Decreasing data demand; a behavioral approach

Thesis report

Ch. 11
-.
APPENDIX

A.1 USER STUDY SETUP

This appendix contains the setup of the Miro board, interview guide and homework exercise. The Miro board contains various small exercises that the researcher could use to engage participants and provide input for the further questioning. Some of these exercises required input that participants were asked to provide in advance as their 'homework'.

HOMEWORK EXERCISE

Before the start of the interview participants were asked to provide the following pictures:

- A picture of their router and it's location in the house
- Pictures of all SMART devices in the house

MIRO EXERCISES

Locate your internet source

In this exercise the location of the router was discussed along with interaction with said router.

Choosing from evocative images

In the second exercise participants were asked to choose up to three images from a set of 80 evocative pictures of which they thought it resembled the internet. The main objective of this exercise is to identify attitudes towards the internet and discover personal values influenced by it.

The SMART rundown

Pictures of the personal devices were reviewed by researcher and put into an overview of icons. The devices were discussed to make any final adjustments to the overview and allow the researcher to make observation along with asking additional questions.

Rating digital services

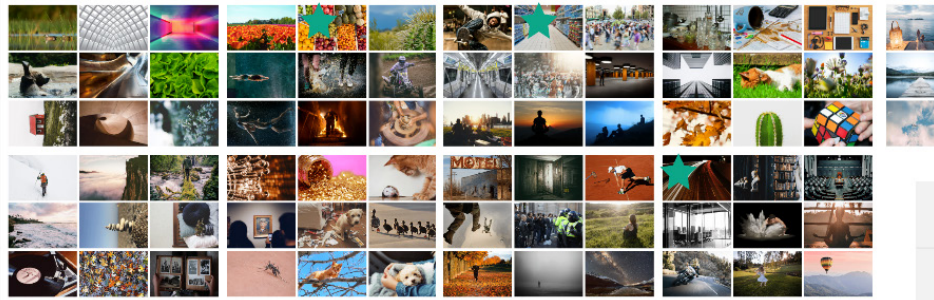
After identifying the devices the participants were also invited to discuss the services that they run. By means of a rating the six categories defined within this project were compared to each other, again to provoke discussion and identify values. Participants were also asked to list the serviced they used per category.

Building a timeline

The last exercise aimed to generate more insight into the consumption habits of participants and the way services are used in combination with each other and their corresponding devices. Together with the participant the researcher constructs a regular day of internet usage using the device icons and services discussed earlier in the interview.

Your home

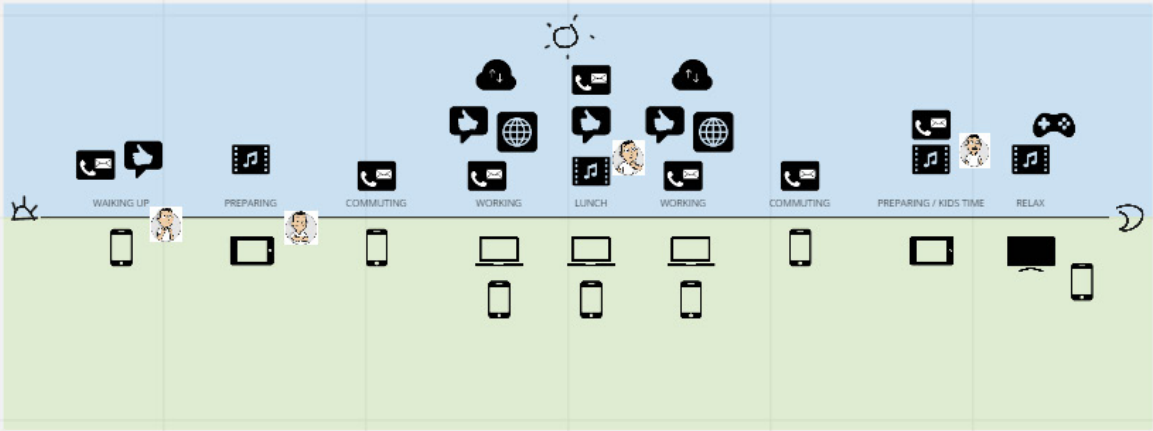
Choose a picture matching your view of the internet



Devices

Services

Weekday



INTERVIEW GUIDE

Introducing

Explanation research project
Check privacy statement
Who are you?

to miro

Relationship with the Internet
Where in the house is the router located?
    Why this place?
How often do you do something with the router?

Choose (a) photo(s) that symbolise the internet for you

Which devices in the house use the internet?
Do you think this is a lot or a little?
Have any devices been added/left?

Use digital services

Explanation categories digital services

Make a list of the most important digital services you use

What makes it so important/valuable?
Could you do without any of these services?
What did you use for this (for the apps)?
What could be alternatives?

Explanation timeline

Complete timeline with devices, apps and services throughout the day
When are there times when you (choose a service) use more?
What do you think is that?
How do you feel about that then?
Are there any services that you may not use every day but more often?
Are there times when you worry about your use?
    Why is that then?
    How do you feel about that
    And from people around you?
When is the internet most important to you?
What makes this so important?
What do you think is important for people around you?
    Children?
Why this device?
Do you also use this app on other devices?
Are you doing this alone or with someone else?

Internet usage in general

Do you mainly use mobile or fixed internet?
    When mobile?
Has your internet usage changed a lot in recent years?
Do you ever stop to think about your internet use?
    Why/why not?
    How do you feel about it?
How much do you think you use (Gb)?
    Do you think this is a lot?
Which apps do you think use the most?
Do you know/use apps that help you get a grip on internet use
    If yes which one? Why are you using it?
Do you ever think about your energy consumption?
    What are you doing then?
    Why are you doing/not doing this?
How do you estimate the energy consumption of digital apps/devices?
    And the internet itself?
Are there any other aspects of your use that you care or care about?

A.2 RESULTS SERVICE ANALYSIS

This appendix contains a list of all digital services analysed and their corresponding "data intensity". Data intensity is here limited to the intensity of data transferred and does not take into account computing and storage related processes. For every service three measurements from three different days are taken to simulate different use scenarios.

Service	Measured intensity MB/h	Intensity MB/h (Schofield, 2020)
YouTube	403 – 616 – 1066	562.5 (Standard) – 1860 (720p60fps) – 3040 (1080p60fps) – 15980 (4k60fps)
NOS	200 – 305 – 797	
Spotify		40 (Standard) – 72 (High) – 136 (Extreme)
Reddit	555 – 686 – 1000	
Facebook	996 – 1260 – 1660	
Facebook Lite	84 – 84 – 160	
Chrome	169 – 291 – 542	
LinkedIn	159,5 – 303 – 313	
Instagram	1370 – 1461 – 1530	
Netflix	199 – 252 – 400	300 (Low definition) – 700 (Standard) – 3000 (HD) – 7000 (4k)
WhatsApp	3.5 –39 – 750 (Video call)	
Google Maps	34.4 – 87.6 – 537	

A.3 USER STUDY RESULTS (3.1-3.6)

The listings below contain all quotes and observation made during the interviews that are used throughout the report. These findings were obtained through notetaking at the time of the interviews by the researcher and by a deeper analysis of recordings of these interviews. Findings were categorised on the basis of their subject matter in order to make referencing easier and more clear. The listings all contain one of these categories along with the findings that relate to it and the corresponding interview number. Observations are written as plain text and quotes are put between parentheses. All quotes have been translated from Dutch to English.

