as this vehicle is not required to have as strong headlights the headlights can serve the double purpose of being for appearance and lighting up the street in front, see figure 19.

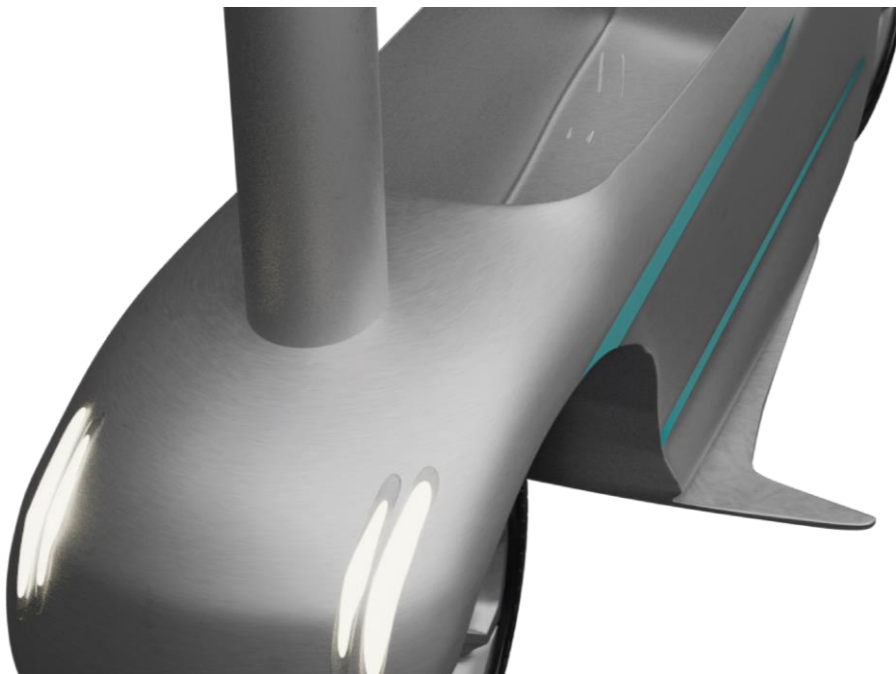


Figure 19. A rendered image showing the shape of the headlights on LynkLyte

The most common place for details using contrasting colors is on the rims of the car, on the top of the doors, and as a line going across the front, just below the headlights. This was however last seen on the Lynk & Co 06 (only available in Asia) and haven't been seen in the three following car releases. An assumption can therefore be made that the way Lynk & Co cars will be detailed going forward will not be by using that same formula. For this reason, the way the concept is detailed is inspired by this way of detailing but leaning more towards the way Lynk & Co aims to detail future cars (see chapter 4.3.2).

The concept is detailed mainly by using a matte, semitransparent orange plastic with texture below a shiny transparent brighter orange and cyan plastic. This is done in few long stripes going across the body of the vehicle which creates a good contrast between each other and the metal base color. The location of the details is inspired by current Lynk & Co cars, but the way they look are different. Recycled plastic is used as pops of color, although because of the unstructured nature of the material, it is used in smaller areas to not take over. The color of the saddle matches the main color of the plastic but with fake leather. The final idea of adaptation can be seen in figure 20.



Figure 20. A rendered image showing the final appearance of LynkLyte with materials, shape and details

5.2.2 Function

In the concept, there are plenty of functions included. This is necessary, both to enable the ability to fold the vehicle into a more compact version, but also to allow it to feel complete

and stand out among other micromobility solutions. There are of course the functions necessary for any electrical vehicle, which are also present in this concept. These include the ability to turn the front wheel, to use turn signals, to accelerate and brake, and to have mudguards preventing spray. The most unique function compared to other micromobility vehicles is the possibility of storing luggage. This is stored close to the ground to help keep balance when riding the vehicle as it gives it a lower center of gravity.

