IDE Master Graduation

Project team, Procedural checks and personal Project brief

This document contains the agreements made between student and supervisory team about the student's IDE Master Graduation Project. This document can also include the involvement of an external organisation, however, it does not cover any legal employment relationship that the student and the client (might) agree upon. Next to that, this document facilitates the required procedural checks. In this document:

- The student defines the team, what he/she is going to do/deliver and how that will come about.
- SSC E&SA (Shared Service Center, Education & Student Affairs) reports on the student's registration and study progress.
- IDE's Board of Examiners confirms if the student is allowed to start the Graduation Project.

USE ADOBE ACROBAT READER TO OPEN, EDIT AND SAVE THIS DOCUMENT
Download again and reopen in case you tried other software, such as Preview (Mac) or a webbrowser.

STUDENT DATA & MASTER PROGRAMME

Save this form according the format "IDE Master Graduation Project Brief_familyname_firstname_studentnumber_dd-mm-yyyy".
Complete all blue parts of the form and include the approved Project Brief in your Graduation Report as Appendix 1 !

family name	de Jongh
initials	D.M.I
given name	Darcy
student number	
street & no.	
zipcode & city	
country	
phone	
email	

Your master programme (only select the options that apply to you):

IDE master(s): ( ) IPD ( ) DfI (★) SPD

2nd non-IDE master:

individual programme: - - (give date of approval)

honours programme: ( ) Honours Programme Master

specialisation / annotation: ( ) Medisign ( ) Tech. in Sustainable Design ( ) Entrepeneurship

SUPERVISORY TEAM **

Fill in the required data for the supervisory team members. Please check the instructions on the right !

** chair	Jasper van Kuijk	dept. / section:	HCD
** mentor	Jeroen Coelen	dept. / section:	DOS
2nd mentor	Joris Koudijs (CTO)		
organisation:	Tiler		
city:	Delft	country:	The Netherlands

comments (optional)

Chair should request the IDE Board of Examiners for approval of a non-IDE mentor, including a motivation letter and c.v..

Second mentor only applies in case the assignment is hosted by an external organisation.

Ensure a heterogeneous team. In case you wish to include two team members from the same section, please explain why.

APPROVAL PROJECT BRIEF

To be filled in by the chair of the supervisory team.

chair Jasper van Kuijk date 14 - 09 - 2022 signature

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CHECK STUDY PROGRESS

To be filled in by the SSC E&SA (Shared Service Center, Education & Student Affairs), after approval of the project brief by the Chair. The study progress will be checked for a 2nd time just before the green light meeting.

Master electives no. of EC accumulated in total: 31 EC

Of which, taking the conditional requirements into account, can be part of the exam programme 31 EC

List of electives obtained before the third semester without approval of the BoE

[x] YES all 1st year master courses passed

[ ] NO missing 1st year master courses are:

name K. Veldman date 22 - 9 - 2022 signature

FORMAL APPROVAL GRADUATION PROJECT

To be filled in by the Board of Examiners of IDE TU Delft. Please check the supervisory team and study the parts of the brief marked **. Next, please assess, (dis)approve and sign this Project Brief, by using the criteria below.

- Does the project fit within the (MSc)-programme of the student (taking into account, if described, the activities done next to the obligatory MSc specific courses)?
- Is the level of the project challenging enough for a MSc IDE graduating student?
- Is the project expected to be doable within 100 working days/20 weeks ?
- Does the composition of the supervisory team comply with the regulations and fit the assignment ?

Content: [V] APPROVED [ ] NOT APPROVED

Procedure: [V] APPROVED [ ] NOT APPROVED

comments

name Monique von Morgen date 4/10/2022 signature MvM

Initials & Name D.M.I de Jongh Student number 4565193

Title of Project The road towards greener mobility: a strategic view on the future of light electric vehicles

The road towards greener mobility: a strategic view on the future of light electric vehicles

project title

Please state the title of your graduation project (above) and the start date and end date (below). Keep the title compact and simple. Do not use abbreviations. The remainder of this document allows you to define and clarify your graduation project.

start date 05 - 9 - 2022 03 - 2 - 2023 end date

INTRODUCTION **

Please describe, the context of your project, and address the main stakeholders (interests) within this context in a concise yet complete manner. Who are involved, what do they value and how do they currently operate within the given context? What are the main opportunities and limitations you are currently aware of (cultural- and social norms, resources (time, money,...), technology, ...).