1. The future is digital

There is no alternative anymore for internet connections like the copper cables that used to deliver TV signal
"You take your place in the transition from analog to digital" - 6

2. Lack of norms and knowledge

"It's hard for me to judge how much Gb of data watching TV or Netflix generates" – 3
"I think WhatsApp uses a lot of data, it's a gut feeling" -7
While participant has great knowledge on the working of the internet they estimate their own consumption to be low yet also uses video conferencing the whole day long – 1

3. No limits (infrastructural)

"Fixed access internet is everywhere, you rarely use mobile internet" – 1+6
People lower their data plans because of WiFi being more common
"If you're always home you don't need a lot of mobile data" – 5
"My plan is unlimited so I don't think about it (data use) until I get a warning from the fair use policy" – 8

4. Separating virtual from real

Sci-fi movies create an image of the internet that influences people's perception – 11
"The internet feels like a different universe" – 11
"The internet seems to be wireless but in the end there is always a wire somewhere" – 8

5. The internet as a given

"You turn on/off the central heating yourself, other appliances you just plug them in and they are always on" – 2
"I don't know any better than that I have a router and it produces the WiFi signal" – 2
"Plug it out and plug it back in, that's usually how it (solving router problems) goes" – 1
"(The router and other peripherals) is something that's part of the house like the fridge, it's always on" – 6
"I was never told to worry about my internet usage" – 5
None of the participants is able to describe what exactly happens on the network past their router

6. Left over findings contextual level

"The whole automation of society produces more GHG- emissions than TATA steel and the production of fertilizer combined" – 3
"We shouldn't pollute the landscape with infrastructure" – 4
What is a SMART devices differs between participants

A3.7-3.15

7. Personalizing addiction
"Sometimes it (playing chess) doesn't go well and you know you should stop but you continue anyway" – 9
"Social media keeps you in a loop by suggesting interesting things" – 2
"Pop-ups are distracting and keep your mind focused on that one thing only (the news), it's addictive" – 2

8. What is reality?
"Profiling with AI works very well and this makes you vulnerable for being influenced" – 1
The blue checks (in Twitter) help to separate real from fake – 4

9. Everything, everywhere
The smartphone is used for an increasing amount of things
Smartphone is often used to look things up on the internet instead of on the pc
"Social media is quick consumption, it can always go in between activities" – 10
"In the morning you turn off the alarm on the phone and then you immediately check your email" – 6
"The ease of streaming is that it's always there, you can switch it on just like that" – 10 + 6

10. The illusion of choice
One browser is faster, the other one offers more privacy, some users choose to you specific software based on their needs – 1 + 5
"Services are moving to all-in-one solutions" – 3 + 4
Being more transparent about the energy costs of digital services could be an important factor when choosing services – 1
"When you decide to leave Facebook you isolate yourself" – 9
Participants often use many different services for the same purpose (i.e. storage)
"Facebook and WhatsApp are connected in a way" – 6 + 8

11. Sustainable by proxy
"There is not a lot of choice (when it comes to sustainability), you just by a service from Google and they take care of it" – 1
Participants expect that newer devices are also more sustainable but are not always certain
"The green argument can go a long way but in the end there just need to be more efficient devices" – 9

12. More devices for the same purpose
"Sometimes you need to upgrade to run the newest software" – 1
Participants often own multiple devices of the same kind, i.e. a work laptop and personal laptop
"You shouldn't buy a Ferrari to do the groceries in town" – 5

13. Low buy in/the hook
Accounts for services are often shared between users to cut costs – 11
"I pay for Videoland and Prime but I actually don't use them anymore" – 11

14. Left over findings product/service level
"Streaming has surpassed downloading, before I used to store things" – 5

15. Seeing what you want to see (confirmation bias)
"I'm being triggered to think about something that has been suggested to me" – 11
"Everybody gets different results when they search for the same thing" – 11
"A confirmation bias, getting more of the same, people like this confirmation they're getting" – 1
"Google always has very confirming search results" – 9
"People are digitally illiterate, they just accept the first information that's handed to them" – 1

A3.16-3.21

16. Wanting personal interactions

"It's a shame there is a lot of middlemen on the internet instead of direct connections" – 9
"Sending a photo is a lot more interactive than sending a message, there is more to talk about" – 2
"Sometimes I feel bad when I visit them (the kids) and they only look at their screens" – 6
"Calling is faster and more personal than sending a message" – 2
Quickly looking something up can stand in the way of having a good discussion about the topic
"I don't really post things myself, I'm mostly just scrolling" – 10

17. Confused by the amount of services

The great amount of services causes confusion amongst some participants
"It's frustrating that not all series and films are in one place" – 6

18. An obsession for being up to date

"I would say I'm a little addicted to news" – 8
"Being informed allows you to join in on the talk of the day" – 2
"When I see a notification in the corner of my eye I'm immediately distracted, I need to see what has been said" – 2
"You need to stay up to date with the news" – 7
"Constantly having the feeling that you have to be up to date can really distract from all other things that need to be done that day" – 2
Even when notifications are off participants keeps looking at phone for updates – 2

19. More information than we can handle

"Emails are forwarded to quickly, nobody actually thinks about where the message actually ends up" – 1
"It's not effective to keep sending emails in between other activities" – 9
"Sometimes I'm thinking, stop sending me those useless pictures" – 8
"Communicating through email becomes some sort of social media with all those short messages" – 1
Participant does not want to be bothered with Cookie notifications, it even leads to noticeable frustration – 3
"Sometimes everything that I receive drives me crazy, it's like a panic attack" – 2
"With all this space (cloud storage) I don't need to be selective anymore" – 9
"You are less serious and in the end you have to spend a lot of time selecting (when taking pictures)" – 3 + 5
"Reply to all makes your inbox fill up really quickly" – 1
"Once in a while the cloud is full and I have to pump everything onto a stick, then the process starts anew" – 6

20. Data impacts device performance

"When I notice that I'm using a low of internet it's because my battery is running out" – 7
"Less data on your device makes it less sluggish" – 5
Some apps are 'heavy' and become slow to use
"Programs that clean up folders are nice, everything is cleared quickly" – 5
"Less intensive use makes the battery last longer" – 6

21. Losing control over privacy

"It's a fact of life <…> the internet is a public space, people can see me there" – 1
"I have a China phone and a China tablet, then you know you're being monitored" – 1
"I think they know in Peking when I leave the house (when using Chinese Devices)" – 3
"Why does Facebook need so much information about me?" – 9
"Big tech knows more about us than we think, I'm sure of it" – 4
"When I use 3 browsers I am harder to track down" – 1
"I believe Firefox offers me more privacy" – 3
"We shouldn't be so gullible to think there's any privacy left" – 3

