DESIGN FOR our future

TU Delft

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: Kooijman
initials: FSC given name: Finn
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: Conny Bakker dept. / section: CPD
** mentor: Charlotte Kobus dept. / section: MCR
2nd mentor: Nina Boorsma
organisation: TU Delft ReCiPPS Team
city: Delft country: 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 Conny Bakker date 16 - 09 - 2021 signature Conny Bakker Digitally signed by Conny Bakker Date: 2021.09.22 07:58:43 +02'00'

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: 41 EC

Of which, taking the conditional requirements into account, can be part of the exam programme 32 EC

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

★ YES all 1st year master courses passed

NO missing 1st year master courses are:

name Colinda/Monique von Morgen date 11/10/2021 signature MvM

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 11/10/2021 signature MvM

Initials & Name FSC Kooijman Student number [redacted]

Title of Project Project Journey Mapping: Towards a circular economy

Project Journey Mapping: Towards a circular economy — 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 16 - 09 - 2021 — 10 - 02 - 2022 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, ...).

To restrain the global environmental footprint of the products we use, the linear economy needs to transform towards a circular, less wasteful system. Direct reuse, repair, refurbishment and remanufacturing offer approaches towards this circular economy by extending the product lifetime beyond its first use. After products are restored, they are reintroduced to the market.

Nevertheless, products have to be made appropriately in order to make them suited for this extended lifetime. Currently, programs of requirements (in the developmental phase of a product) often don't take circular (pathways) strategies into account. Despite the growing importance of these circular (pathways) strategies, also from the European Commission, companies do not plan their products over consecutive life cycles. Questions like: what will the product have to deal with? Which stakeholders will it meet? And, what will its value proposition be? Are all important questions to consider when strategically planning out the various life-cycles of a product. Hence to aid companies in this transition, design tools and methodologies need to be researched and developed.

ReCiPSS, cofounded by the European Commission's Horizon 2020 research and innovation program, is a research program composed of two large-scale demonstrators out of the automotive industry (Bosch) and white goods industry (Gorenje group). Both demonstrators hope to contribute towards a circular economy and make a case for other companies to learn from. As stated by the Recipss project Coordinator Amir Rashid: "The main goal of the project is to demonstrate the implementation of circular manufacturing systems addressing different aspects of industrial and business environment." The program is further composed out of 13 partners, including the TU Delft, and will be coordinated by KTH.

The TU Delft ReCiPPS team is developing the Product journey map (PJM), a decision support based mapping tool for internal communication, further development and optimisation of product services. Its current goal is to map consecutive product use cycles, defining the 'pains and gains' of a product and its stakeholders over time, allowing companies to take appropriate action to develop a successful circular business model. The product journey map puts the product centre-stage and helps enhance the value capture. Currently, the PJM has gone through multiple iterations and can be found in the latest edition of the Delft Design Guide. However, according to its creators, the tool lacks a clear goal and formal structure. Therefore, this graduation project will focus on making the PJM more concrete and complete.

Lastly, being able to prototype the PJM with the ReCiPSS program demonstrators is a real opportunity for me to gain better insights into the needs of companies with circular ambitions. Nevertheless, the Corona pandemic might prove to be a limiting factor. Increases in the activity of the virus might limit interactions with demonstrators of the Recipss program and other third parties. Hence I will need to be prepared to conduct any activities online using communication platforms such as Zoom and whiteboard application such as Miro. This is something I have gained experienced in through my internship at Noorderwind.

