4083

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	Shang
initials	C
given name	Chieh-Hao
student number	4920139
street & no.	[redacted]
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	Henk Kuipers	dept. / section:	ID/AED
** mentor	Rick Schifferstein	dept. / section:	ID/DA
2nd mentor	Emil Goosen		
	organisation: Sagar Energy Solution		
	city: Mwanza	country:	Tanzania

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.

Procedural Checks - IDE Master Graduation

TU Delft

APPROVAL PROJECT BRIEF

To be filled in by the chair of the supervisory team

chair Henk Kuipers date 07 - 04 - 2020 signature

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: 30 EC

Of which, taking the conditional requirements into account, can be part of the exam programme 30 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 J. J. de Bruin (SPA-IO) date 15-04-2020 signature JdB

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: ✓ APPROVED NOT APPROVED

Procedure: ✓ APPROVED NOT APPROVED

comments

name Monique von Morgen date 28 -04 - 2020 signature MvM

Initials & Name C Shang Student number 4920139

Title of Project Product Design for Social Sustainability: Fish Preservation in Tanzania

Product Design for Social Sustainability: Fish Preservation in Tanzania

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 30 - 03 - 2020 28 - 08 - 2020 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, ...).

In Tanzania, catching dagaa (a sort of sardine) is one of the main activities of the places surrounding Lake Victoria to earn their livelihood. Moreover, dagaa is an important nutrition source for their people. However, the process of catching and processing the fish catch is not fully secure, which leads to issues of insufficient income and food waste.

Main stakeholders in the fishing industry are: fishing camp owners, managers, fishermen, fish processors and dealers. The dagaa caught by the fishermen are spread onto the sandy ground under the sun in open air (see Figure 1.) by processors. The contamination caused by sand or animal and insufficient sunlight during rainy and cloudy days which leads to fish spoilage are the main reason of food waste, which often ends up being chicken food. The enormous amount of food waste consequently leads to insufficient income. Moreover, another factor that affects the income is the quality, which is evaluated by the dealers on its intactness and luster which are affected by the turning process and UV exposure respectively.

Sagar Energy Solutions (SES) is developing a greenhouse drying solution "Upepo" (see Figure 2.) The solution is designed to protect the fish from sand and animal contamination, rain, and direct UV exposure. The greenhouse provides active ventilation to ensure it will be dried before the trade of the day. The solution has only been validated on limited scale, as a consequence, SES is now working on an active heating system and planning prototype testing. In addition, SES is also considering adding monitoring system to have a better control of the humidity and temperature inside the greenhouse.

There are many limitations when it comes to design a new solution for the fishing industry in Tanzania. Firstly, considering the income level of the fishing industry, the budget of the product is very limited. In addition to that, the product should not cause job loss. Next, due to the lack of education, learning new skills might be a difficulty to the users, thus, it requires extra attention if the product involves big changes. Next, to be sustainable and to lower the cost, the product is preferably manufactured locally, and the materials should also be locally available. Last but not least, electricity in some islands are not available, thus, the design should be self-sufficient.

space available for images / figures on next page

introduction (continued). space for images

image / figure 1: Dagaa Drying in Tanzania. (Blankendaal, M. Retrieved from Final Report Project Dagaa)