The main function when it comes to foldability is the telescope function of the steering stem, both because it is what the concept is built upon, but also because it shows the biggest change in shape when done. This allows the seating area to be positioned right above the main body when being stored, as well as the handle to end up close to the body. Without it, the handle would most likely not fit in most cars. However, a big drawback with this way of compacting the vehicle, is that there is close to nothing keeping the seating up when presented with the gravitational force of the user. For this reason, a support beam situated right below where the user will sit is implemented. It is connected to the body via an axle at the back and connected to the seat via a rail across the bottom of the seat, allowing it to follow towards the back of the seat while it is being raised as shown in figure 21.

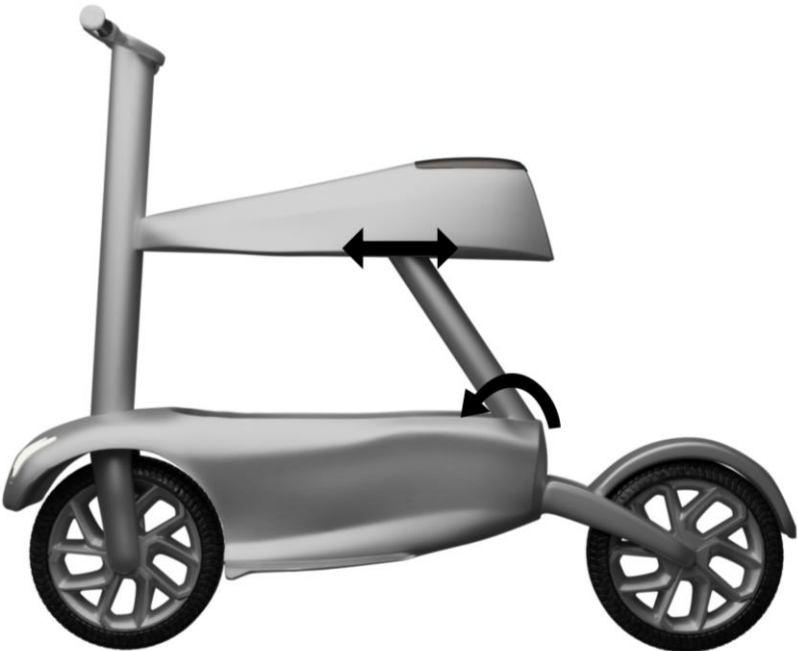


Figure 21 A rendered image showing the functionality of the rear support beam works

The other important joint allowing foldability is the one connected to the rear wheel and the body. To decrease the length of the vehicle when stored, the rear wheel can be folded towards the front, ending up half inside where the luggage is to be stored. To make that possible, there must be a way to remove the floor at least where the wheel goes. This was done by allowing the floor to fold upwards with a division in the middle. This makes it easy for the user to fold the wheel up, while the floor automatically folds to be along the walls, below the collapsed concept is illustrated in figure 22.

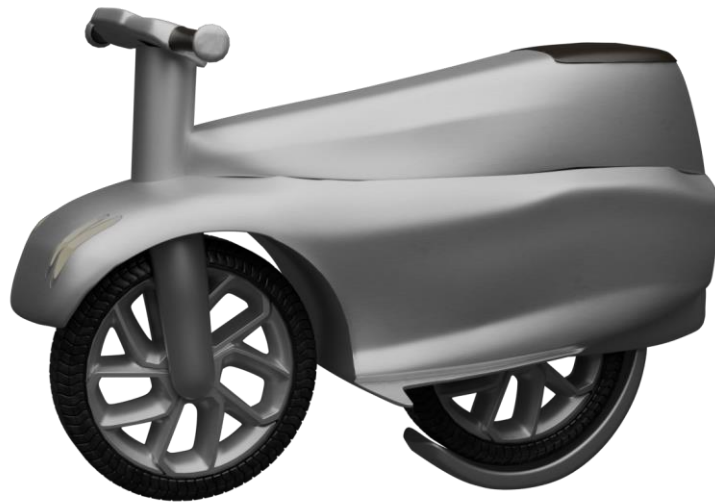


Figure 22. A rendered image showing how the rear wheel folds into the main body of LynkLyte

5.2.3 Material

The main material being used for the concept is polished aluminum. It works both as a strong material capable of withstanding the force produced in a micromobility vehicle, but also as a neutral color that can look futuristic (seen in figure 23). Another material being used is a semi-transparent and transparent orange/salmon plastic. The transparent plastic is being used outside of the semi-transparent plastic to create depth. This is also done in the same way with dark cyan plastic (seen in figure 23), but it is used for smaller details to make the shape pop with help from the color to make the concept a bit more interesting. This type of plastic however does not have the mechanical properties of aluminum and will therefore only be used

where strength is not required. Two other types of plastics used are fake leather for the seat, and recycled plastic as detail on parts that don't require mechanical properties. Figure 23 shows pictures of the materials chosen.



