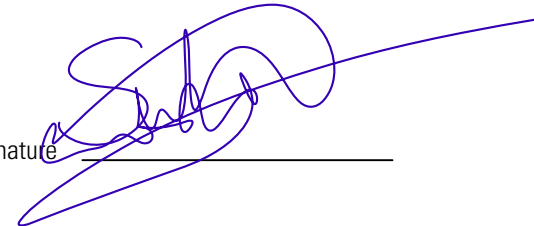## APPROVAL PROJECT BRIEF
To be filled in by the chair of the supervisory team.

chair __S. Hiemstra-van Mastrigt__   date __16__ - __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: __36__ 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 __Colinda van der Bunt__   date __20__ - __04__ - __2020__   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: (★) APPROVED   ( ) NOT APPROVED

Procedure: (★) APPROVED   ( ) NOT APPROVED

- in title landscape dash between demand and responsive (demand - responsive)

comments

name __Monique von Morgen__   date __28__ - __04__ - __2020__   signature _____

Initials & Name __M.__   __Sampimon__   __4088__   Student number __4217586__

Title of Project __An inclusive demand responsive transport service__

An inclusive demand responsive transport service _____ 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   17 - 09 - 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 the Netherlands, there are 12 decentralised public transport authorities. PT-authorities aim to provide public transport by recording the requirements of PT for the specified area in their regional policies. These policies are described in a concession. A concessionaire is a public transport operator that has the right to exploit public transport according to the concession (Europadecentraal, 2020) (Rijksoverheid, n.d.). The Ombudsman has identified that concessionaires in consultation with their decentralised public transport authority put focus on profitable connections. In low-density or other less lucrative areas, this results in replacing fixed transit lines by demand responsive transport (DRT) services (OV-loket, 2017).

Traditionally, public transport has a fixed schedule and route. Demand responsive transport (DRT) is a flexible mode of transportation that adapts to the temporal and sometimes spatial demands of its user groups (Interreg Europe, 2018). Whereas fixed line transit (FLT) runs according to a fixed schedule and route, DRT services operate on demand and therefore, only when and where needed (see figure 1).

The concept of DRT is not new as it did its appearance in the early 90's. DRT services typically involve users calling a booking service which plans a route for the day to pick-up users and take them to their required destination (Interreg Europe, 2018). Due to the current usage of internet and GPS-enabled smartphones, operators are able to operate in real-time and on a large scale (Alonso et al, 2018). For the users this means that the services often provide a website or a mobile application that enables the users to unlock mobility by using a computer or a smartphone on the go.

DRT services typically use mini buses with a capacity of 8 passenger seats (see figure 2).

DRT services can range from a fully flexible door-to-door service, to more rigid configurations in which only partial deviations from a planned route are possible (Alonso et al, 2018). Compared to conventional transit lines, the concept of flexibility in this case promises to increase the temporal and spatial availability for the user, whereas the efficient routing combined with the smaller vehicles require less fuel. Besides improving the effectiveness of transport, it is expected that increasing the flexibility enables the operator to better respond to user needs, which results in higher attractiveness of using PT (Sampimon, 2020).

According to the yearly reports of the OV-loket, this is not always an improvement for the traveller (OV loket, 2017; OV loket, 2019). One of the issues appears with low digital literacy. Not everyone is able to keep up with the digital transformations and cope with it. Since more and more services and routines are "digital by default", including the nature of DRT services, it is important to determine to what extent the non-digital alternatives are accessible for the users (in terms of costs, time, support, etc.). When the spread of digital accessible DRT services is accompanied or followed by cuts or changes in physical infrastructure or services such as station staff, the dependency on ICT in transport increases. This results in an increase of digital inequality or even digital exclusion. The groups that are often related to this problem are elderly, people with a lower education degree, people with a lower income and women (Durand et al., 2019).