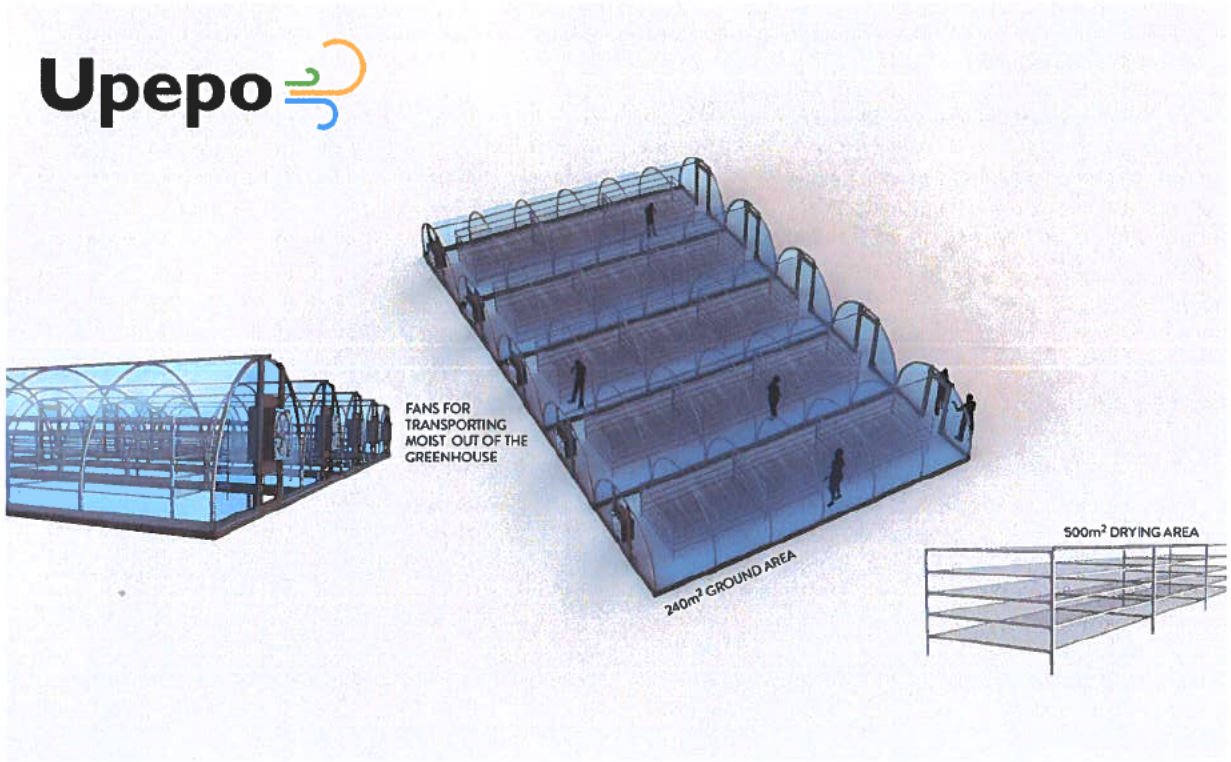

image / figure 2: Upepo. (Blankendaal, M. Retrieved from Final Report Project Dagaa)

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.

The current design, Upepo, was only tested on a smaller-scale model, it has not been validated on a full-scale model, which implies the drying effectiveness, usability, and capacity need to be tested. Furthermore, the design is less likely to be fully functional on rainy days and in places with insufficient sunlight, which is the case of other islands in Tanzania.

Upepo is mainly pursuing the social aspects of sustainability, namely "Zero Hunger" and "Decent work & economic growth". On the other hand, for environmental sustainability, its materials are purchased locally and the fabrication is done locally. Moreover, its modularity helps reduce waste of resources. However, there are some more factors of its life-cycle needed to be analyzed, for example, material, carbon emission, recycling, etc.

The cost of the current solution comparing to the income would place a huge financial burden on the fishing camps. A suitable business model is required for the new solution to secure the income of the local parties and service providers. The current design has no patent or other protection, so the competition will arise, which may result in business loss of the service provider.

While developing Upepo, it was mostly focusing on improving the drying system throughout the design process. However, there are some areas still unexplored. By looking into the fundamental reason for the problem, the scope can be broadened up, for example, to "design a new solution for fish preservation".

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.

1. Analyze the sustainability and function of the current solution to refine the product.
2. Explore more opportunities in a larger scope and research the possibilities and then make the ideas into concepts.
3. Evaluate the concepts with stakeholders and experts and bring the chosen one as close to production-ready as possible.

During the design process, the function of the design will be validated and sustainability will be taken into account at the information-gathering stage. The business model will be generated with calculation and evaluate with SES after design iterations

Based on the problem and previous research, a preliminary vision can be drawn: (Re)Design a product-system combination that ensures dagaa can be preserved under various weather conditions in Tanzania and secures the income of the local and the business of Sagar Energy Solution.