A3.22-3.27

22. Content as company

"Some data is used in the background and you don't notice it" – 4
For many participants music is like a background noise that is always on throughout the day
"Music is on the whole day, when TV is turned on the Sonos is turned off" – 6
"When I'm cooking there is always music playing on the TV via YouTube" – 7
"I tend to turn on series when I'm alone, when I have company I don't need it" – 11
"When you're not feeling well you can always just turn on some music" – 4

23. It's all about connecting people

"I think the main goal of the internet is connecting people" – 9
"In the end it all comes down to communication between people or systems" – 8
"Communicating with other people is actually valuable" – 9
If there is someone on the other side of the internet connection than that's a trigger to use a service
For many participants social media is a good way to keep in touch with faraway friends and family
"The internet can give small businesses an opportunity" – 9
"It's easier to keep in touch with people, even over a distance" – 4

24. Social media distracts from valuable things in life

"It's entertainment but the happiness is short-lived" – 10
Even when social media is ranked as important participant indicated that they could do without when asked about removing services – 4
"I feel guilty after watching a lot of movies on a day and not really doing anything productive" – 11
"I could've also been selling necklaces in Mexico instead of sitting in front of a screen" – 11
"Social media doesn't have a lot of content, it's a void" – 9
"I think social media fulfils a role in society that shouldn't be necessary if people would just talk more to each other" – 8
"I sinned today as well, this time it was a video of a dog" – 8
For many participants, less internetting means more time for things that they find more important
"Social media is entertainment, you could also go to a theater but there's a bigger threshold" – 2
"A lot content is being replayed so you've already seen it" – 8
"A big part of social media is just self-glorification, it doesn't amount to anything useful" – 9

25. Scrolling is an unconscious decision

"It can be nice to switch the your mind off, but not too often" – 10
"Sometimes I don't even take in what's happening, it's just mindless scrolling" – 2
"It's not something you plan, it's not like I actually think about scrolling social media for half an hour" – 10
Some participants indicate to use multiple devices at the same time, mostly watching tv combined with scrolling social media
"Sometimes you've been scrolling for an hour or so and you think, what have I been doing?" – 10

26. Memory is for memories

"Cloud storage is important because you store a lot memories there" – 6 + 9
As long as there is enough space cloud storage is an attractive option for storing important documents and memories for a long time

27. Seeking certainty

"A lot things end up on Facebook that shouldn't be there (fake news)" – 7
"Information gives you security and something to hold onto, you know what's ahead of you" – 2
"When my computer crashed I still have access to my files" – 3 + 5
"You need to look critically from what sources you get information and look at multiple sources" – 7
"Advancements like Deep fake can be very dangerous" – 4
The internet can also help to distinguish real from fake news
"Local storage is safer because it cannot be hacked" – 10

A3.28-3.35

28. Practicality rules
Features like voice commands can help people that are physically less able
"Practical uses of internet are more valuable than entertainment" – 6
"But I'm not being lazy!" – 6
"Maybe I could save some costs here and there but it's just not very practical" – 9
"More often than not files are good to keep stored for a while" – 4
When considering SMART home appliances, the practical advantages are most important
"The internet is also a means to an end" – 1
"I just click on it and it's in the cloud, done" – 5
"It's also laziness, otherwise I would have to wait until everything is started up again (when turning of pc)" – 7
For making pictures the internet offers a lot of new practical features that make life easier
"It takes a lot of effort to really unplug all devices to really power them off" – 3
"The internet can give quicker and often more complete advice than a clerk in the store" – 3

29. Lack of morals online
"There are parts of the internet (dark web) that you know nothing about, it's better to keep it that way I think" – 9
Some participants witnessed cyberbullying and hostility on the internet
"Bringing cultures together can also cause them to clash online" – 4

30. Worry free internetting
"I just want to be sure I have the fastest connection" – 5
"There just needs to be enough <…> otherwise I'll just get a bigger plan" – 3 + 9
"Those wellbeing apps are incredibly patronizing" – 3 + 6

31. Moderation for better health
"Quitting social media is like quitting smoking, it's very interwoven into your life" – 4
"For parents with kids it might be good to have more control (over data consumption)" – 3 + 4
"\Wellbeing apps at work are useful because a lot of them are overworked but I'm the only one using it" – 9
"I have to put Instagram on lock at certain times" – 11
"Because I have some health issues I am now actively using them (digital wellbeing apps)" – 4

32. Technology as a hobby
"Google home is a toy, just for fun" – 6
"It's also fun to occupy yourself with technology" – 5
"\When 4K becomes the standard then I want it too of course" – 10

33. Accepting the digital standard
Some participants seem to have accepted that everything is simply digital now and that this is the new society
"I know people who have a lot more (devices)" – 6
"I think everybody is already addicted to their smartphone anyway" – 11

34. Pressured into overconsumption
"Young people still want to earn their stripes so they continue to work late hours" – 6
"I have to work during the weekends because I was less productive or because I keep getting reminded in my free time" – 11
"It's hard to be disciplined (not working on in free time) when there is a pressure on you from your job to start covering ground" – 9

35. The internet broadens horizons
"Because of the internet you're less tied to a place" – 7
"The internet broadens your horizon" – 7
"Internet is freedom, you can go anywhere" – 5 + 10

A3.36-3.43

"You're more flexible because now you can work evenings and plan it yourself" – 4
"With on-demand you don't depend on your provider anymore, you can watch whatever you want" – 4
"Platforms like YouTube allow me to discover new talent (music)" – 4
The internet is never quiet, there's always something happening somewhere around the globe" – 10

36. Using without a purpose

For some participants boredom is a reason to (re)install social media apps
"Sometimes you watch because you're just bored" – 6
"I pay for Videoland and Prime but I don't actually use them" – 11
"Cloud storage is like water from the tap, it's always nice to have" – 9

37. Wanting distraction

Most participants end the day with playing games or watching movies/series
"Sometimes we keep the kid occupied by putting a tablet in front of them" – 6
"It can be nice to switch the your mind off, but not too often" – 10

38. Left over value level

"Whether I call via cellular or internet depends on who I'm calling, older generations I don't use internet" – 10
"It's a basic principle to concern yourself about your energy usage" – 3
"Sometimes you don't know something and you just quickly look it up" – 5
"The cloud is complicated, an external hard drive isn't" – 7
"Photography has been 'snaphotted', everything is faster and more landscapes" – 3
Playing games can also be a challenge and train your brain
"Calling cellular feels better; safer" – 4
"Regular calling is better than calling over the internet" – 2

39. Show the consequences/benefits

"V" – 2
"There are no real consequences linked to it (wellbeing app reminders)" – 2