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introduction (continued): space for images

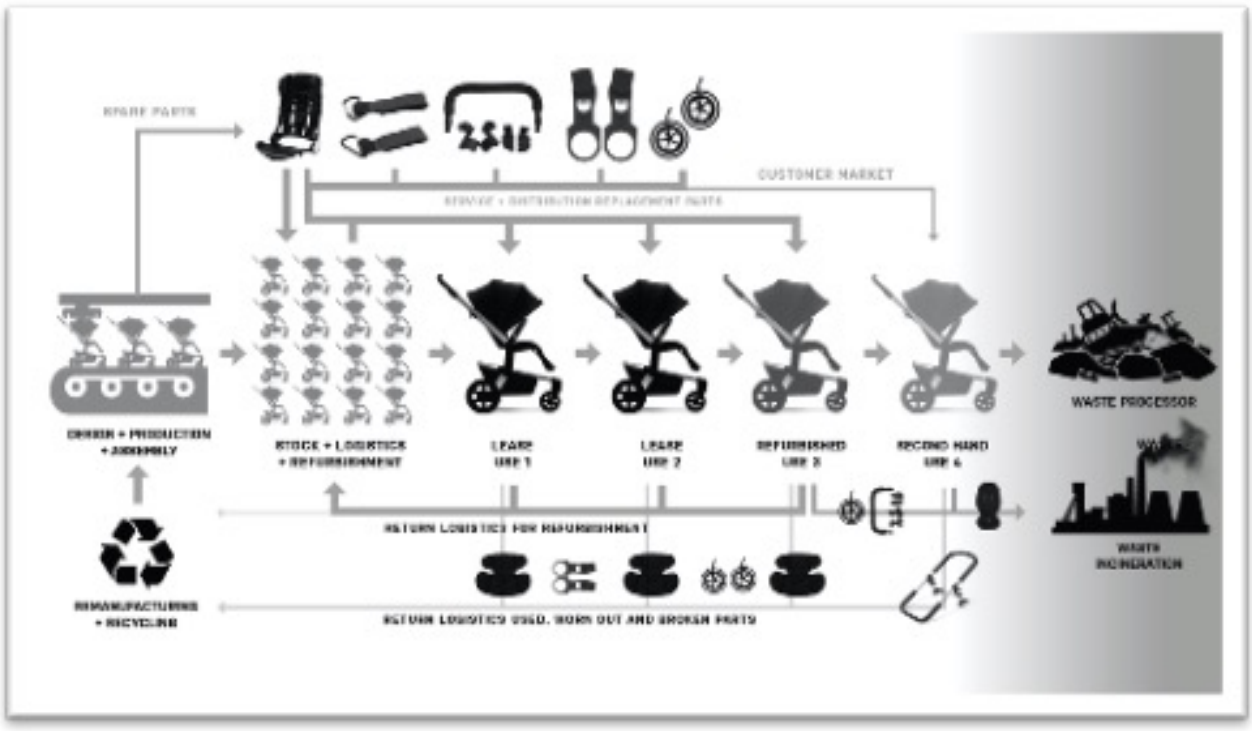


image / figure 1: Current visualisation of the Product Journey Map in the Delft Design Guide.

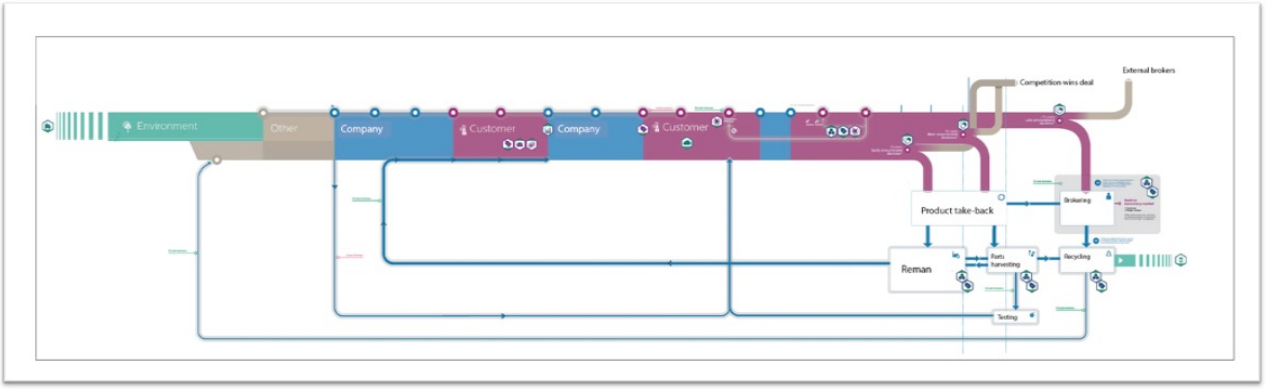


image / figure 2: Alternate Product Journey Map visualisation based on a Sankey Diagram.