Initials & Name C Shang Student number 4920139

Title of Project Product Design for Social Sustainability: Fish Preservation in Tanzania

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 30 - 3 - 2020 28 - 8 - 2020 end date

		Full-time during semester 4 (30ECTs 20 weeks)																				
Calendar Week		14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Project Week		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			16	17	18	19	20
0	Kick-off																						
1	Analyses, Research																						
2	Refinement																						
3	Analyses, Research																						
4	Ideation																						
5	Conceptualization																						
6	Prototyping																						
7	Evaluation																						
8	Weekly Design Iteration(NL)																						
9	Midterm																						
10	Weekly Design Iteration(TZ)																						
11	Greenlight																						
12	Product Finalization																						
13	Graduation Ceremony																						

Break

The project starts on March 30th with a kick-off meeting. Then, the life-cycle and function of the original solution will be analyzed. Subsequently, literature research will be done to look for alternatives and improvement possibilities of the functional units. After information gathering, the ideas will be evaluated and used to refine the current solution.

To explore more opportunities in the broadened scope, previous research and new finding obtained by literature research will be used to generate ideas. Two ideas will be selected with defined criteria and conceptualized to be ready for evaluation. Depending on the criteria and generated concepts, prototypes will be build, if necessary, to evaluate the concepts. After the evaluation, one concept will be chosen for the next stage: design sprints(iterations).

The graduation project focuses more on the embodiment aspects, one of the aims is to make it as close to production-ready as possible, thus most of the time will be used to optimize the product by running design sprints. The first few sprints will be done within the Netherlands to optimize its function by evaluating it with experts (e.g. experts in production, sustainability, food preservation, etc.).

The mid-term meeting will be held in the week of May 18th. After mid-term, the design sprint will focus on user interaction and test in a real environment which will be conducted in Tanzania from May 25th to July 10th (7 weeks). After the green-light meeting, which will be held in the week of July 27th after a two-week break, the design will be finalized with detailed material, production method, business model, roadmap, etc., back in the Netherlands. Then the project will end around August 28th.

Initials & Name C Shang Student number 4920139

Title of Project Product Design for Social Sustainability: Fish Preservation in Tanzania

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.

My family education fostered my motto: "Help those in need even with nothing in return", which is one of the reasons behind my dream: travel around the world to fix local problems. I believe that in many places, especially the base of the pyramid (BoP), people have relatively fewer resources and lower education that can help them improve their living conditions. Moreover, in such places, the natural environment is precious and vulnerable, which makes it vital to establish a sustainable environment for them.

By participating courses in TU Delft, I have learned some skills that I think are good for designing for BoP, for example, cultural analysis, design for sustainability, and practical experience with design for BoP, and have gained some knowledge may come in handy during the design process, for instance, simulation, behavioral model, electronic design, embodiment design, and various design methodologies. Of course, there is still a lot to learn but at least I'm competent to make my first steps. As a designer, observation, sketching, ideation, prototyping, etc., are my strengths.

Among the skills I learned, prototyping, and design iteration skills are the main things I want to prove while doing this project, which might be one of the main values of being an IPD student. There are plenty of skills, which did not have a chance to be developed in-depth, I would like to explore and learn, for example, skills related to culture-sensitive contents and sustainability. Therefore, I set up some learning goals for this project and listed below,

1. Meaningful integration: make use of the resources especially the experts within TU Delft and meaningfully integrate things into a good design.

2. Design for sustainability: learning theories in the course is not enough for practical application. The goal is to practice sustainability-related (e.g. material-related) methods and tools.

3. Communication with people from a different culture: the language barrier can be a huge obstacle when designing for BoP. Learning an effective way of communicating with local people, maybe with some methods or tools, is one of my goals.

4. Team evaluation in design sprints: during the iterations, evaluation is critical for the development of the product. How to tackle different opinions and integrate them into the design can be a challenge for this project.

FINAL COMMENTS

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

1. If the situation of pandemic at the time planned to visit Tanzania does not allow traveling, the field test will be executed remotely by SES in Tanzania.
2. If Tanzania enforces lockdown at the time planned for user tests, which makes the remote execution impossible, the test pivot will shift from development of the usability to the functionality. But some user tests will still be conducted in the Netherlands for validation.

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