Figure 23. Images showing the materials in daylight. To the left, recycled plastic. In the middle, transparent plastics upon an aluminum sheet. To the right, miniature shape illustrating sheen of aluminum over a flowing form.

5.2.4 System

System solutions were analyzed in chapter 4.2.7, and it was then left as an add on to the concept. The main system, which is evident in LynkLyte, is the ability to store and charge the vehicle in a Lynk & Co car, making it easy to bring wherever the owner goes. However, in addition to this, the prospect of this type of functionality might entice companies to conduct a business-to-business deal with Lynk & Co. As it is not uncommon for companies to give access to a parking space that might not be right next to the office, this presents an opportunity for an appealing collaboration. Giving employees a deal where they can have a car with a micromobility vehicle meant to bring in the trunk, a system can be made to effectively solve commute and parking problems.

Instead of parking the car in the parking space and either walking or taking public transport to the workplace, the employee would use the concept to travel, where cargo wouldn't be an issue. The workplace could then provide a suitable location specifically to store the micromobility vehicle in. This way a business-to-business solution would be enticing both for Lynk & Co, the company, and the employees. Additionally, this is not an uncommon way for

car companies to conduct part of their business, implying that a car company which also has a micromobility concept made specifically to bring in the trunk, could use it as a selling point in their marketing. Despite there being other ways to incorporate micromobility in a system, this is the most suitable system found for this specific concept.

6

Discussion

The purpose of this chapter is to analyze and discuss the project, as well as to contextualize the created product within a larger framework. This chapter includes analyses of the process, methods, and limitations, a critical review of the final product, and considerations of ethical aspects.

6.1 Process

This section aims to review and analyze the process through its various phases.

6.1.1 Phase 1

The vision created for 2030 was developed to enhance the understanding of the concept. It was based on existing research and reports concerning micromobility and urban planning. However, a primary limitation in creating this vision is that all future scenarios are speculative by nature. Therefore, assumptions had to be made about what Europe would look like in the year 2030.

The goal of the project was to create a micromobility concept for the year 2030, developed with the Lynk & Co members as primary users. Lynk & Co members today are people who own a Lynk & Co car, but this could change in the future to broaden their target audience. In this project a limitation was made to focus on the users who own a Lynk & Co car. This were to narrow down the needs and desires more easily from the target audience and not only make it based only on speculations.

An information gathering was made by asking informal questions to current Lynk & Co users via social media forums. This gave valuable insight on users' needs and desires today. The information gathering was made early in the process with the priority to get answers to the

given questions fast. Asking questions like this could also be done in a more structured manner, such as surveys and interviews, which would increase the reliability of the information gathered. The purpose of these methods is to collect quantitative and qualitative data, which could strengthen reasons for decision.

Since the target audience could grow and that people who are not members today might become members in the future, the target audience could have been seen as almost anyone. With this in mind, a survey or interviews could have been made with more people to broaden the vision of what the future user might want.

Because the product is intended for use from the year 2030, creating personas and scenarios was crucial to better understand the users and their context. This approach facilitated a better understanding of the users' needs and the environmental constraints within which the product is intended to be used.

6.1.2 Phase 2

The methods used in phase 2, the ideation phase, made it possible to ideate a variety of concepts and part solutions. This phase was iterative and at the same time as the concepts were developed and explored, parts of phase 1 such as scenario and persona, were revisited and explained further.

To ensure that the phase concluded in the best concept the goals and criteria were updated along the phase and the concepts were always critically reviewed against the list of functions and criteria set.

With more time this phase could have been extended and another set of information gathering could have been done. To strengthen the concept decision, it would have been helpful to get feedback from potential users during this phase.