Mobility forms an essential part of our lives and today's citizens have different options with which they can transport themselves from A to B. In the energy transition, mobility is one of the domains where innovation brings new complex challenges with it. The increasingly diverse light (electric) vehicles that can be found in citizen's bike sheds and throughout cities could possibly alter the way in which we move around in the future. In a study by the Boston Consulting Group, results show the size of the global micro mobility market (Figure 1). Though regular bikes account for the biggest part of the total market, the projected growth for subscriptions in the coming decade across the listed light electric vehicles (LEVs) (Lang et al., 2022) shows the appeal to this market.
In the transition towards cleaner transport to meet the climate goals, the European Commission has formulated proposals to improve urban mobility. This includes adding more charging points, simplifying the transport system to support better connected use of different vehicles and creating better multimodal terminals (European Commision, 2021).
Alongside these developments is the shift away from polluting petrol cars in cities. Over the years, cities have applied different measures to keep out cars, such as bans or extra fees in certain areas for certain vehicles. However, in addition to discouraging car use itself, we will need to rethink the infrastructure of cities and how to have alternative transport accessible at all times (WEC, 2020). But for electric vehicles to be available at all times and become part of the cityscape they need to be charged and preferred by the riders themselves. Currently, (shared) electric vehicles (from e-bikes to scooters and cars) are either charged out of our sight, plugged into a big loading station on the street or getting the battery switched out when needed.
The startup Tiler has a mission to change this way of charging, hoping to become the go-to solution for charging small EV's in the future. Their tile and kickstand (for electric bikes) consist of technology that allow for wireless charging. At first glance this solution removes the need for bulky plugs and loading stations as the tile can become part of its surroundings also changing the action required from the user. So far, the startup has had its focus on creating and refining the charging concept for e-bikes as the designs of these bikes are similar enough to allow their design to be compatible with many.
The starting point of this challenge is about how Tiler's product and the benefits it offers fit into the future. This involves considering the approach needed for other LEV's, looking at partnerships, and the entire system needed to realise this in cities in the future. For example, in the lessons learned from the European sustainable energy week it was concluded that disrupting potential of EVs cannot be complete without integrating cities. They argue that a successful transition in this area requires collaboration of governments, entrepreneurs and knowledge institutes (Chenadec et al., n.d.) Furthermore, it requires looking at how people use such innovations, the behaviours and beliefs involved. As preference for micro mobility varies across and within countries, it is important to understand the transportation habits in the area a provider is trying to enter (Heineke et al., 2021).

Building the right system to support different modes of mobility is a dynamic problem that requires collaboration between private and public parties and continuous attention for the changing needs of the people in this system. Small electric vehicles will likely fail to be embraced on the long term if the infrastructure of cities is not adjusted properly. Therefore this project aims to investigate the characteristics of a system in which micro-mobility can flourish.

space available for images / figures on next page

introduction (continued): space for images

Source: BCG's micromobility market model.

image / figure 1: Market size micromobility

TO PLACE YOUR IMAGE IN THIS AREA:
- **SAVE THIS DOCUMENT TO YOUR COMPUTER AND OPEN IT IN ADOBE READER**
- **CLICK AREA TO PLACE IMAGE / FIGURE**

PLEASE NOTE:
- **IMAGE WILL SCALE TO FIT AUTOMATICALLY**
- **NATIVE IMAGE RATIO IS 16:10**
- **IF YOU EXPERIENCE PROBLEMS IN UPLOADING, COVERT IMAGE TO PDF AND TRY AGAIN**

image / figure 2:

PROBLEM DEFINITION **

Limit and define the scope and solution space of your project to one that is manageable within one Master Graduation Project of 30 EC (= 20 full time weeks or 100 working days) and clearly indicate what issue(s) should be addressed in this project.