40. Educate in a simple way

"It would be nice to have a list of all devices and their power rating" – 7
"Being more transparent about the energy costs could help me in making a decision between services" – 1
"We have a plug-in that calculates the costs before you run it (queries written by data analysts)" – 8
"It's nice to know what are the power hungry devices around the house" – 6

41. (physical) Prevention

"I put my phone in the room of my housemate so I will use it less" – 12
Two participants indicate that a physical distance between them and digital devices helps to reduce their usage – 2 + 12

42. Define a standard and compare

"I once ended up on the list with most expensive query of the month" – 8
Data limits on the mobile plan can be an indicator of what is considered a lot of data – 2
"Nice to see that we are below the national average (electricity use in the house)" – 6
"Every week I go down with a couple of tens of euros (using the Nuon energy meter)" – 5

43. Money as incentive

Some participants were triggered to think about their data consumption when choosing a new plan – 4 + 7
"A higher electricity bill makes me aware of my energy consumption" – 10

A3.44-3.47

44. Learning from others
"There are unspoken rules of what you run in the cloud and what is kept local <..> it was taught to me that way" – 8

45. Confront
"Prompts and limits help me to become more aware of the amount of screen time" – 12
"Being confronted with my consumption habits can be pretty shocking but the effect doesn't last" – 2

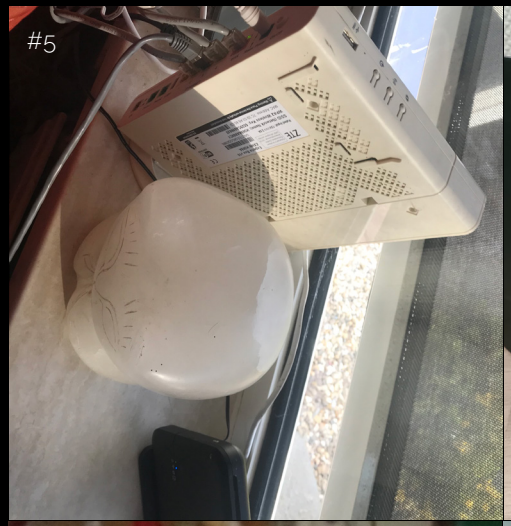
46. Substitute/distract
"Doing something else like walking can help me to disconnect form the continuous stream of information" – 1

47. Explicit action
"You turn on/off the central heating yourself, other appliances you just plug them in and they are always on" – 2

A3.48 RESULTS HOMEWORK EXERCISE

As they are not fundamental to the research, pictures of personal devices are left out of this appendix for privacy reasons. Important observations and quotes resulting from this exercise have been included in this appendix. Two participants did not submit the homework exercise.

#5

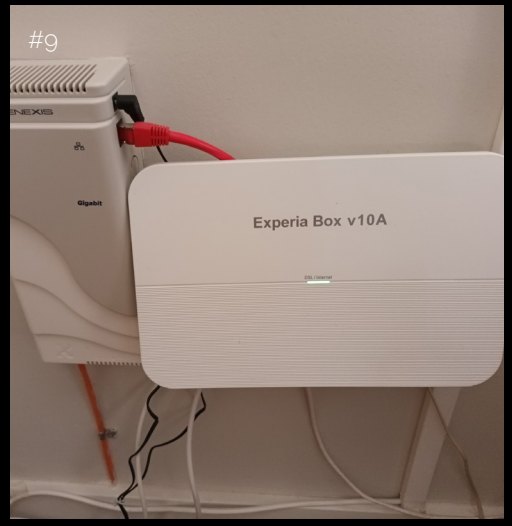


#6

#7

#8

#9



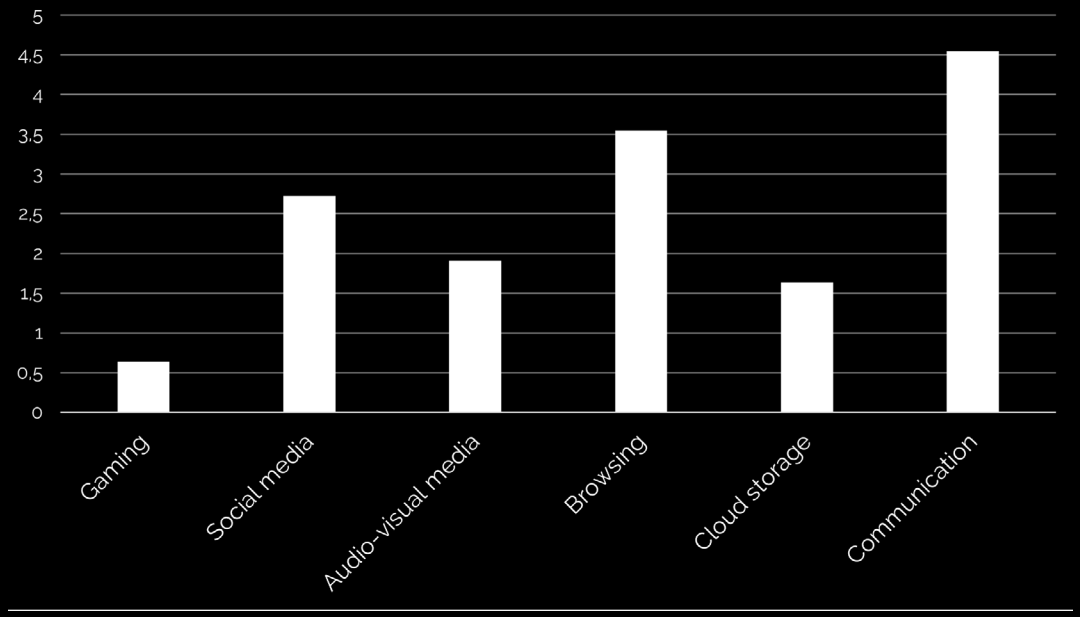
#10

#11

A3.49 RANKING OF THE DIGITAL SERVICES

The table and graph below show the scores of the ranking exercise that was performed with participants during the interview.

Participant	Service Gaming	Social media	Audio-visual media	Browsing	Cloud storage	Communication
1	0	4	1	2	3	5
2	0	2	3	4	1	5
3	0	1	2	5	4	3
4	0	4	2	1	3	5
5	0	4	2	5	1	3
6	0	4	1	3	2	5
7	2	1	4	3	0	5
8	1	3	2	4	0	5
9	3	2	0	4	1	5
10	1	4	2	3	0	5
12	0	1	2	5	3	4
	0,6363636	2,72727273	1,909090909	3,5454545	1,636363636	4,545454545



A4 FACTORS BY CLUSTER

Unregulated misbehaviour

- There are no social norms or rules on the internet resulting in misbehaviour of people (trolling/'toxic' behaviour)
- There is no 'normal' for internet use, so people cannot compare their behaviour to others
- Parents are concerned about the amount of screen time their children should have as they believe it is bad for their development
- To use the internet safely governments are promoting/ educating digital literacy
- With more fake information being spread it becomes hard to verify information as true or false
- Machine learning programs can discriminate if allowed to operate without intervention of humans
- Digital applications are updated very frequently as new features or security measures are released