6.1.3 Phase 3

In the third phase of the process, the shape development phase, significant progress was made by visualizing and concretizing the concept further. A three-dimensional model was created and rendered in blender, which contributed to a more concrete visualization of the concept. This step of the process made it easier to understand how the concept would appear in reality.

Since one of the original requirements from the brief was that the concept should be aligned with the Lynk & Co brand, a form analysis was performed. By exploring the brand's design principles and aesthetic preferences, valuable insights of Lynk & Co's design styles were given. The information gathered could later be applied to the final concept.

For the shape finalization, Lynk & Co's design department gave good insights on how the future cars will look like. The insights served as a foundational source for detailing the final concept, which was essential since the concept is set to be in 2030.

6.2 Concept discussion

In the end, the concept was finished with all details within the scope. However, some traits were not analyzed, and the best way to solve a given problem might not have been found. For example, there was no reason for the folding of the wheel to be as it is, other than it being the first thing thought of. This, unfortunately, was because more aspects had to be considered than anticipated, so the project quickly had to move along in the end. But though this would have been an interesting part of the project to investigate, it was not the most important part as the project could still feel complete. The functionality was still solved in some way. The same thing was true for other parts of the concept as well, not only when it came to the different functions of the project. The details could have been done in several other ways, but there was no time to do another ideation process for this. However, there was still consideration done to find something that looked appealing and gave the appearance which was aimed for.

One discussion that was had regarding the final concept was the financial aspect. The concept as is, takes no consideration of price, and some functions such as the screen on the handle could be seen as unnecessary. This was discussed, but ultimately, the goal of the project was

to inspire, and this was seen as creating an interesting scenario inside of the bigger scenario. Although this would not be worth it if the concept ever came to production, it is more interesting than having a Voi inspired phone holder and is not hard to change if something like the concept were ever to be produced. Additionally, Lynk & Co's concept car standing in the lobby of their offices has a screen on the hood. This has no purpose other than creating a visual but would probably not be on the car if they were to produce functioning versions of it.

6.3 System discussion

A further development of the concept could have been to develop the system around the product further. During phase two a short iteration was made on the topic and a lot of ideas were found. But with the scope of the project in mind the choice was made to focus on the specific product rather than to develop the system further.

At the same time considerations were made to not limit the product to one system to enable further developments of the system down the line.

6.4 Ethical aspects

In a project about creating a micromobility, there are always going to be several ethical aspects present. This is both about the requirement of ensuring safety for the rider as well as other pedestrians or people present in traffic, but also about the environmental impact the ownership of another vehicle brings.

6.4.1 Safety

Safety is of crucial importance when it comes to the implementation of micromobility. By considering various aspects of safety, the concept has striven to be not only efficient and comfortable, but also safe for both users and the surrounding environment.

To promote the safety of users and the other road users such as pedestrians, several functions and measures have been integrated into LynkLyte. These include following the speed limits on cycle paths, as it is one of the requirements in the function list, but also to avoid accidents and maintain a safe speed. It is also encouraged to use a helmet in conjunction with the use of LynkLyte, to minimize the risk of injury.

Other functions are also implemented such as turn signals and sound signals to warn pedestrians when the vehicle is approaching. These safety features can lead to make both users and pedestrians feel safe and protected.

By prioritizing safety in the design, the micromobility concept strives to promote a safe and sustainable transport solution that reduces the risk of accidents and contributes to increased traffic safety in urban environments.

6.4.2 Environmental impacts

The project is related to the automotive industry, which faces numerous environmental challenges. Currently, more and more vehicle manufacturers are transitioning to electric solutions to move away from the fossil fuel solutions that have dominated the market in the past. However, there are still environmental concerns, particularly regarding the management of battery waste. Some materials used in batteries are classified as hazardous to the environment, and how these materials will be managed at the end of their lifespan remains a problem that needs to be addressed, especially as the use of these types of batteries will increase from today.