Initials & Name FSC Kooijman Student number [redacted]

Title of Project Project Journey Mapping: Towards a circular economy

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.

Problem definition

The current version of the PJM lacks a clear objective, formal structure, an informative and an actionable visualisation. These are necessary if companies, such as Gorenje and Bosch, want to plan their products' journeys over consecutive life-cycles to gain insight into the benefits and consequences on their industrial and business environment to further develop and optimise their product service. The problem definition is further illustrated in figure 1 and figure 2, which shows that there currently is no consensus on how to create and visualise an useful PJM.

Scope and solution space

The scope of this graduation project will be defined by the analysis of previous PJM iterations, together with expert literature on remanufacturing, data visualisation, design tool criteria and design methodologies. Through this analysis it will become clear whether the focus needs to be on creating a clear objective, a formal structure, an informative and actionable visualisation, all of them or a combination. The final deliverable will consist of a intuitive PJM which companies can use or internal communication, further development and optimisation of their product services.

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.

I will create an intuitive PJM containing a clear objective, a formal structure that supports this objective, an informative and an actionable visualisation. I will analyse previous versions of the PJM to gain a better understanding of their goals, analyse expert literature on remanufacturing, data visualisation, design tool criteria, design methodologies, prepare and conduct prototype sessions with the TU ReCiPSS team, ReCiPSS demonstrator parties and other companies.

This graduation project will follow an iterative double diamond approach. Based on the analysis of previous iterations of the Product Journey Map, graduation projects (e.g. Martin Steffner & Francesco de Fazio) and expert literature (e.g. remanufacturing, data visualisation, design tool criteria and design methodologies) I will determine which aspects to focus on during this graduation project (clear objective, formal structure, informative and actionable visualisation). Based on the insights gathered I will create a (design) goal for the PJM.

Accordingly, I will create a first set of iterations of the Product Journey Map. These iterations will then be discussed with the TU Delft ReCiPPS team, tested using the old cases of Bugaboo/Philips and finalised for prototype sessions with ReCiPPS demonstrator partner Gorenje and and potentially other companies.

Based on the findings of the prototype sessions and additional research, further iterations will be made in between prototyping sessions. Through this iterative cycle of creating and testing, my final deliverable will include a final iteration of the PJM with a clear objective, a formal structure that supports this objective and contains existing methodologies if necessary, an informative and actionable visualisation.