Forming social communities

- We want to belong to social groups and be able to join in on 'the talk of the day' so we need to stay up to date
- Groups of people get together on the internet and establish digital "subcultures" with their own memes and customs
- Humans are social animals and care about belonging to a social group
- Through digital apps it's easier to get in touch with people you affiliate with no matter the distance or other boundaries
- By connecting many the internet allows people to create a following of people that admire or respect them
- The internet has connected us with people all over the world allowing for communities and families to stretch beyond borders
- People form attachments to personal data containing memories making it difficult to remove it

Seeking pleasure

- The relative anonymity of the internet allows people to seek out 'guilty pleasures'
- SMART systems give you more control to exercise your preferences/ values in your living situation
- Bombarding the brain with information can have numbing effect that is desirable
- Dopamine rush of digital service use does not lead to longer-lasting happiness and stands in the way of meaningful activities
- Many tech savvy people crave technological advancements, new gadgets and gimmicks
- Access to unlimited sources of information opens up your world to many new things

Speeding up our lives

- Time has become one of our most valued resources
- A period where no new content is generated results in loss of users/ viewers/subscribers
- High productivity results in an increasing desire to unwind and 'escape' from the real world
- The attention span of humans is decreasing due to the information age
- Data tracking in digital services and applications quantifies values in order for them to be optimised
- Phone purchases are declining as higher performance isn't always required anymore
- In the performance culture we always challenge ourselves and continue to work far beyond office hours as we can easily performs our tasks form home
- Computing efficiency doubles every 1.57 years "Koomey's law"
- With a lot of services competing for the user's (limited) attention they engage in a fierce competition
- Despite rises in productivity we still work more hours every year
- New fibre optic infrastructure allows for higher speeds and efficiency

Ever-present temptation

- 99% of young adults multitask while streaming and use multiple digital services at once
- Clickbait articles grab your interest by tricking you that there is more to them than there really is
- Rich media attract our attention because they appeal to multiple senses (sight, sounds)
- Continuous streams of information are addictive and it's hard to stop
- Instant gratification of quick accessible content gives people a dopamine rush that makes them happy for a short moment
- Digital applications are accessible from anywhere and on many devices
- Being bored and doing nothing is good for your mental health and development
- Autoplay features play content automatically even when the user isn't paying attention
- Humans are hard wired to learn seek out new information in order for them to adapt and survive

Pushing physical boundaries

- Digital services are often accesses whilst sitting/laying down which makes people less active
- "heavy" apps with lots of bloat decrease the device's performance
- There is a finite amount of energy available on earth that can be shared between people
- The ever increasing demand for content put creators under a lot of pressure to keep delivering
- There is a limit to the amount of information we can digest
- Data centres reduce carbon by buying green electricity and investing in restoring nature
- When we use resources more efficiently we also use them more extensively keeping it in balance (rebound effect)
- Lack of variation in the movements we perform due to using similar digital interfaces leads to a growing amount of complications

Digital decadence

- Integration of sensors and cameras in devices enables live footage and monitoring with a lot of data handling as a result
- Advertisements monetise digital content making it free to use, only paying with your attention
- We see digital content as a free resource and refuse to pay for it if possible (AdBlock)
- 45% of KPN customers does not know how fast their internet is as they simple want it to be fast enough
- Homes contain more electrical devices and more and more are also connected to the internet "IoT"
- Service plans often feature unlimited access for a fixed fee, increasing the incentive to use more
- Digital services are often offered for free or on monthly plans with a low entry fee making them affordable
- "heavy" apps with lots of bloat decrease the device's performance
- Like water, Internet is an essential resource and should not be limited
- Data saving features in apps do not apply when connected to WiFi (fixed network)
- Screen size and resolution increases rapidly enabling visual formats which consume more energy/data

Threats to the individual self

- AI personalization narrows down your suggestions to what you already like
- Personal information has become a valuable resource to big tech companies and criminals
- People have an in-born need to keep certain information private as it underlies autonomy and self-actualization
- There are no social norms or rules on the internet resulting in misbehaviour of people (trolling/'toxic' behaviour)
- Digitally illiterate people are vulnerable to online scammers
- Digital services lack qualities of real humans and can stand in the way of meaningful interactions

Illusion of choice

- 25% of the GDP in the Netherlands is reliant on ICT infrastructure
- Big tech companies create monopolies through unique user bases and features or buying out the competition
- Like water, Internet is an essential resource and should not be limited
- Services are made part of platforms owned by one DSP that offer all-in-one solutions
- AI personalization narrows down your suggestions to what you already like
- Access to unlimited sources of information opens up your world to many new things

Turning a blind eye

- We don't see the internet as something unsustainable
- There are no energy labels for IoT devices
- Computing/automation decreases the amount of effort required from the user and allows things to happen 'seamlessly', meaning work is done without being noticed
- Updating and other data handling happens in the background unbeknownst to the user
- As portrayed in movies, the internet is and seen as a virtual place, another universe somewhere other than on earth
- The ecological impact of ICT takes place far out of sight of the user
- Social media do not show the consequences of abusive behaviour
- Data centres (and their corresponding energy infrastructure) claim valuable space in natural landscapes

A.5 EVALUATION SETUP

This appendix contains the sequence/interview guides for the user evaluations

GUIDE INDIVIDUAL TEST

Introduction
Introducing

Project introduction
Explanation assignments

Do you know how much data you use?
What do you think of this?
Would you like to reduce it?

Website

Scroll through page

First comments?
Was the information clear?
Does this membership appeal to you?
    Why/why not?
Was this page informative did you gain new insights?
Has your image of internet consumption changed as a result?
    In what sense?
What do you think of these new insights?
Could this spur you into action?

App
Browse app screens + set target and boost

First comment?
Was this app informative did you gain new insights?
Has your image of internet consumption changed as a result?
    In what sense?
How user-friendly do you estimate the app?
    Why is that?
Is it clear what the purpose of the app is?
Can you relate to this?
Would you like to use this app?
    Which functions do/don't?
    Why/why not?

Router

Interaction with frame (login/logout + boost + roommate simulation)

First comment?
How do you like seeing how much the household uses?
Would you talk to the house about this?
Can you see yourself using this router on a daily basis?
What does this look like then?
What do you think of the new features?
Would you like to have the router at home?
    why/why not?

General
Would you like to reduce your internet use?
Does this concept help with that?
    Which parts do/don't?
Did you learn more about data use during this research?

GUIDE FOCUS GROUP

Introduction
Welcome

Explanation study
Icebreaker > word game association internet
Introducing

Discussion
What is data usage?
What is the Internet to me? > choose pictures with markers
How does the internet work?
What is data?
- How much data do I use?
- Is this good/bad?
- personal stories of a lot of data consumption

Consumption in environment

What kind of consumer am I?
Make a list of the app and indicate what is important/most important > post it
Discuss consumers
Where in contact with data?
Choose character

Introduction concept

view page + screens app + router

Educational?
Interesting?
User friendly?
Would you like it?
what is/isn't?
Action?
Simulation

watching TV + router animation

How did you find this?
What did the painting do?
What does the painting look like now?
How do you feel about that?
What does this mean?
Does this provide insight into your data usage?