Regarding the materials extracted for battery production, there can be poor working conditions for miners, which is an aspect considered in the project. Battery manufacturing also has a significant environmental impact in terms of energy. Depending on the geographical location of the factory, it is also not possible to guarantee the energy source. Currently, production occurs in developing countries where energy sources are fossil fuels or coal-fired, rather than the preferred renewable sources, which may be more prevalent in other parts of the world.

Regarding the project, the client desires an electronic solution; Lynk & Co already produce hybrid vehicles. Although influence may be limited over the geographical location of their factories or the suppliers they use, technical solutions can still be recommended to minimize manufacturing emissions and energy consumption.

The benefit of the project is to contribute to a positive development within the transportation industry. This entails a responsibility to contribute in a positive way for the individuals, society, and environment affected by the product. It is important not only to consider the people who will use the product but if it would be taken to manufacturing considerations would have to be done regarding the people who will work to produce it.

Although the micromobility concept could be seen as a way to overconsumption and littering of the city, there are also several positive impacts that come with the product. By offering an alternative to the car, the concept can help reduce unnecessary use of the car in the city. This in turn could lead to better air quality by reducing CO₂ emissions and particles from tires that get dispersed in the air. The concept can also contribute to an improvement of accessibility by offering a flexible transportation option that includes those living in areas with limited public transport or those which do not have access to a car.

6.5 Further development

Because the result concept is merely just that, a concept, there are plenty of options for further development. Some further development areas would have been preferred to be finished before the end of the project, and some were found to be outside of the scope, and therefore left. The two areas which could be further improved within the scope of the project given more time is the appearance and the ergonomic aspect, especially when not driving the vehicle. As of the end of the project, the way to bring the micromobility vehicle from the ground into the trunk of the car had not been developed further than just having handles to carry it in. Additionally, no specific way to carry the vehicle was created for situations like carrying it from the streets into an office. If this had been done, the concept would have felt more complete, but as it was not the main focus, it was partly forgotten about.

The final appearance was unfortunately not able to be analyzed as much as would have been preferred. Doing another iteration of ideating the final shape could have made either a big difference, or a barely noticeable one. However, doing it would have made the concept more complete, and made it feel more thought through. Furthermore, it would have given a more satisfying result, without having to wonder if some major improvements could have been done.

As the concept is a vehicle, it has plenty of hidden details and functions which make everything work correctly. For example, just to create the steering, the technical solution is complex and has details that must work properly. How these technical details will work and look in this vehicle is something that is an important step to continue from. It is however not entirely inside the scope of the project but is something that must be done to take the concept to a prototype level.

Even further outside the scope is finding production possibilities and calculating cost of different components and production methods, as well as adjusting the design to these parameters. This is something that was discussed briefly but decided to not be the focus area of the project.

7

Conclusion

The goal of the project was to create a micromobility concept on behalf of Lynk & Co design. The concept was to be designed for the context of urban environments in 2030 Europe. During the project, ideation was done for scenario, functionality, and shape to create a concept of a micromobility vehicle and an environment giving a purpose of the concept. The final concept vehicle, LynkLyte, is a foldable electric scooter, excelling in being compact and storing luggage, and being something unique compared to other micromobility solutions. Hence, LynkLyte satisfies the purpose of the project given the scope set.

The concept offers flexibility when the car is not a suitable option, as well as being the perfect micromobility vehicle to use with a Lynk & Co car. Considering cars already being hard to drive in cities and that some cities are making it harder, having a micromobility vehicle to go with a car will probably give the most amount of flexibility when traveling. This is the requirement LynkLyte satisfies, but it also provides flexibility if there is no access to a car.

LynkLyte also presents a new way of thinking about the shape of electrical scooters by diverting from the typical appearance. By forgoing the form of electrical typical scooters, the vehicle can have a closer resemblance to a car and the Lynk & Co brand. This is presented as a three-dimensional rendition, which creates something that is easy to understand and supports the description of the concept. This way of showing the concept inspires the imagination of the beholder, which was one of the main goals of the project.

The project introduced the team to a new way of thinking about ideation. In this project, a concept is designed for a non-existing problem which had to be defined before ideation could begin. To do this, the context of 2030 had to be defined before a problem space could be defined.