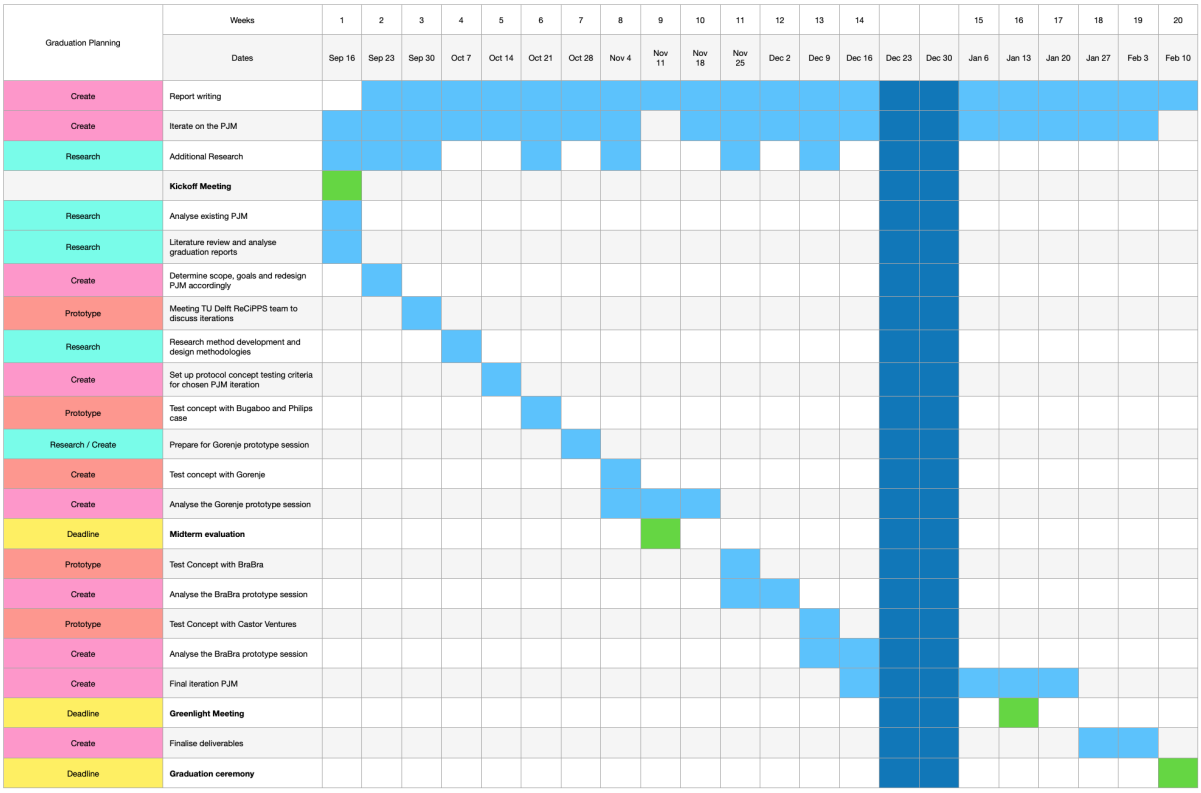
Initials & Name FSC Kooijman Student number [redacted]

Title of Project Project Journey Mapping: Towards a circular economy

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 16 - 9 - 2021 10 - 2 - 2022 end date



The above Gantt chart shows the planning for this graduation project. It follows an iterative double diamond approach (discover(research), define(create), develop(create), deliver(prototype)). The kickoff meeting will take place on 16 September 2021. During the midterm I will present the insights gained from the prototype session with the ReCiPPS demonstrator Gorenje group, together with the key learnings from my research period prior to the prototype session. Before the greenlight meeting I will have conducted and analysed 2 more prototype sessions with Feelou and Castor Ventures, allowing me to synthesis all the insights gathered throughout my graduation project and write my final draft report. All materials will then be finalised and in the last week the materials for the graduation ceremony will be prepared. In total this graduation project will take 22 weeks due to 10 holiday days.

Initials & Name FSC Kooijman Student number [redacted]

Title of Project Project Journey Mapping: Towards a circular economy

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.

Having gone through the IDE bachelor, SPD master and the TiSD annotation program, I hope to learn how to generate a strategic mapping tool, in the form of the product journey map, that companies can use to work towards new circular business models and circular (re)manufacturing of their products. The IDE bachelor and SPD master have equipped me with a deep understanding of the fundamentals of product design and the tools to exploit business resources and market opportunities. The TiSD program and master electives have allowed me to further deepen my knowledge on sustainable design, allowing me to maximise the impact design can have on markets and businesses. Hence I believe that this graduation project will provide me with the opportunity to use all skills and tools I have acquired over my academic career.

Ambitions:

To create and test clear and intuitive design mapping tool that companies can use for internal communication, further development and optimisation of their product service.

Gain more experience in preparing and giving prototyping sessions with companies. This is something I have gained experience with during my internship, however is still an underdeveloped skill for me.

Clearly communicating with and manage all stakeholders involved in my graduation project.

Improve my academic skills such as writing reports and providing concrete and useful advice.

FINAL COMMENTS

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

Initials & Name FSC Kooijman Student number [redacted]

Title of Project Project Journey Mapping: Towards a circular economy