General
Would you like to reduce your internet use?
Does this concept help with that?
Which parts do/don't?
Did you learn more about data use during this research?
Main takeaways > write down post its

A.6 USER EVALUATION RESULTS

The listings below contain all quotes and observation made during the interviews that are used in the report. These findings were obtained through notetaking at the time of the interviews by the researcher and by a deeper analysis of recordings of the tests. Findings were categorised by the design criteria. Observations are written as plain text and quotes are put between parentheses. All quotes have been translated from Dutch to English.

INSTALLING AWARENESS BY EDUCATING AND FRAMING

Concrete

"I saw a comparison of my impact with light bulbs, that triggers me more than different tarifs" - 9
"I do think it's nice to make it so insightful with visuals " - 6
"It gives a lot of insight and makes you aware of what you do on a daily basis " - 6
"If you make it concrete in other forms of usage than you compare it to something" - 9
"It's clear and to the point " - 2
"You can see the most energy is in the data centre and less in the network and on devices " - 9
"This makes you aware of the things that happen without you noticing " - 4
"Ah this is handy! Yeah really fun <when interacting with the tool> " - 2

Convincing

"With this information I can already start doing things at home to reduce " - 4
"Its a simple way to become more aware, and then you will also act differently " - 1
"This information would make me so much more aware, is this usage really neccessary " - 1
"When you see this you automatically act more aware, especially when it's about CO_2 " - 1
"At first I thought as fast as possible but when I read about these values then it makes sense " - 1

Confronting

"14 hours a day online!! That's nuts " - 1
"It's like a slap in the face, 22 years of your life online " - 3
"Seeing how long you use on a daily basis is the most shocking " - 3
"'ha 14 hours a day!' " - 4
"Really, 14h a day? I don't think I do that " - 5
"'mindblowing' that its so much " - 8
The tool on energy usages surprises the participants; 'thats a lot' - 7 + 9

Depth

"You hear about it sometimes but now you can view things on an individual level " - 1
"I knew about most things but the specific numbers are new " - 3
"I've done this in the past with Nuon, someone came to the house to see what devices were using a lot of electricity " - 4
"If I don't know why its there I wouldnt know what to change, a bit more information is needed <climate tab> " - 5
"Sustainability is something I already know about and I understand everything we do has a cost " - 4
"You have a feeling of how much you are online but when you see the numbers you think "oh oke" " - 2

New

"So stupid, I never realised this also has effect on the environment " - 5
"'eye opener', this is something I didn't realize <tool> " - 4
""Wow" I didn't know about this, the CO_2 impact " - 2
"I am member of green choice and vegatarian but I never thought of this " - 5
"This is also quite new right? <switching off devices> " - 5
"I did learn somethings, it was an eye opener " - 5
"It's more extreme than I expected " - 1

"Yeah I actually didn't know about this, it's new to me " - 2
"The cloud is hanging somewhere but now you see the real impact " - 2
"Ha, nice to see whats behind it all, you never realise this " - 1

Relevant

"ooh that IS interesting <climate usage tab> " - 5
"For me this is not very interesting <safety page> but I can see there is an audience for this " - 3
"The other 2 were still a bit abstract but with climate you know what it is and that you can reduce it " - 6
"I'm not a huge netflixer or anything but its still food for thought " - 2
"I think its the most interesting that you get insights into the roots of it all " - 5
"'Ooh' this one is really good <family tab> , you could split the costs based on usage " - 3
"Its interesting to see how far you go <map> " - 5
"If you hear this and know there also needs to be space for housing, then you start to wonder " - 2
"I'm not sure what to do with this <safety tab>, what can I really change about it? " - 1
"Yeah it's very relatable for me and something I worry about " - 3
"I don't think this would interest me <safety> " - 4
"Especially the first module I read was educational, and now is the time for this " - 1
"You know about this because of the situation in Zeewolde " - 2
"Given the current situation in the world this could really motivate me to change, this flows perfectly into that thought " - 1

COMMITTING TO PURPOSEFUL DECISIONS

Conscious decisions

"This would be a good option for my mother, she is addicted to netflix and this way you have more control " - 3
"It allows you to make a conscious decisions and that's not a barrier but something desirable " - 1
""Ooh" participant happy to see you can choose a time for your usage " - 1
"This would be really interesting, sometimes I just dont know why I spend so much time online " - 3
"This is the most interesting part <boost>, you can adapt to your situation " - 3

Making actions visible

"This is pretty useful, normally I wonder whether I turned something off or not <logging in/out> " - 2
"'Smart', this way you dont forget to turn it off <boost> " - 3
"Sometimes I might think hey if I do this, then the usage goes up and I might question whether it is neccessary " - 2
"You can see what uses what, its a real nice presentation of the info " - 1
"Would be nice to compare this too old subscriptions to see the effect of the new plan " - 1

Goal setting

"It's a bit like the fitbit, i'm personally not a big fan of that " - 2
"With fitness apps its oke but for internet.. I dont know, its a bit too much " - 2
"This is also nice <points at targets> " - 9

AFFORDING INCONVENIENCE

Balancing pains and gains

"I think I could get used to the boost but I dont want it to impact guests " - 5
"I think I would find that a bit annoying <boost>, a lot extra actions " - 5
"I might be a bit scared that it would cost me more time but I think you will have more gains from the social benefits " - 1
"its good to have unlimited but there needs to be a pricetag to the usage " - 4
"If I end up paying more its a simple consequence and it would drive me to use more consciously, like calling used to be " - 4
"I would not want to pay more when I use this like I use my current plan" - 7
"If I want to watch Netflix I will just do it, this won't change my mind <router> " - 2
"It could make people a bit too hesitant to use their devices, but sometimes you simply work from home <router> " - 3

Providing incentive

"Paying for what you use could really help me to reduce " - 3
"It was also visual in the app but there I have to click on it, now I would be confronted on a daily basis " - 1
"This looks pretty confronting, I push away the others and hoard all the data <router> " - 1
"Now I don't have a reason to put away my phone, but if it saves me money I would " - 3
"This should be the natural responde of anyone when you see this, too use less " - 1
"If you have to pay for it you suddenly start to think about it <usage> " - 3

It's also about money

"Of course this is also interesting; less = more " - 5
"The less=more is really appealing " - 4
"I want to say yes but no, there needs to be a reward also in monetary form " - 3
"Price benefits are a reason to click further and learn about the offer " - 4
"It would have to be a lower price than the other plans, maybe just at the start and then see " - 1
"If it's only 5 euros its not worth the effort, despite the other benefits " - 3
"If I were to do this than you want it to give you something in return, probably money" - 1
"Most people will be concerned about money and having enough data first and then other concerns second " - 2
"For the 7,50€, I would just go 'superfast' " - 1