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Appendix

A

Brief

Kandidatarbete
Examenskod
IMSX16-24-19

CHALMERS

Institutionen för
INDUSTRI- OCH
MATERIALVETENSKAP



Målgrupp
TD

Gruppstorlek
Mellan 5 och 6

Speciella förkunskaper
-

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Språk:
Engelska

The First and the Last

Innovative ideas and smart solutions around new shared micro-mobility solutions for the Lynk&Co Members

Lynk&Co is a brand know in Europe for introducing a new subscription-based, sharable, mobility concept on the 01 SUV vehicle, designed by Lynk&Co Design. Lynk & Co Design serves as the centre of design excellence, overseeing both vehicle and experience design for the Lynk&Co brand. Within this division, the Prospective Design Team is actively seeking new challenges, fresh perspectives, and speculative ideas surrounding future experiences in the automotive realm. Lynk&Co Design wants new shared micro-mobility ideas to integrate in one of their vehicles to allow Lynk&Co member to move in freedom and style. Lynk&Co Design would like you to pick a context to focus on, with either a European or Chinese cultural influence. The scene is set in 2030, cars won't probably fly yet, but hopefully they will drive us to beautiful places without hurting the environment too much. The contexts are:

- 1) **Urban** - the crowd chaotic mess of the megacity. Imagine a simple, compact, electric and fast commuter that wants to help declutter the city-center and get your fast wherever you want.
- 2) **Offroad** - for the occasional adventure seekers, to enjoy and share the beauty of nature, in the premises of the city, without any advanced survival skills.
- 3) **Family** - not only kids need toys. For the parents who want to move with their kids in the city, with the need of bringing some stuff around, with enough space to fit in 2 or 3.

Ideate, pitch and refine a full story around a Product and its Service/Usage. Lynk&Co Design is looking forward to meet the protagonists of your story, discover the place where your story takes place and what is possible to do there. In a close-future, (maybe) autonomous world, these products will hopefully create positive experiences around mobility.

Use your preferred technique, but please do make it as interactive and immersive as you can! We all want to be almost part of it!

B

Scenario writing

B.1 Parking roulette

SA

You

could u make this story more selling and interesting? Imagine sitting in a car driving to your first day of your new job. When you are a 5 minutes away from the office, you see a parking lot, BUT you are lazy and have hopes to find a parking lot closer to your job. you drive around the office and eventually get further away from the office and still don't see a parking lot. And now you are late. Then you realise that the parking lot that you saw in the beginning was the optimal spot and now you have to drive back and be late. What if you had a smart solution that you could secure your arrival time to the job?



ChatGPT

Picture this: You're in the driver's seat, nerves buzzing as you embark on your first day at the new job. The excitement is palpable, but so is the anxiety as you navigate the unfamiliar roads to the office. Just when you spot a parking lot a mere five minutes away from your destination, the allure of a closer spot beckons, fueled by a hint of laziness and the hope for a more convenient space.

You decide to play parking roulette, steering away from the seemingly perfect spot. As minutes tick by, you find yourself driving further and further from the office, all the while scanning for a parking space that remains elusive. Panic sets in, and the clock becomes your nemesis. In an ironic twist of fate, you realize that the parking lot you initially dismissed was the optimal choice.

Now, not only are you farther away, but you're also fashionably late for your first day. The stress and frustration mount as you ponder the missed opportunity for a smooth, punctual entrance.



But what if I told you there's a smarter solution to this daily dilemma? Imagine having a tool that

Message ChatGPT...



Parking roulette

Picture this: You're in the driver's seat, butterflies in your stomach as you are about to start your first day at your new job. The excitement is real, but so is the anxiety as you navigate the unfamiliar roads to the office. Just when you spot a parking space only five minutes away from your destination, the idea of a closer one pulls you in, fueled by a hint of laziness and the hope for a more convenient space.

You decide to play parking roulette, steering away from the seemingly perfect spot. As minutes tick by, you find yourself driving further and further from the office, all the while scanning for a parking space that remains elusive. Panic sets in, and the clock becomes your enemy. You start to realize that the parking spot you initially dismissed was the optimal choice.

Now, not only are you farther away, but you're also late for your first day. The stress and frustration build up as you think of the missed opportunity for a smooth, punctual entrance.