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TUDelft

introduction (continued): space for images
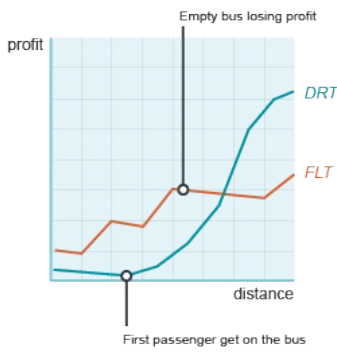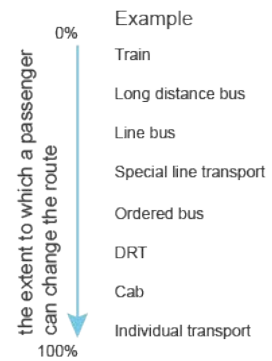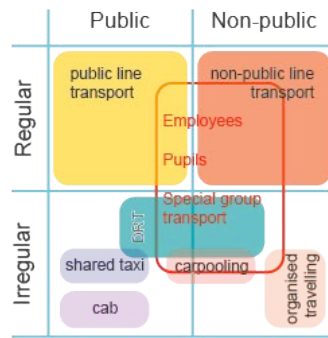

image / figure 1:   Advantages of DRT compared to other modalities (Left: Sampimon, 2020) (Right: Wikipedia, 2020)

image / figure 2:   An 8 passenger vehicle commonly used for DRT services

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.

When digital accessibility of public transport services are accompanied or followed by cuts or changes in physical infrastructure or services such as station staff, the dependency on ICT in transport increases. This results in an increase of digital inequality or even digital exclusion. The groups that are often related to this problem are elderly, people with a lower education degree, people with a lower income and women (Durand et al., 2019).

Examples of known usage issues for low digital literacy travellers are: insufficient physical information about the service, lacking support in checking in/out, in changing service providers (in the example of the OV-chipcard), in having the latest app update and with physical payment options as ticket offices, in providing travel information and finally, the consideration of modern wording as for example "travel product" which is the overarching word used for subscriptions, et cetera (Durand et al., 2019).

The goal of this project will be to design an inclusive demand responsive transport service. According to Cambridge University the definition of inclusivity is "The practice or policy of providing equal access to opportunities and resources for people who might otherwise be excluded or marginalized, such as those having physical or mental disabilities or belonging to other minority groups" (Lexico, 2020). Contrary to the above described design guidelines for low digital literacy in public transport, the project scope is limited to the context of digital oriented DRT services in Dutch public transport.

I expect that the currently digital oriented demand responsive transport services need additional features in order to become more accessible for low digital literacy travellers.

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.

The goal of this research is to determine the factors that influence the interaction between a low digital literacy traveller and a digital oriented demand responsive transport service (by doing both desk and field research as user tests). The framework of knowledge supports the design of a digital oriented demand responsive transport service in Dutch public transport.

The assignment is to design additional features to the currently digital oriented demand responsive transport services that enhance the user experience for low digital literacy travellers. The first part is the research of the critical use factors of low digital literacy travellers using digital oriented demand responsive transport services. The second part is the ideation and assessment by the stakeholders of solutions.

The outcome of this project is a design report and presentation that communicates the research driven design process, including the relevance, research setup, research results and design. Because there are many DRT services rising, it is useful to communicate the outcome as guidelines for the industry. Considering my drawing, visualisation and storytelling skills, it is likely that this report and guidelines will be supported by appropriate artifacts like visual system overviews, storyboards of scenarios and (animated) movies.

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 - 03 - 2020   17 - 09 - 2020 end date