MATERIALISE THE BENEFITS

Satisfying curiosity

"I like to reach goals, also with my fitbit, so I would love to set these goals " - 4
"My girlfriend would find this amazing, she is into the SMART home and has a TADO " - 3
"I would like to find out what I could win by pre-downloading things " - 5
"I would do it for the climate but also the insights it gives, to really get to the bottom of it " - 5

Competitive advantage

"I am with Ziggo now and they've never supplied me with information like this " - 5
"Nice to see the a company is working on this and showing that they care " - 3
"I would like to see this at my own provider " - 6
"Its nicely phrased; its beneficial for both parties and like a partnership " - 3
"If my current subscription with Ziggo was ending I would go for this " - 3
"I just switched to Ziggo and this wasn't there yet but it would have been a serious option " - 3
"Right now KPN doesnt have anything that Ziggo doesnt have, this would be different " - 1
"If KPN does this and provides these insights then its a reason to switch " - 5

Need for tailored offers

"If I spend only a few days at home, the costs should be halved or so " - 3
"Fast when its needed, that does sound good " - 1
"Internet usage is forced down your throat " - 9
"It feels like somebody is thinking along with me " - 3
"I get so much more than I need, fine if that's how you want to keep me as a customer but I could do with less " - 2
"I think there's demand for this, it allows me to take action myself " - 1
"I would definitely want to learn more about this, now I get a lot of things I don't need" - 2
"Where does all the data go that I don't use? There's room that's being paid for but not utilised " - 2

Social value

"I saw a comparison of my impact with light bulbs, that triggers me more than different tarifs " - 9
"Its shocking, I know about it from experience with people and loneliness " - 4
"I would like to be more aware, this is valuable to me " - 4
"If it benefits sustainability then I'm willing to change my behaviour " - 4
"It would probably make you more aware, that's a good thing in itself " - 1
"Main benefits are sustainability but also the loneliness that could be avoided " - 4
"I become more conscious about my safety since I was hacked myself, when it happens to you it suddenly matters " - 4
"Social media is bad for your self esteem so I use it less " - 5
"Ive become a member at the library so I watch less series at night " - 5
"If the data is kept in China then it's totally uncontrollable, I would remove it " - 9
"Being online gets in the way of productivity " -3
"It would help me to reduce stress levels " -3
"We have to look at what we use from a societal perspective and its honest from KPN to provide this information " - 4

ILLICIT A SOCIAL FRAME OF REFERENCE

Discriminating small households

"I live alone so this makes less sense for me " - 5
"If you live alone this information doesn't really add anything " - 2
"I understand that for a family i could be useful but I dont have kids i could address " - 4
"I live by myself so the family tab is not relevant to me " - 5
"I would like to see a plan where I wouldn't be discriminated because I live alone " - 5

Making it part of the upbringing

"You could use it once a week or so to talk about the usage within the family" -1
"When you have a family, this is part of raising your kids. " - 1
"In a family with kids this could be very clear and helpful " - 4
"for families with kids this could work really well " - 2
"It could help with parenting smaller kids, telling them when they can boost " - 6 + 9

Fun interactions together

"If I had someone else in the house we could look and compare that could be fun, entertainment " - 5
"I also think its fun to visualise it like this, and then set targets together " - 1
"I can really see the added value for a family, to see 'hey dad is home' " - 5

Social agreements

"If my son would agree to use it it would be helpful but i think not all teenagers would like that " - 6
"If everybody in the house agrees, it could be a good tool to monitor usage and reduce <router> " - 3
"This should work in a family setting but then everybody needs to be in on it and im not sure that will work for many families " - 9
"I'm not yet a person that would do something with this information, I'm becoming more aware but I need to see it first " - 2

Provoking discussion

"comparing usages could lead to discussion about costs in student houses " - 2
"I could use this to start the conversation with others, definitely " - 1
"This is something I would mention at the dining table " - 1
"Especially when living with roommates, you can say to someone 'hey I think you use a lot' " - 3
"I can see this <router> become a trigger to have a chat about it <data usage> " - 2
"Now I can say to her, hey blue what are you doing?! " - 9
"Well Noor obviously uses the most " - 7
"I would use it to provoke my girlfriend; 'hey honey, you are using a lot today' " - 3
"By making it visible you could have a talk about it " - 9

MAKING IT STANDARD

Avoiding intrusion

"The pop up is very useful and can serve as a reminder to boost " - 2
"If it's in the phone interface than it's not a barrier, only two clicks right? " - 1
"'Oh nice' Yeah this is really handy <pop-up> " - 3
"I don't think setting a boost would become annoying, I'm not sure wether I would use it at all " - 4

Practicality

"As long as it's not too technical than I think its nice <..> I dont want to wire it " - 4
"It is neccessary to provide updates on costs but then the aspect to save becomes really interesting " - 5
"Maybe activate a boost with something more simple such as the TV remote " - 5
"If my parents come to visit then they would have to download the app as well to boost " - 5

Short vs long term

"Its like the app for my solar panels, I used it in the beginning but then you know what the benefits are and it simply works " - 4
"I would use it for a month or two, its informative but not any longer " - 2
"Setting targets is less interesting, maybe I would do it sometimes " - 5
"Its good to have a moment in the week to evaluate " -1
"I'm not thinking about how much I'm using every day, that's too much effort " - 4

Less in your face

"It would have to be smaller for me to put it somewhere in the house " - 1
"But who would put this in their living room? it's distracting " - 9
"I dont want to look at that the whole day " - 4
"If it were smaller than this would be really nice to give more insight " - 1
"I would go crazy, its too much <router> " - 5
"If I put it in the hallway I could look at it sometimes and that's fine " - 5
"With the normal router I go crazy because of all the blinking lights so I hide it " - 5
"Im not sure whether I would hang this and look at it regularly - 2
"I want to hang in my house what I want, not what I am forced to "- 4
"Seeing the usage is nice but I dont want to see it all the time " - 5
"In a different format it could definitely add value " - 6 + 7 + 9
"I would go crazy, I would put it somewhere I wouldn't see it every time " - 4
"'Och' <reaction to hearing the router comes into living areas> " - 4

A.7 PROJECT BRIEF

Personal Project Brief - IDE Master Graduation

TU Delft

Increasing data sustainability: a behavioral approach — 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 08 - 02 - 2022 — 04 - 07 - 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, ...).