But what if I told you there's a smarter solution to this daily dilemma?

B.2 Other scenarios



You

could u make this story more interesting and selling. Imagine its black friday, its 7 am and ur a shopaholic. U want to be the first running into the stores to get the best deals and purchase the cheapest clothes. What if u had something that would transport u from the parking outside to the shopping mall, but also would be convenient to have inside, to effectively transport yourself inside and outside. ur hands are full with the bags containing the new clothes u bought.



ChatGPT

Step into the high-energy world of Black Friday, where the air is charged with anticipation, the clock strikes 7 am, and you, the ultimate shopaholic, are on a mission. The thrill of being the first to pounce on unbeatable deals and snag the trendiest clothes fuels your adrenaline.

But wait, there's a twist – what if I told you there's a game-changing device that not only transports you seamlessly from the parking lot to the shopping mall but becomes your trusty sidekick inside, making your shopping spree more exhilarating and convenient?

Imagine this: as you juggle bags filled with your fabulous finds, a sleek and innovative transportation tool whisks you effortlessly from your car to the heart of the shopping extravaganza. No more battling through crowded parking lots or racing against other eager shoppers. You're the VIP, and convenience is your middle name.

Now picture navigating the bustling aisles with your hands full of shopping bags. The struggle is real, right? Fear not! Our revolutionary device, designed for shopaholics like you, becomes an extension of your shopping experience. A compact and stylish companion, it helps you zip around the mall with ease, effortlessly transporting you from store to store, ensuring you never miss out on those must-have deals.

As your fellow shoppers grapple with crowded spaces and cumbersome bags, you're on a different level, effortlessly gliding through the chaos with your newfound shopping superpower. The envy of the Black Friday crowd, you not only secure the best deals but also do it with unmatched style and efficiency.

Embrace the future of shopping – where the excitement of Black Friday meets the ease of a seamless shopping experience. No more compromises on comfort or convenience. You, the savvy shopper, now have the ultimate edge, making every Black Friday spree a memorable and stress-free adventure. Gear up for a shopping revolution – your hands may be full of bags, but your heart is full of satisfaction, knowing you've conquered Black Friday like never before!

Story - Black friday

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You

A family of three has to get to the kindergarten but their car is broke. Write a story that enlightens the struggle. It is a story that takes place in 2030.



ChatGPT

In 2030, the Turner family faced a dilemma when their self-driving car broke down on the morning of Lily's kindergarten orientation. Despite their attempts to fix it, the vehicle remained unresponsive. Determined not to miss the important event, the family set out on foot.

Their attempts to borrow a neighbor's car or use public transport failed. Just when desperation set in, a tech enthusiast named Alex offered them a ride in their own vehicle. Hesitant at first, the Turners decided to trust Alex's kindness.

As they reached the kindergarten just in time, the family thanked Alex for their generosity. Mark remarked, "In this high-tech world, sometimes a human touch is all we need." With a warm smile, Alex replied, "Kindness will always be the driving force."

Grateful for the unexpected help, the Turners walked into the kindergarten hand in hand, ready to face the challenges of the futuristic world.

Story - Lily's kindergarten orientation

It is a crisp morning in 2030, the Turner family faced an unexpected hurdle as they prepared for Lily's kindergarten orientation. The Turners' electric car, a dependable companion for years, refused to start. Panic ensued as Mark tried to troubleshoot the issue, only to realize that they had forgotten to charge the electric car.

Determined not to let this setback ruin Lily's big day, the family quickly abandoned the idea of the car and considered alternatives. Living in a neighborhood with a sense of community, they decided to reach out to a neighbor for help. However, their hopes were dashed when they discovered that their neighbor was away for the day. And if they would start walking now, they would arrive really late.

Emily suggested taking the bus, a less glamorous but reliable mode of transportation in 2030. But the station was 1 km from the house and it would just take to long to go with the buss. With time ticking away, the Turners felt the pressure of potentially missing the kindergarten orientation... if only there could be a solution...

C

Mash up innovation

Technical features

Charging structure

Practical features for urban use





CHALMERS