Tiler's solution proposes a different type of solution to the challenge of charging small electric vehicles. Regular plug in chargers and detachable batteries are vulnerable (WPC, n.d) and shared mobility providers currently need to send out people to exchange the batteries for their vehicles that are parked everywhere. Tiler's current product is a universal solution for e-bikes (tile and special kickstand) with which they struggle to define the market to sell their product to, its size and how exactly to supply their technology. Furthermore, they are unsure of how to be a desirable solution for other small EVs and get their product into public space in the future.

To make the project manageable within the allocated time I have set several constraints.
- I will focus on a specific area (citycenter/residential are/etc)
- In my research I will search for focus to limit the different types of EVs I will consider.

The issues to be addressed include:
- Is charging the right problem and does their product solve it better than current options
- Which customers are the most likely fit for Tiler's product?
- What can we learn from other places where such mobility is gaining more momentum already
- What are people's needs and experiences in the use of small electric vehicles (in cities)
- Which collaboration is need to get the product in the right place?
- What does the ecosystem look like that tiler's product can fit in?

I expect more specific questions to arise in my discovery phase.
During my research, I expect to find information that allows me to formulate argumentation to narrow down.

ASSIGNMENT **

State in 2 or 3 sentences what you are going to research, design, create and / or generate, that will solve (part of) the issue(s) pointed out in "problem definition". Then illustrate this assignment by indicating what kind of solution you expect and / or aim to deliver, for instance: a product, a product-service combination, a strategy illustrated through product or product-service combination ideas, ... In case of a Specialisation and/or Annotation, make sure the assignment reflects this/these.

Investigate and formulate possible futures of shareable transport and what is needed to become an important part of this system.

As part of my first phase, I will take time to further define the scope of this project and the direction I want to go in. This will involve looking deeper at what activities I will be performing for which purposes, as this gives shape to what end result I will be working towards. Together with the initial research plan as described in my planning, this can result in changes within the larger constraints of the assignment. As framing the right problem is a process, I cannot foresee these changes now and want to make the company aware of this.
At this point, I imagine my possible end result to be research that offers a systemic overview of the possible direction(s) shareable transportation will change in during the coming years. This can result in deliverables such as a set of likely future scenarios for electric micromobility supported by research conveyed through a stakeholder map, 4C & SWOT analysis that help map trends, competitors, opportunities etc. and what design strategy Tiler could apply to deal with this. Other options could include an ecosystem overview to inform about possible innovation strategies or directions for future product development and a to market strategy.

My goal is to design a result that can is useful in Tiler's longterm strategy.

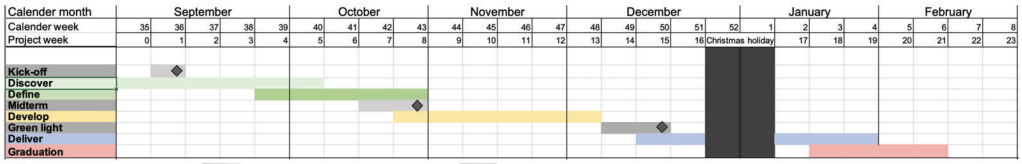
Initials & Name D.M.I de Jongh Student number 4565193