The way we interact with data-enabled devices in day to day practices is changing rapidly as many new technologies are emerging. When designed correctly these new information technologies can contribute to better fulfilling consumer needs and solving complicated challenges, also on a societal scale. The recent COVID-pandamic has sped up these developments even further and showed us how services like Zoom can reduce morning traffic by enabling us to work from home. Cases like these and many others envision how the digitalization of our society can have major benefits in terms of mitigating CO_2 emissions in various sectors and can contribute to realizing global sustainability goals (Corbett, 2018). However, this remedy also comes with a risk as data-driven products themselves require energy and infrastructure in great quantities. When used abundantly and recklessly, the potential of IT to reduce climate impact will then (partly) be nullified through irresponsible use of the very same technologies. During the same period where zoom allowed us to drive less, the massive increase in use of digital services from home compelled the European commission to intervene. Streaming services were requested to lower their base quality so that internet service providers (ISP's) would not get overrun (Gonny van der Zwaag, iCulture, 2020). Along with that, the dutch government is now actively overseeing the construction of data centers in the country so that they will not clutter the electricity grid. To better manage our demand for data and ensure IT has a positive impact on the climate, we need to shine more light on the material aspects of the internet.

What makes this difficult is that these material costs are spread out across the various stakeholders acting in this domain. As users, we only see the impact of powering our own devices but this is just one part of the equation. Much more intangible are the computing, storing and transfer of data behind the scenes. Efforts in reducing the ecological footprint of the IT sector have been made mainly by operators of data centers and ISP's such as KPN, a major internet provider in the Netherlands. They focus on increasing the efficiency of their hardware which is in line with the dominant 'cornucopian' mindset where technological advancements will always meet society's demand for resources. Despite their good intentions however, research suggests that efficiency gains alone will not be enough to reduce IT related emissions as they are outweighed by increases in demand (Andrae & Edler, 2015 & Schneider electric, 2021). So far, the end users themselves take much less responsibility for their "digital footprint", partly due to the lack of awareness and transparency in the complex and invisible world of 'clouds and data'. To have an even bigger impact, KPN could investigate together with their users how their interaction with digital products and services could lead to positive climate impact. This project aims to map user behaviors and the underlying values to develop handles and guidelines for a more sustainable way of interacting with data-enabled products and services.

- Andrae, A., & Edler, T. (2015). On Global Electricity Usage of Communication Technology: Trends to 2030. Challenges, 6(1), 117–157. https://doi.org/10.3390/challe6010117
- Corbett, C. J. (2018). How Sustainable Is Big Data? Production and Operations Management, 27(9), 1685–1695. https://doi.org/10.1111/poms.12837
- Gonny van der Zwaag, iCulture.nl. (2020, 15 mei). Netflix gaat weer normale streamingkwaliteit aanbieden in Europa. iCulture. Geraadpleegd op 3 februari 2022, van https://www.iculture.nl/nieuws/netflix-normale-streamingkwaliteit-europa/
- Schneider electric. (2021, oktober). Digital economy and climate impact. Schneider Electric Sustainability Research Institute. https://www.se.com/ww/en/insights/tl/schneider-electric-sustainability-research-institute/digital-economy-and-climate-impact-2

space available for images / figures on next page

Initials & Name MAK Bodelier Student number 4458044

Title of Project Increasing data sustainability: a behavioral approach

introduction (continued): space for images

image / figure 1: Invisibility of the material aspects of the internet

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.

In order to move towards a more 'green' relationship with data-enabled products and services we must first create a comprehensive understanding of how sustainable current interactions with these designs are. As these are influenced through a system of stakeholders, products and services they should all be integrated in the research to come to a holistic understanding. Within this project I aim to focus on the contextual research of user interactions with digital products and services. The way we use information technologies such as email and streaming services into our daily lives holds valuable implications for their sustainability. This type of empirical information on user behavior is often missing from existing studies on the topic and is considered as a necessary next step in making a change. Combined with existing knowledge on the environmental impact of data usage this analysis can be a starting point for new interventions and guidelines. Following from this a design direction can be formulated that aims to leverage drivers and values that underlie the current behavior of consumers. This will inform the design process of interventions that encourage more sustainable behavior in an appropriate way.

As the project aims to highlight the perspective of the individual user and their behavior, it will zoom in on the more personal consumption of IT services such as digital entertainment. Currently, this forms a large share of overall data usage both globally as well as amongst private consumers that make use of KPN's network. Therefore the context in which this research and design will take place is further specified as: "the personal consumption of digital information and communication (media) products and services by KPN consumers on in-home and mobile networks". Digital products and services can be digital media such as streaming or gaming services and information/ communication services like search engines and email. To make the outcomes more relevant for the future, new technologies that are expected to be implemented in this domain in the upcoming years, such as the rise of IoT and AI systems, will also be incorporated on a more theoretical level.

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 design and research activities performed within this project aim to identify possibilities for interventions that encourage sustainable interactions with IT products and services. Within the project I will analyze how user behavior influences environmental factors and explore ways to create a desirable change.

The assignment will have two main deliverables:

An overview of insights on underlying values and factors that influence current behavior around the personal consumption of data. This overview will contain opportunities for KPN to target user groups with marketing/awareness campaigns and develop new products and services. At the same time, the knowledge gathered could flow into existing frameworks for designing with data.
A final concept coming forth from this overview through the exploration of one of the emerging design directions. The designed product/service or combination thereof will aim to facilitate more sustainable behavior in KPN's users by 'visualizing' their consumption in a way that gives them the handles and knowledge to do so.

Possible outcomes (for illustration purposes only)
New router designs with accompanying apps that guide users to adopt new habits
An overview that contains the climate impact of data usage and gives feedback on changes in behavior
An energy label for digital media helping customers to make a sustainable choice
New subscription types that reward responsible usage of data
Strategies involving combinations of the aforementioned interventions

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 8 - 2 - 2022 4 - 7 - 2022 end date

The first part of the project will focus on performing research activities and answer the question "how does the personal consumption of data influence environmental factors". As the exact behavior of people in their homes might be difficult to observe in 'real-time' and hard to pinpoint in an interview, I also plan to observe my own behavior very closely in an autoethnographic study. At the end of this phase, the first deliverable will be created.

The second phase mainly contains design iterations aimed at exploring the way we interact with data-enabled designs in the light of sustainability. In this overview the process is displayed as a linear process, but in practice some activities from the "explore" and "define" phase might be revisited depending on the outcomes.

Project management activities such as report writing and meetings are spread out across the entire project with more work-intensive periods leading up to the deliverables. There are two weeks in the planning where I will only work for half a week (18 and 21) due to holidays and therefore the planning contains one additional week (26). All the other weeks I intend to work full time on the thesis.

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 comes forth from a personal ambition to make a change in the way we interact with technology and how it facilitates consumerism. I hope to contribute to a movement where technological advancements enable more sustainable value-centered ways of living, in contrast to the focus on efficiency and economies of scale.
Aside from my desire to tackle a subject that lies close to my heart, I also want to demonstrate the human-centered approaches to design that I focused on within my master track and internship. Within these activities I wish to showcase my ability to deal with various types of information in a critical way so that they may provide novel perspectives. Next to that I want to keep working on my ability to communicate by providing more visual deliverables and train my illustration skills. A last learning goal concerns the methodologies to be used in the project. By using methods such as the ViP approach and elements of speculative design, I want to gain more experience with working with these visionary approaches.

FINAL COMMENTS

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