Calendar week			14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	
Date			30/03	6/4	13/4	20/4	27/4	4/5	11/5	18/5	25/5	1/6	8/6	15/6	22/6	29/6	6/7	13/7	20/7	27/7	3/8	10/8	17/8	24/8	31/8	7/9	14/9	
Project week			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17			18		19	20	21	22	
Mile stone			KO							MT: 18/5								GL: 15/7				R					FP: 17/9	
Celebration days etc.				10/4: Goede vrijdag	13/4: Pasen 17/4: Vrij		27/04: Konings dag	5 mei: Bevreidi ngsdag		21/05: Hemelv aartsda g	01/6: Pinkster en									Vrij	Vrij		Vrij				
Research objective/output	**Research activities**	**Days**	5	4	5	5	4	4	5	5	4	5	5	5	5	5	5	5			5			5	5	5	3	101
Phase 1: Research/design setup (Preperation)																												
Research/design setup	Literature review/expert interviews	1	1																									
problem statement, research domain, target group, context etc.																												
Vision and scope	Literature review	1	1																									
Approach and method	Literature review/expert interviews	2	2																									
Phase 2: The user and the interactions (Diverging)																												
User characteristics (persona)	Explorative interviews	2		2																								
Customer journey (Digital oriented service elements)	Context mapping/interviewing	4		2	2																							
Phase 3: The desired interaction and solutions (Converging)																												
Key insights from case studies	Literature review/benchmark	2			1	1																						
Interaction vision	Brainstorm	2			2																							
A list of requirements	Organise data	2			2																							
Phase 4: The solution ideation																												
Solution ideas	A creative session/brainstorm	2					2																					
Low fidelity prototype	Prototyping	1					1																					
New insights of first prototype	User test	2					1	1																				
Buffer time	...	5						3	2																			
Midterm report and presentation		4							3	1																		
		30																										
Solution ideas	A creative session/brainstorm	3								3																		
User research approach and methods	Literature review/expert interviews	2								1	1																	
Prototypes	Prototype building	5									3	2																
New insights and improved prototypes	User tests	7										2	5															
Stakeholder feedback	Partner/expert feedback	3												3														
Final direction/final concept	Organise data	7												2	5													
	Repeat several times within time frame																											
Buffer time	...	5														5												
Green light report and presentation		7															5	2										
		41																										
Phase 5: The solution assessment by stakeholders																												
Final concept	Prototype/concept building	5																3	2									
A comparative test	Research setup and prototype building	4																	3			1						
New insights and improved concept	Comparative user testing	4																				4						
Recommendations for industry and further res	Project partner assessment	4																						4				
Final report		9																						1	5	3		
Public presentation and defence	Preparing the public presentation and defence	5																							2	3		
		31																										
	Tot. days	100																										100

The project is divided in 5 phases. I start with setting up the research and design process. This includes the determination of an appropriate research and design method. The second phase is the research of the user's background and the interactions with the service. The third phase dedicated to improving the current interaction by running through several cycles of ideation, prototyping and user tests. Finally, the last phase is time to assess the final concept with the stakeholders by doing a comparative test and presenting it to the project partners.

It is worth mentioning that during the times of COVID-19, it might occur that the research activities should be altered accordingly. Particularly, when it comes to the low digital literacy subject group, problems might occur when user research, involving interviewing and user testing, is required, while the researcher is obliged to keep distance and therefore, highly dependent on external factors.

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.

Personal motivation
Mobility-as-a-service (MaaS) is currently trending and is going to change a lot in the mobility sector. MaaS offers a tailored door-to-door one-stop-shop for trip planning, booking, paying and travelling (Kuiper, 2020). In my own experience in the industry, the concept of MaaS is built upon the usage of internet- and GPS enabled devices and ICT in modality increases, which implies that most services related to MaaS are "digital-by-default". While seeing the landscape of mobility changing to a digital environment, I find it thrilling to look into the case of implementing demand responsive transport (DRT) for fixed line transit (FLT) as a case to support digital low literates in their mobility solutions, while being an inspiration for other inclusive (mobility) designs.

Also, the past months I have done a research elective for the Seamless Mobility Lab. This lab is coordinated by Suzanne Hiemstra-van Mastrigt and therefore, as an expert in mobility I consider her as a good fit to be my chair. Secondly, Euiyoung Kim is a lead researcher in the People in Transit (PiT) research theme and has experience with demand responsive transport from a previous project.

Ambitions
First of all, I would like to learn more about the mobility of people. Also, I find the mobility landscape interesting, because of its complexity, which allows me to challenge my pragmatic (service) design skills. Thirdly, the project is for a good cause: supporting the more environmentally friendly group transit and supporting a minority group: low digital literates. Finally, I have done an internship at Jam Visual Thinking where I learned to think visually. Although this method is most commonly used in vision/strategic design, I aim to use it along the (service) design process to communicate complex processes.

Learning ambitions:
1. Learning about the mobility industry
2. Learning about service and system design methodology
3. Improving academic writing
4. Improving my pragmatic design skills, involving choosing research and design methods along the process
5. Learning to Incorporate my drawing/visual thinking skills in a (service) design project

FINAL COMMENTS

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

During a research elective, I have done a benchmark study on the user experience of demand responsive transport services in the Netherlands. For this study, I have done a literature review and I have visited six DRT services throughout the Netherlands and conducted field research as user interviews, observations and autoethnographic research. This study has given me the required background knowledge about demand responsive transport services and has shown the relevance for further research.

Initials & Name __M.__ ___Sampimon___ ___4088___   Student number __4217586__

Title of Project ___An inclusive demand responsive transport service___