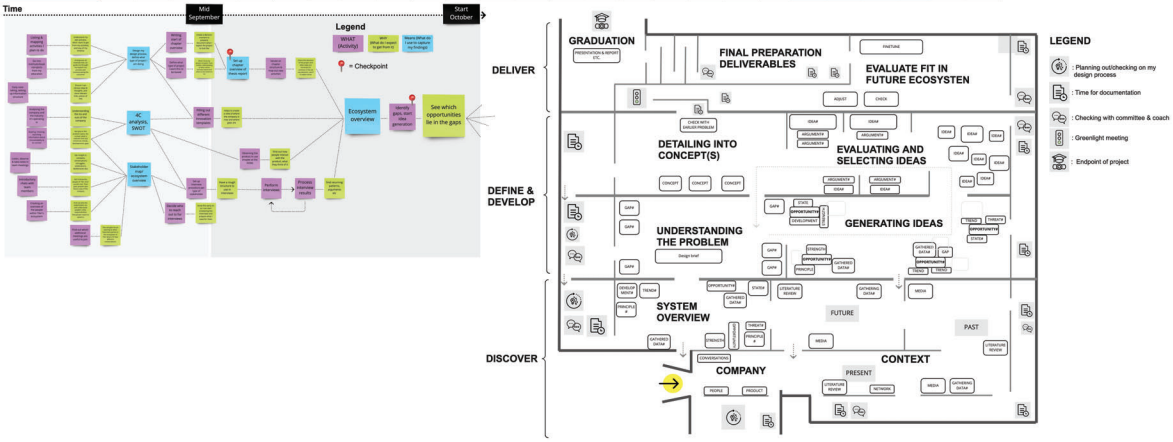
Title of Project The road towards greener mobility: a strategic view on the future of light electric vehicles

PLANNING AND APPROACH **

Include a Gantt Chart (replace the example below - more examples can be found in Manual 2) that shows the different phases of your project, deliverables you have in mind, meetings, and how you plan to spend your time. Please note that all activities should fit within the given net time of 30 EC = 20 full time weeks or 100 working days, and your planning should include a kick-off meeting, mid-term meeting, green light meeting and graduation ceremony. Illustrate your Gantt Chart by, for instance, explaining your approach, and please indicate periods of part-time activities and/or periods of not spending time on your graduation project, if any, for instance because of holidays or parallel activities.

start date 5 - 9 - 2022 3 - 2 - 2023 end date





The Gantt chart's main purpose for me is to show the follow up of my project phases and planned breaks. I currently want to work on this project full time but if I need a short break I will adjust this planning accordingly. This will be in deliberation with all parties involved of course.

The second image with purple & green notes displays the activities I am performing or expect to perform on the short term. There are many activities happening alongside each other but this is familiar chaos I need to be able to discover the entire system and all its components.
This overview will also develop overtime and useful in discussing my process and my progress.

The graphic on the right side shows how I see my design process mapped onto the larger phases of the double diamond process. I have displayed this as a wayfinding map to express that a logical underlying structure still allows for movement back and forth, revisiting points when necessary.

Initials & Name D.M.I de Jongh Student number 4565193

Title of Project The road towards greener mobility: a strategic view on the future of light electric vehicles

MOTIVATION AND PERSONAL AMBITIONS

Explain why you set up this project, what competences you want to prove and learn. For example: acquired competences from your MSc programme, the elective semester, extra-curricular activities (etc.) and point out the competences you have yet developed. Optionally, describe which personal learning ambitions you explicitly want to address in this project, on top of the learning objectives of the Graduation Project, such as: in depth knowledge a on specific subject, broadening your competences or experimenting with a specific tool and/or methodology, ... Stick to no more than five ambitions.

This project drew my attention due to the mix of interests it combines; a complex challenge in the domain of sustainability, a future oriented character, in a dynamic startup environment.

Within these interests I have several ambitions;

Discover my role as a future strategic design graduate in making mobility greener within the large societal challenge of the energy transition . I am very curious to observe my own research and thought process to get a feeling for how my knowledge can be applied in other domains that interest me where strategic design can be of added value.

As I will be joining a startup which was also due to my interest in entrepreneurship I want to learn more about the processes, the way of working and the mindset need to operate in such an environment.

During my master's program I have always enjoyed the effort of building solid argumentation, therefore I want to explore this in a real working environment and see how well I am able to consider all aspects and integrate them. In connection the arguments is an ambition that relates to the outcomes I will communicate in my project. I want to explore using storytelling with which I mean to investigate ways in which I can convey information in such a way that it will resonate with my audience. I want to explore using knowledge from existing literature on narrative transportation and perspective taking to help make the future more tangible as I believe this can be important in such complex challenges.

Finally, I want to work on the balance between being patient and acting now as I often operate in the extremes.

FINAL COMMENTS

In case your project brief needs final comments, please add any information you think is relevant.

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